

TROPIMED

Annual Review
2006

คณะเวชศาสตร์เขตร้อน

**Faculty of Tropical Medicine
Mahidol University**

Asia's leader in Tropical Medicine



from the past to the present and into the future

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**Faculty of Tropical Medicine Mahidol University,
Annual Review 2006**

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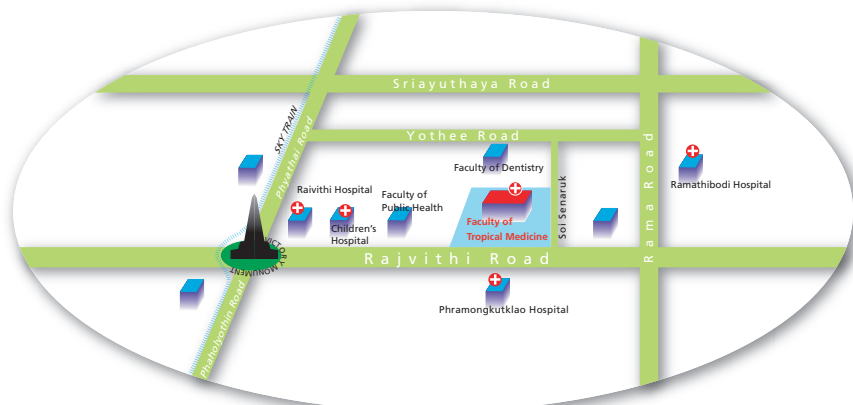
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Foreword from the Dean

To commemorate His Majesty King Bhumibol Adulyadej's 60th year of Accession to the Throne, the Faculty of Tropical Medicine is joining with Mahidol University and other government official sectors in dedicating their utmost efforts to improving the quality of life of the people, particularly those in tropical and developing countries. The Faculty of Tropical Medicine conducts three main activities: basic and clinical research in tropical medicine; provision of medical services; and postgraduate training through six international courses. The Faculty employs 98 academic staff, comprising 65 PhD and 33 Master degree graduates. The Faculty is currently affiliated with more than 20 leading institutes domestically and with more than 30 international academic institutes. The Faculty also conducts and supervises collaborative research on tropical diseases within the wider SE, South Asian regions, and world wide. I myself, as Dean, and my colleagues, aim further to strengthen the Faculty as "Asia's Leader in Tropical Medicine" through research, education, and services.



I wish to convey my sincere appreciation to all members of the Faculty, to our supporters and collaborators for their excellent work throughout the year 2005. I trust that the Faculty of Tropical Medicine Annual Review 2006 provides a comprehensive summary of the Faculty's activities in 2005, and that any reader delving into it will find something of value and interest.

A handwritten signature in black ink, reading "P. Singhasivanon". The signature is fluid and cursive, with a long horizontal stroke at the end.

Pratap Singhasivanon
Dean

Editor's Note

In the Year 2005 and the beginning of 2006, there was a lot of activity in the Faculty of Tropical Medicine. Particular, the 46th Anniversary of the founding of the Faculty was symbolized by "Homecoming Day" for retired FTM members. It was the first time all five deans of the Faculty met on one day.

FTM staff no doubt realize how busy we were, and that delayed publication of this issue of the Annual Review. On behalf of the team, I wish to apologize for the delay. We will definitely try for a better and faster job next year.

The achievements in 2005 increased compared with the beginning of the transition period for the Dean, in 2004. From 2005, FTM granted 12 small research projects to young scientists, expecting that the published scientific papers of the Faculty in the 2007 Review will increase quantitatively and qualitatively. This was also true for our training courses, with the number of tailored short courses higher than 2004. We hope that you find these facts pleasing, and enjoy reading this Review.



A handwritten signature in black ink that reads "Jitra Waikagul".

Assoc. Prof. Jitra Waikagul

Editor

Executive Summary

Research

Current research of the Faculty of Tropical Medicine ranges from molecular research to community studies, covering more than 20 diseases including malaria, melioidosis, soil-transmitted diseases, and mosquito-borne diseases. The current research programs include clinical trials, laboratory research, field and epidemiological studies, vaccine trials, assessment of future drugs for avian influenza, and assessment of the health effects of unpredicted natural hazards and disasters. The Faculty is a pioneer research hub in conducting HIV/AIDS and dengue vaccine trials, assessment of the efficacy of antiretroviral therapies, assessments of treatments for opportunistic infections, epidemiological surveys, and analyzing social risk factors. The Faculty is well placed to conduct high quality research, having a well-established Ethics Committee, Bioequivalence Unit, an extensive Data Management Unit, a board of research consultants, and the Research and Academic Affairs Unit. We encourage collaborative studies through both local and international linkages. The Faculty is currently affiliated with more than twenty leading research institutes from all continents of the globe. As part of our research activities, we provide international postgraduate education and training in tropical medicine for scientists, physicians and others from all nations.

In 2005, the Faculty published 129 international scientific papers, and 12 national or local scientific papers. There were 106 research projects, of which 49 were new, and 57 ongoing.

Seventy-four papers were presented at international conferences and 11 at national conferences. The Faculty remains the leader in Asia in publishing research studies on malaria and other tropical diseases. We will continue to encourage, support, and facilitate research in tropical disease and other related global health problems. The research activities of the Faculty will continue to strive to improve the education and health of the peoples in the region.

Education

The Bangkok School of Tropical Medicine offers six regular international postgraduate programs—the Diploma in Tropical Medicine and Hygiene, Master of Clinical Tropical Medicine, Master of Clinical Tropical Pediatrics, Master of Science in Tropical Medicine, Doctor of Philosophy in Tropical Medicine, and Doctor of Philosophy in Clinical Tropical Medicine. In the year 2005, we enrolled 29 new DTM&H students from 12 countries, 15 MSc students from 5 countries, and 11 PhD students from 2 countries. In total, 245 students were enrolled in the six programs (DTM&H: 29; MCTM: 7; MSc: 82; and PhD: 127) while 55 students graduated. To date, participants from more than 50 different countries have attended the Faculty's international programs.

Joint International Tropical Medicine Meeting 2005

In 2005, the annual Joint International Tropical Medicine Meeting (JITMM 2005) was co-organized with the Parasitology and Tropical Medicine Association of Thailand, TROPMED Alumni Association, and SEAMEO TROPMED Network. The Meeting was held from 30 November to 2 December 2005, at the Grand Hotel, Bangkok, and attracted 586 delegates from 23 countries, with 106 oral and 96 poster presentations. Prof. Emeritus Mukda Trishnananda, President of the Thai Society of Travel Medicine, presented the 11th Chamlong-Tranakchit Harinasuta Lecture, entitled "Travel Medicine and Health".

Collaborations

The Faculty has ongoing collaborative relationships in research and training with over 30 institutions internationally. Ten new Memoranda of Understanding were signed with international institutions, and eight with national institutions.

Finance

Total expenses amounted to 345.058 million Baht, of which 241.16 million Baht were supported by government budget, and 103.89 million Baht derived from Faculty revenues.

Personnel

In the year 2005, there were 771 staff in the Faculty, comprising 98 academic staff, 187 support staff, and 484 administrative staff. 67 staff (66%) had PhDs, while 31 (34%) had Master Degrees or comparable qualifications. Twenty-four staff were promoted to higher positions. The ratio of Professor : Assoc. Prof. : Assist. Prof. : Lecturer = 4 : 31 : 30 : 33, respectively. Twelve staff retired, and 4 took early retirement during the year.

The best-performing staff awards of the year 2005 were given to Mrs. Pornpimon Adams, Information Scientist Level 7; Mrs. Sureeporn Ratrungruengyos, Assistant Nurse Level 5; and Mrs. Pissamai Inkong, Janitor.

Staff development

Three staff have been continuing their education within Thailand, and 5 overseas. Seven staff were trained within Thailand and 6 overseas. Fifty-eight staff participated in international conferences and 364 in national conferences.

Construction and area development

Recent developments have included the construction of a new building on the main Phayathai campus, which includes the Executive and Administrative Office, Conference Room, Data Management Unit, and a Tropical Disease Reference Center and Museum. The building will be finished at the end of 2006.

Administrative Board



Assoc. Prof. Pratap Singhasivanon
Dean



Assoc. Prof. Jitra Waikagul
Deputy Dean for Academic Affairs
and Special Projects



Prof. Sasithon Pukrittayakamee
Deputy Dean for Research



Assist. Prof. Usanee Suthisarnsunton
Deputy Dean for Educational Affairs



Assoc. Prof. Wattana Leowattana
Deputy Dean for Service and Hospital Director





Assist.Prof. Kasinee Buchachart
Deputy Dean for Administration and Finance



Assist.Prof. Varaporn Suphadtanaphongs
Deputy Dean for Policy and Human Resources



Assist.Prof. Phanorsri Attanath
Deputy Dean for International Relations



Assist.Prof. Chotechuang Panasoponkul
Deputy Dean for Student Affairs
and Special Activities



Mr. Chanathep Pojjaroen-anant
Deputy Dean for Environment and Land Resource



Assoc.Prof. Porntip Petmitr
Assistant Dean for Research

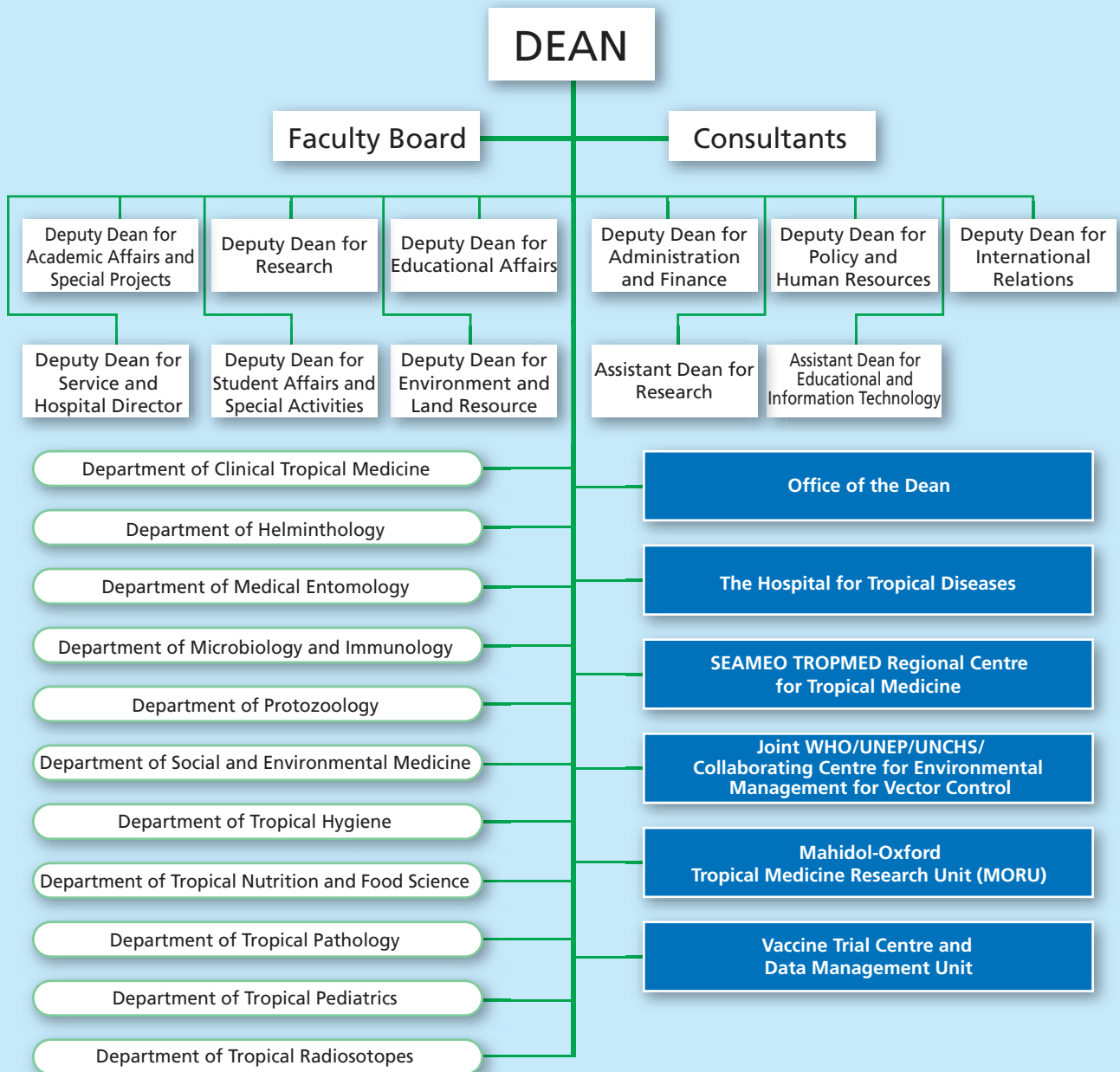


Dr. Wichai Ekataksin
Assistant Dean for Educational
and Information Technology



Mrs. Vorapan Singhsilarak
Secretary of the Faculty

Organization Chart



Special Events



Joint International Tropical Medicine Meeting 2005, 30 November - 2 December 2005, The Grand Hotel, Bangkok.



Opening Ceremony and Orientation of the Collaborative Project to Produce Rural Doctors, Faculty of Tropical Medicine, Mahidol University, 19 December 2005



Opening Ceremony of the International Training Course on Management of Malaria, Faculty of Tropical Medicine, Mahidol University, 26 September 2005.

Special Events



■ Opening Ceremony D.T.M.&H., M.C.T.M. and M.C.T.P. Course for the Academic Year 2005
7 April 2005, Faculty of Tropical Medicine, Mahidol University.



■ Opening Ceremony for M.Sc.(Trop.Med.), Ph.D.(Trop.Med.) and Ph.D.(Clin.Trop.Med.) Course for the Academic Year 2005
6 June 2005, Faculty of Tropical Medicine, Mahidol University.



■ Special Lecture on "Good Clinical Practice" By Prof. Juntra Karbwang, Clinical Coordinator, WHO/TDR, 23 September 2005, Faculty of Tropical Medicine, Mahidol University



■ Certificate Award Ceremony for Nurse Assistant Course 2005

Special Events



■ Closing Ceremony of International Training Course in Partnership Building for Healthy Borders, 26 August 2005



■ Welcome Ceremony for H.E. Prof. Dr. Nguyen Minh Hien, Minister of Education and Training of Vietnam and President of SEAMEO Council 2005, to SEAMEO/Faculty of Tropical Medicine, 20 August 2005.



■ Short Training Course on Laboratory Diagnosis of Malaria, 22-23 August 2005



■ Signing Ceremony of Academic Exchange Agreement between Faculty of Tropical Medicine, Mahidol University and University of Shizuoka of Pharmaceutical Sciences, 8 August 2005.



■ Vietnam-The Netherlands Project Community-Oriented Medical Education, 11-17 December 2005, Bangkok and Khon Kaen, Thailand.

Consultants

1. Prof. Emeritus Chamlong Harinasuta
2. Prof. Emeritus Danai Bunnag
3. Prof. Emeritus Arunee Sabchareon
4. Prof. Emeritus Chaisin Viravan
5. Prof. Emeritus Prayong Radomyos
6. Assoc. Prof. Mario Riganti
7. Prof. Emeritus Mukda Trishnananda
8. Prof. Emeritus Sommai Wilairatana
9. Prof. Emeritus Sirivan Vanijjanonta
10. Lieut. Col. Dr. George Watt
11. Assoc. Prof. Supranee Changbumrung
12. Dr. Lalive Jitkarun
13. Dr. Manoch Uvutipong
14. Dr. Sunee Norasetthada
15. Dr. Somrueng Kanjanamatakul
16. Dr. Sakchai Atthavibul
17. Dr. Pipat Jiranairadul
18. Dr. Peerasak Pholpruksa
19. Dr. Suvich Thampapalo
20. Dr. Tienchai Kijjanayothin
21. Dr. Nithipat Siripan
22. Dr. Preecha Pinyopornpanich
23. Dr. Arun Sattayapaisal
24. Dr. Sorakij Bhakeecheep
25. Dr. Pisit Kiranantawat
26. Dr. Nattakorn Baisang

Visiting Professors 2005

- Prof. Dr. Ma Sandra Bernado Tempongko
Dr. Peter Echeverria
Prof. David J.P. Ferguson
Dr. Gareth D.H. Turner
Assoc. Prof. Chris Beyrer
Prof. Dr. Kenrad E. Nelson
Dr. Nicholas John Day
- Prof. Gary M. Brittenham
Dr. E.B. Doberstyn
Dr. Stephen Wheeler King
Mr. T. Kawai
Prof. Tsutomu Takeuchi

Faculty Board

1. Dean Chair
2. 11 Deputy Deans Members
3. 11 Heads of Department Members
4. 4 Lecturer Representatives Members (4-year term)
5. 1 Deputy Dean Member and Secretary

Faculty Senate

1. Assist. Prof. Achara Asavanich Chair
2. Assoc. Prof. Porntip Petmitr Vice-Chair
3. Assoc. Prof. Punnee Pitisuttithum Lecturer Representative
4. Assist. Prof. Pongrama Ramasoota Lecturer Representative
5. Assoc. Prof. Narumon Komalamisra Representative, Department of Medical Entomology
6. Assist. Prof. Watcharee Chokejindachai Representative, Department of Tropical Pediatrics
7. Assist. Prof. Varee Wongchotigul Representative, Department of Microbiology and Immunology
8. Mr. Teera Kusolsuk Representative, Department of Helminthology
9. Miss Rachatawan Chiabchalard Representative, Department of Protozoology
10. Assist. Prof. Talabporn Harnroongroj Representative, Department of Tropical Nutrition and Food Science
11. Dr. Duangkamol Viroonudomphol Representative, Department of Tropical Radioisotopes
12. Assist. Prof. Wanchai Phatihatakorn Representative, Department of Social and Environmental Medicine
13. Assist. Prof. Apichart Nontprasert Representative, Department of Clinical Tropical Medicine
14. Miss Pannamas Maneekan Representative, Department of Tropical Hygiene/Secretary
15. Assist. Prof. Urai Chairsi Representative, Department of Tropical Pathology/Assistant Secretary



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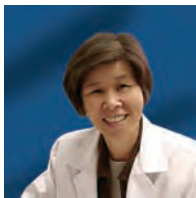


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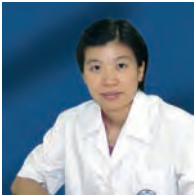
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Ms. Sasikarn Phokham
(Researcher Associate)



Ms. Sirikorn Phokham
(Scientist)

Ms. Sujittra Inunchot
(Scientist)



Mr. Trithar Pholcharoen
(Senior Medical Technologist)

Mrs. Sompong Mingmongkol
(Medical Technologist)



Mr. Surong Prasartpan
(Medical Science Associate)

Ms. Jantima Laegthaisong
(Scientist Assistant)



Mr. Kongpop Pupae
(Scientist Assistant)

Ms. Jariya Maharatchamongkol
(Researcher Associate)



Mrs. Chuanpit Preechawuthiwong
B.A. (Political Science)
Tel: 0 2354 9168, ext. 1429
General Affairs Officers

CURRENT RESEARCH ACTIVITIES

The Department has published more than 300 papers and has continued to pursue its mission in three major activities, teaching, research services and social welfare. The Department embarked upon clinical research on several major tropical infectious diseases.

Malaria research activities have focused on clinical trials, pathophysiology, clinical pharmacology and clinically related laboratory studies. Staff of the Department studied about 2,500 admitted cases of this disease. Most of the cases were falciparum malaria and vivax malaria and a few cases of mixed infections malariae malaria and ovale malaria. The major focus is on clinical trials of multidrug-resistant falciparum malaria in uncomplicated and complicated cases. Combinations of various antimalarial drugs were carried out continuously; halofantrine, mefloquine, quinidine, amodiaquine, artemether and artesunate in combination with mefloquine. We found that sequential treatment with artesunate or artemether followed by mefloquine is effective, well-tolerated and suitable as an alternative treatment for multidrug-resistant malaria.

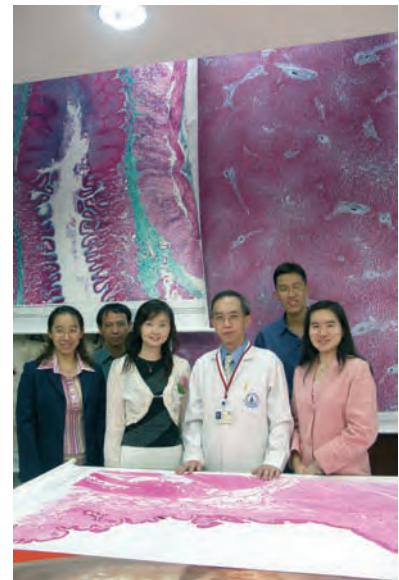
Besides extensive clinical studies, we also carried out interdepartmental and institutional collaborative studies of antigens in cerebral and non-cerebral malaria patients, of lymphocyte subpopulations during the acute and convalescence phases of malaria, and qualitative and quantitative polymerase chain reaction to predict *Plasmodium falciparum* treatment failure. Pathophysiologic alterations in malaria have been widely investigated. Interesting results were dynamic alteration in splenic function during acute falciparum malaria, in erythrocyte survival following clearance of malaria parasites, defective production of and response to IL-2 in acute falciparum malaria, cytoadherence and ultrastructure of *Plasmodium falciparum*-infected erythrocytes from splenectomized patients, and hepatic blood flow and metabolism in severe falciparum malaria.

Studies of the stage specificity of quinine, chloroquine, mefloquine, artesunate, artemether and halofantrine were carried out in vivax malaria. The antimalarial efficacy of tetracycline, doxycycline, rifampicin and azithromycin was also studied.

Parasitic infestations have been studied, such as drug trials and investigations for gnathostomiasis and local drugs application parenterally for strongyloidiasis, opisthorchiasis, paragonimiasis and teniasis.

Research series are continuing, involving new applications of antifungal drugs for AIDS with fungal disease. Traditional medicines for the treatment of HIV/AIDS are also being studied.

Research into skin diseases in HIV patients has been conducted in many aspects, the epidemiology of cutaneous manifestations in HIV patients in Thailand, fungal infection in leukoplakia patients, superficial fungal infections in normal and HIV patients, such as PPE, Dermatophytes, leucoplakia and PCP.





The titles of current departmental research activities are as follows :

1. A worldwide, Phase I dose-escalating study of the safety tolerability and immunogenicity of a three-dose regimen of the MRKAd5 HIV-1 gag vaccine in healthy adults
2. Immunogenicity and safety of quadrivalent HPV (Type 6,11,16,18) L1 Virus-Like Particle (VLP) Vaccine in 16-to 23 Year-Old Women With an Immunogenicity Bridge Between the HPV 16 Component of the Quadrivalent Vaccine and the Monovalent HPV 16 Vaccine Pilot Manufacturing Material And A Study to Evaluate the Efficacy of Quadrivalent HPV V (Types 6,11,16, and 18) L1 Virus-Like Particle (VLP) Vaccine in Reducing the Incidence of HPV 6-11-and 18-Related CIN, and HPV16 and 18 Related external Genital Warts, VIN and VaIN, and HPV 16 and 18-Related Vulvar and Vaginal Cancer in 16-to 23 Year-Old Women----The F.U.T.U.R.E. Study
3. Safety and Immunogenicity Studies of WRSd1, a Live Attenuated Shigella dysenteriae type 1 Vaccine Candidate in Thai Adults
4. Safety, Immunogenicity, and Efficacy of Quadrivalent HPV (Types 6, 11, 16, 18) L1 Virus-Like Particle (VLP) vaccine in Mid-Adult Women---The FUTURE III (Females United to Unilaterally Reduce Endo/Ecto Cervical Cancer) Study
5. A Phase III Trial of Aventis Pasteur Live Recombinant ALVAC-HIV (vCP1521) Priming With VaxGen gp120 B/E (AIDSVAX® B/E) Boosting in HIV – uninfected Thai Adults.
6. A multicenter, randomized, double-blind, phase II study to evaluate the safety, tolerance and efficacy of multiple doses of SCH 56592 versus fluconazole in the treatment of oropharyngeal candidiasis (OPC) in HIV-positive patients.
7. Open-label, treatment protocol for the safety and efficacy of SCH 56592 (oral suspension) in the treatment of invasive fungal infections.
8. Efficacy and tolerability of ivermectin for gnathostomiasis.
9. Effect of drug accumulation in the neurotoxicity of artemether, dosing regimens with variable drug-free intervals in a mouse model.
10. Safety and therapeutic effects of Jin Huang Chinese medicine in uncomplicated HIV-1 patients.
11. Observational probe study of in vitro immune response parameters to candidate HIV-1 vaccine antigens among subjects from Thailand.
12. Neuropathological toxicity of artemisinin derivatives in a mouse model.
13. Development of field methods and investigators of the molecular basis of sulfonamide resistance in *Plasmodium vivax*
14. Novel point mutations in the dihydrofolate reductase gene of *Plasmodium vivax*: evidence for sequential selection by drug pressure
15. Asexual and sexual stage antimalarial activities of artesunate and primaquine in falciparum malaria
16. Research and development for Thai people living at Thai-Myanmar border to free from tropical diseases.
17. Research and development on drugs and diagnostic tools for diagnosis and treatment of tropical diseases in Thailand.
18. Liver megaproject Phase 1: from basic research to education science and applied technology in clinical study.

AWARDS



National Awards

1. Dr. Wirongrong Chierakul "Young Investigator Award" (First Prize): In recognition of the outstanding research publication of the Annual Scientific Meeting of the Infectious Disease Association of Thailand 2005

2. Dr. Wirongrong Chierakul Research Award: In recognition of the outstanding research paper of the Annual Scientific Meeting of the Infectious Disease Association of Thailand 2005

3. Liver Research Unit "Micrograph Award" (First Prize) Micrograph Award 2005, Bioscience: LM 1st of Microscopy Society of Thailand XXIInd Annual Conference on Microscopy, 2-4 February 2005, Chonburi, Thailand.

International Awards

1. Prof. Sornchai Looareesuwan "The Most Admirable Order of the Direkgunabhorn" Companion (Fourth Class).

2. Liver Research Unit; First Prize, Second Prize, and Consolation Prize for Most Attractive Poster Awards. The Joint International Tropical Medicine Meeting 2005, Nov 30-Dec 2, 2005, Bangkok, Thailand.

3. Ms. Naowarat Thanormsing "The Best Tropmed Student Presentation Award".



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Prof. Sornchai Looareesuwan 2005: Companion (Fourth Class) of the Most Admirable Order of the Direkgunabhorn.



- 1990-Present: Journal of Infectious Diseases and Antimicrobial Agents, Bangkok, Thailand.
- 1996-Present: Mahidol University Journal, Bangkok Thailand.
- 1996-Present: Parasitology International, Elsevier Science, Ireland.
- 1999-Present: The Journal of Tropical Medicine and Parasitology, Thailand.
- 2000-Present: The Lancet Infectious Diseases, UK.

- 2001-Present: Internal Medicine Journal of Thailand, Thailand.
- 2001-Present: The Malaria Journal and Pubmed, Liverpool, UK.
- 2001-Present: Acta Tropica, Elsevier Science, The Netherlands.
- 2002-Present: International Medicine J. of Thailand
- 2002-Present: Am J Trop Med Hyg USA.
- 2005-Present: Journal of Molecular and Genetic Medicine

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CURRENT RESEARCH ACTIVITIES

On-going Departmental Research

Angiostrongyliasis

- Angiostrongyliasis: partially purified antigens of *Angiostrongylus cantonensis* adult worms for diagnosis using immunoblot.
- Angiostrongyliasis: potential fractionated antigens of *Angiostrongylus cantonensis* adult worms for diagnosis using ELISA.
- *Angiostrongylus cantonensis*: s-adenosyl methionine decarboxylase.
- Analysis of a protein expression from *Angiostrongylus cantonensis* DNA cloning for serodiagnosis of angiostrongyliasis.
- Detection of IgG-subclass for serodiagnosis of angiostrongyliasis.
- Experimental infection of freshwater fish in Thailand with infective stage of *Angiostrongylus*.

Cysticercosis & Taeniasis

- Comparison of biochemical extract preparations of *Cysticercus cellulosae* by SDS-polyacrylamide gel electrophoresis and immunoblot technique.





- Differentiation of fractionated larval antigens (*Cysticercus cellulosae*) responsible for antibody of neurocysticercosis patients
- mtDNA sequences of *Taenia* spp.

Echinococcosis

- Analysis of fluid antigens of *Echinococcus* cyst for diagnosis.
- Mitochondrial DNA sequence of protoscoleces of *Echinococcus* cysts from four patients.
- Serodiagnosis of suspected echinococcosis cases using native, partially-purified, and DNA recombinant antigens.



Filariasis

- Rare or unrecognized evidence of human dirofilariasis in Thailand: possible immunoblot diagnosis of one Thai patient.
- Study on prevalence of *Wuchereria bancrofti* infection in Kanchanaburi and Ratchaburi provinces.
- Urine ELISA for diagnosis of Bancroftian filariasis

Gnathostomiasis

- Effect of ivermectin on *Gnathostoma spinigerum* morphology.
- Immunoblot-diagnostic specificity for gnathostomiasis.
- Prevalence of *Gnathostoma spinigerum* in cats and dogs in Buddhist Temples in Bangkok.

Opisthorchiasis

- Research and development of an application to purify *Bithynia* snail antigen in serodiagnosis of opisthorchiasis.
- Studies on the efficacy of Thai traditional herbal medicines in the treatment of opisthorchiasis

in hamsters.

Paragonimiasis

- 32-33 kDa-eluted *Paragonimus heterotremus* antigen for serodiagnosis.
- Comparative studies on surface ultrastructure of adult worm of *Paragonimus* sp. in Thailand.
- Chromosomes and occurrence of chromosome breakage of lung fluke, *Paragonimus heterotremus*.
- Isozyme discrimination between *Paragonimus heterotremus* and *P. miyazakii*.
- Molecular systematic of *Paragonimus* lung flukes and intestinal trematodes.
- Studies on *Paragonimus* populations: morphology, enzymology, molecular biology and epidemiology aspects.

Soil-transmitted helminthiasis

- Effect of mebendazole on *Trichuris trichiura* morphology.
- Efficacy of high dose mebendazole against trichuriasis in adult patients.
- Epidemiology and treatment of strongyloidiasis with ivermectin.
- Herbal medicinal effects on soil-transmitted helminthiasis.
- Impact of deworming on anemic status of children and adolescence girls.
- Relationship between behavior and soil-transmitted helminthiasis in seaman.
- Soil-transmitted helminthiasis control through school-based intervention.

Toxocariasis

- Evaluation of excretory-secretory and partially purified antigens of adult *Toxocara canis* against toxocariasis by ELISA and

immunoblot.

- *Toxocara canis* larval antigens for serodiagnosis of human toxocariasis.



Trichinellosis

- Monoclonal antibody-based competitive ELISA and indirect ELISA for immunodiagnosis of trichinellosis.

Other parasites

- Diagnosis of liver and intestinal flukes by PCR.
- Differential serodiagnosis between liver and intestinal trematodes.
- Fish-borne trematodes in Thailand.
- Research and development of the intergrated project on chemotherapy on control of malaria and parasitic infections.



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HIGHLIGHT ACTIVITIES

Study on insecticidal activities of several species of Thai herbal extracts for controlling mosquito vectors. The promising oil extracts that showed mosquito repellency, such as qinghao (*Artemisia annua*), "may chang" (*Litsea cubeba*), clove (*Syzygium aromaticum*), and "makaen" (*Zanthoxylum limonella*), are formulated in forms of cream or gel. The extract of "thong pun chang" (*Rhinacanthus nasutus*) provided high larvicidal activity and is prepared in tablet form. The mosquito repellent formulation of the volatile oil mixture from *Artemisia annua* is in the process of patent application.

CURRENT RESEARCH ACTIVITIES

Research conducted by the staff of the Department of Medical Entomology involved both basic and applied knowledge applicable to controlling insects and arthropods that are vectors of tropical diseases, with an emphasis on mosquito-borne diseases.

The effective control of mosquito vectors directs both laboratory and field trials. Control of larvae of *Aedes aegypti* in the Faculty of Tropical Medicine premises, by Abate sand granules (temephos); studies on the efficacy of insect repellents extracted from various medicinal plants; and effective measures for preventing tropical disease infections in the population living at the Thai-Myanmar border are continuously conducted.

Inter-organizational projects on various aspects, such as, a construction of a key for the identification of *Anopheles aconitus* and the search for malaria transmission form(s), a search for effective herbal extracts for lice control, survey of malaria vectors in Sa Kaeo Province, and effective control measures of *Brugia malayi* in Narathiwat Province, are conducted.

Several research topics at the molecular level are performed, for example, DNA bank of mosquito vectors in Thailand, genetic diversity of *Anopheles barbirostris* group in Thailand for the control of tropical diseases, and specificity test of primers synthesized from DNA fragments of the *Anopheles minimus* mosquito. The effects of the heavy metals, lead and cadmium, on enzymes of *Culex quinquefasciatus* larvae are also studied.





Laboratory colonies of different strains of mosquito vector species of *Anopheles*, *Aedes*, *Culex*, and *Mansonia* are continuously maintained in the insectarium for further use.

The Department of Medical Entomology also acts as a reference center on mosquito vectors in Thailand through the Mosquito Museum Annex. Academic consultation, especially on mosquito-borne diseases and their control measures, and also services for the detection of filarial parasites, identification of mosquitoes and other medically important insects and arthropods, are regularly provided.



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CURRENT RESEARCH ACTIVITIES



1. Detection of dengue viral RNA in mosquitoes (*Aedes aegypti*) by nucleic acid sequence-based amplification (NASBA) and polymerase chain reaction (PCR).
2. Immunological studies on vector-borne disease of dengue hemorrhagic fever in Thailand.
3. Molecular study of dengue virus in Thailand.
4. Diagnosis of dengue virus infection by luminescence immunoprecipitation assay.
5. Serotypes of dengue virus infection in Petchaboon, Nakhon-Srithammaraj and Srisaket provinces.
6. Development of dot-blot ELISA for diagnosis of *Shigella* spp.
7. Comparison of Salmo-Dot and PCR for the detection of *Salmonella* spp. in foods.
8. Molecular typing of leptospiral serovars based on genes of the rfb locus.
9. Study of the membrane protein antigen of *Leptospira* that react with leptospirosis patients' serum.
10. An application of nested polymerase chain reaction in detecting scrub typhus DNA from clinical specimens.
11. Analyses of natural killer T (NK-T) cell subsets in patients with severe and uncomplicated falciparum malaria.
12. Indirect immunoperoxidase test for dual serodiagnosis of scrub typhus and leptospirosis.
13. Detection of *Salmonella* enterotoxin and enterotoxin in food and clinical isolates.
14. Detection of virulence factors from *Aeromonas* spp. in relation to diarrhea.

15. Antigenic recognition of *Aeromonas* antigens in mice.
16. Detection of antibody response to the 19 kDa fragment of *Plasmodium yoelli* merozoite surface protein-1 (MSP-119) following immunization using CpG oligonucleotide and montanide ISA51 as adjuvant.
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The Department of Protozoology is one of the eleven departments within the Faculty of Tropical Medicine, Mahidol University. It was one of the first five departments created at the beginning of the Faculty of Tropical Medicine in the year 1960. Its responsibilities are teaching training, research and service in the field of medical protozoa.

CURRENT RESEARCH ACTIVITIES



1. Ultrastructure of acute and chronic toxoplasmosis after pyrimethamine and artesunate administration *in vivo* study
2. Dog and cat parasitic zoonoses
3. Biological contamination-free Thai frozen food
4. Molecular technique for diagnosis of toxoplasmosis and neosporosis in Thai dairy cows
5. Molecular and immunohistochemistry studies on stage interconversion of toxoplasmosis in immunocompromised hosts
6. Molecular diagnosis of malaria, amebiasis and cryptosporiosis
7. Purification and characterization of DNA topoisomerases from *Trichomonas vaginalis*
8. Effect of ultraviolet irradiation on viability of *Cryptosporidium* oocysts in water
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10. Molecular characterization of DNA replicating enzymes in *P. falciparum*.



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CURRENT RESEARCH ACTIVITIES

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The Department offers various kinds of laboratory investigation, for example, circum-oval precipitation test (COPT) for blood fluke infection, identification of medically important mollusks, rapid diagnosis of multidrug-resistant *Mycobacterium tuberculosis*, etc. It is also home of the 'Mollusk Museum', where shell specimens of various medically important snail hosts are collected. This museum is considered one of the perfect mollusk museums in the region. The Department periodically offers training courses on various aspects of Socine and Environmental Medicine.

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HIGHLIGHT ACTIVITIES

The Department of Tropical Hygiene was originally named the Tropical Hygiene Section. In 1960, upon the establishment of the Faculty of Tropical Medicine, the Tropical Hygiene Section was also founded. Since then, the Section has been responsible for providing lectures and field training operations as part of the Diploma of Tropical Medicine and Hygiene (D.T.M. & H.) course. Epidemiological research has also been one of the major activities of the Section, responding to public health problems (i.e. scrub typhus and malaria) which afflicted the rural population during that time. In 1974, the Section was upgraded into the Department of Tropical Hygiene. At present, the Department is responsible for providing instruction and training in the M.Sc./Ph.D. degree programs in Tropical Medicine, in addition to the existing D.T.M. & H. course. Most research activities being carried out at the moment are mainly epidemiological, and in the application of Geographical Information System (GIS) to common tropical diseases. Furthermore, the Department has direct responsibility for managing the Rajanagarindra Tropical Disease International Center (RTIC) to ensure the continuous delivery of quality and free health services, through its malaria clinic, to the people within the area. The RTIC is situated in a malaria-endemic rural community near the Thai-Myanmar border in Suan Phung District, Ratchaburi Province.

**CURRENT RESEARCH ACTIVITIES**

1. Application of GIS in monitoring multi-drug resistant malaria in the Greater Mekong Sub-Region of Southeast Asia III.
2. Epidemiological study of *Enterobius vermicularis* in preschool children in Tanowsri Subdistrict, Suan Phung, Ratchaburi Province.
3. Epidemiological study of asymptomatic malaria parasitemia in an endemic area.
4. Epidemiology and control of malaria in Ratchaburi Province, Thailand.
5. Epidemiology and health education program and treatment evaluation of *Pediculus capitis* with Leech Lime cream in schoolchildren, Suan Phung District, Ratchaburi Province.
6. Epidemiology of intestinal parasitic infections among Karen school children in the western border, Thailand.
7. Field-based study of reappearance *Plasmodium vivax* malaria cases in the area near the Thai-Myanmar border, Suan Phung, Ratchaburi Province.
8. Geographic survey of health facilities and demographic data in Tsunami-affected area in Thailand.
9. GIS disease surveillance system in the Mekong region.
10. Health behavior and risk factor of soil-transmitted helminth and malaria infections in primary school children in Saiyok District, Kanchanaburi Province.
11. Occurrence of heterophyid metacercariae *Haplorchis* in cyprinoid fish of 2 reservoirs in Tanowsri Subdistrict, Suan Phung, Ratchaburi Province.





12. Relationship of intestinal parasitic infections to malnutrition.
13. Search for genes susceptible to clinical malaria.
14. Seroprevalence of Rickettsia infection among Thai troops working along Thai-Myanmar border, Suan Phung, Ratchaburi Province.
15. Study of health behaviors and factors associated with intestinal parasite infections in the community and Air-Force unit in Ubolratchatani Province.
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HIGHLIGHT ACTIVITIES

The three-day-workshop on “Assessment and Research Methodology in Nutrition” was organized by all staff of the Department of Tropical Nutrition and Food Sciences on October 25-27th, 2005, at the Faculty of Tropical Medicine, Mahidol University. The objective was to provide knowledge on methodologies in nutritional research, such as anthropometric and biochemical assessment including computer program for dietary assessment, to lecturers, researchers and nutritionists.

CURRENT RESEARCH ACTIVITIES



The research activities of the Department of Tropical Nutrition and Food Science are concerned with nutritional problems in Thailand, such as micronutrient deficiencies, lifestyle and dietary patterns of different age groups, the impact of overnutrition, oxidative stress and antioxidants in relation to health, especially dyslipidemia and coronary heart disease, the effect of smoking on work performance in relation to homocysteine concentration. Furthermore, molecular biology in cancers of the lung, liver, breast, cholangiocarcinoma, colon and cervix, including the molecular biology of obesity, were investigated. Food and health relationships in the populations of Asian countries are of interest for study, and data will be compared.

The topics of the current research projects are as follows:

1. Novel DNA amplification on chromosomes 2p25.3 and 7q11.23 cholangiocarcinoma identified by arbitrarily primed polymerase chain reaction
2. Adiponectin/ACP30, a collagen-like plasma protein, in relation to anthropometric measurement in Thai overweight and obese subjects
3. Homocysteine and vitamin in healthy Thai smokers
4. Methylene tetrahydrofolate reductase (MTHFR) polymorphism (C677T) in relation to homocysteine concentration in overweight and obese Thai
5. Relationship between soluble leptin receptor, leptin, lipid profiles and anthropometric parameters in overweight and obese Thai subjects
6. Polymorphism of glutathione S-transferase omega gene and risk of cancer
7. Riboflavin-deficient and *Trichinella spiralis*-induced stresses on plasma corticosterone associated with spermatogenesis in male Wistar rats
8. Assessment of dietary patterns of Thais in Germany and Thailand
9. Low folate status as a risk factor for cervical dysplasia in Thai women
10. Serum leptin concentrations in chronic hepatitis

11. Polymorphism of glutathione S-transferase omega gene and risk of cancer among Thai patients
12. Genetic polymorphism of glutathione-S-transferase gene class omega 2 in acute lymphoblastic leukemia
13. Identification of genetic alteration in cervical cancer in Thai patients by arbitrarily primed polymerase chain reaction (AP-PCR)
14. Genetic amplification at chromosome 4p 15.2 and 6q 23-24 in breast cancer
15. Microsatellite instability and hMSH2 alterations in Thai sporadic colorectal cancer
16. Mutagenicity study of weeds and common plants used in traditional medicine and for animal feed
17. Health behavior of Tsunami victims in Phang-Nga Province, Thailand
18. Vitamin B12 status of Thai women with neoplasia of the cervix uteri
19. Identification of DNA amplification on chromosome 1p22 in cervical cancer

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2. *In vitro* model for studying pathogenesis of atherosclerosis.
3. Ig class switching induced by *Plasmodium falciparum*.
4. Endothelial cell activation by *Plasmodium falciparum*.
5. Ultrastructural study of malarial parasites and the infected red blood cells after drug treatment.
6. Cytokine expression in squamous cell carcinoma and HIV patients.

Awards 2005

No.	Title of Award	Award Recipient	Awarded by	Awarded Date
1.	The Most Attractive Poster award First Prize	Asoc. Prof. Mario Riganti	Joint International Tropical Medicine Meeting 2005	2 December 2005
2.	Thesis award 2004 (Major Infectious and non-Infectious diseases)	Miss Rungrat Nintasen	Faculty of Public Health and Faculty of Graduate Studies, Mahidol University	7 September 2005

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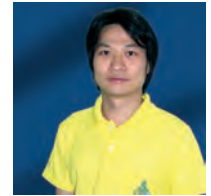
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HIGHLIGHT ACTIVITIES

The major duties of the Department of Tropical Pediatrics are first, to disseminate medical knowledge, especially on tropical diseases in pediatrics, to health personnel and the people; second, to perform research and finally, to provide medical services.

The Master of Clinical Tropical Pediatrics program includes basic knowledge of tropical diseases, clinical tropical pediatric practices and a thematic paper, and is the major training course of the Department. The Department is involved in several training courses of the Faculty.

Each year, there is a one-month tropical pediatrics course for the fellowship in pediatric infectious diseases training program under the Pediatric Infectious Disease Society of Thailand.

Research topics of the Department are wide-spectrum, including clinical tropical pediatrics, infectious diseases, and vaccine trials.

CURRENT RESEARCH ACTIVITIES

1. Evaluation of long-term immunity against rabies in children vaccinated with Purified Chick Embryo Cell Rabies Vaccine (Rabipur®) in different pre-exposure regimens and boosted after one year (Extension of study M49P2)
2. Evaluation of long-term immunity against Japanese encephalitis in children vaccinated with Japanese encephalitis vaccine (Extension of study M49P2)
3. Accuracy assessment of using WHO criteria in diagnosis of dengue infection
4. Safety and immunogenicity of tetravalent dengue vaccine formulation in Thai adult volunteers: eight-year antibody persistence
5. Safety and immunogenicity of tetravalent dengue vaccine formulations in healthy Thai children: evaluation of a booster dose and five-year antibody persistence
6. Epidemiological study of dengue infection in children age 3-10 years in Ratchaburi Province (RAT0148)

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CURRENT RESEARCH ACTIVITIES

Research

1. Current research works :
 - 1.1 Distribution of C¹⁴-Labelled arteether after intramuscular injection in mouse kidney and liver.
 - 1.2 Studies of radiation effects on mouse macrophage cell line (RAW 264.7) and radio protective effect by various Thai medicinal plants.
 - 1.3 Comparison of non-radiological technique and ¹²⁵I-labeled method for measurement of folic acid in normal sera.
 - 1.4 Determination of vitamin B₁₂ and folic acid in Thai foods.
2. Collaborative research works :
 - 2.1 Studies on lethal dose LD₅₀ of 4 Thai medicinal herbs in mice.
 - 2.2 Correlation between folic acid status and cervical cytologic abnormality in Thai women.

Award 2005



Second prize of the most attractive poster entitle "Study on serum transcobalamin II in patients with murine typhus" Joint International Tropical Medicine Meeting 2005.

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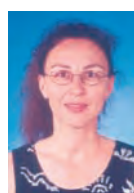
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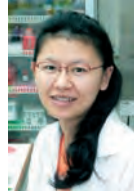
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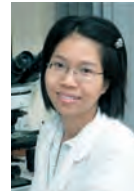
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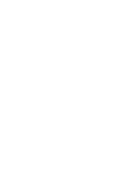
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The Wellcome Trust-Mahidol University-Oxford Tropical Medicine Research Programme (the 'Thailand Unit') began in 1979 as a research collaboration between the Faculty of Tropical Medicine, Mahidol University and the University of Oxford. Our main administrative office and laboratories are embedded within the Faculty, though most of our clinical studies and much of our laboratory work takes place in 'up-country' study sites. Our main research interests are the epidemiology, diagnosis, pathophysiology and treatment of malaria, scrub typhus, melioidosis, leptospirosis and other tropical infections which impose a substantial disease burden on rural populations throughout this populous region. We have study sites in Ubon Ratchatani (melioidosis and cryptococcal





meningitis), Udon Thani (scrub typhus and leptospirosis), Mae Sod Hospital (malaria and microbiological support for SMRU), and Chittagong Medical College in Bangladesh (severe malaria). We also supervise severe malaria clinical trial sites in Burma and India.

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The Vaccine Trial Centre (VTC) was established in February 1984 and became a fully functioning centre in November 1986. The VTC is a joint responsibility of Mahidol University and the Ministry of Public Health, and is operated by the Faculty of Tropical Medicine on their behalf. The major purpose of the centre is testing newly developed vaccines that reach the clinical-trial stage; however, the centre is currently expanding its service to pharmaceutical drug development where evaluation in human participants is needed. The VTC has experience of conducting several Phase I/II and large Phase III trials for various infectious diseases, for example, diarrheal diseases, malaria, HIV, and other viral infections. Currently, the VTC is involved in the world's largest HIV vaccine community trial, with 16,000 healthy informed consenting volunteers.

The VTC renders services in both the clinical and data management of the trial. The centre is the first and only facility of its kind in Thailand, in the region, and perhaps also in developing countries. The VTC has set its goal since establishment to ensure that all trials under its responsibility are conducted and documented in accordance with international standards and guidelines including the International Conference on Harmonisation (ICH) / WHO Good Clinical Practice standards. Each function would have pre-established systematic written procedures for the organization, conduct, data collection, data management, documentation and verification of the trial. The clinical trials carried out under VTC are entrusted with the validity of data and the ethical, scientific and technological quality of trials.

The VTC sets its mission to collaborate with scientists at any national and international institute as well as vaccine developers, pharmaceutical companies, and donor agencies. The centre provides the necessary infrastructure to enable multi-centre clinical trials and also epidemiological studies to be performed meeting international standards for design, conduct and reporting. The advantage of conducting the trials at VTC is that the centre is equipped with a validated system, technology and procedures, and that its professional staff are well-trained and have tremendous experience conduct in trial. The VTC collaborates with studies done in Thailand, the immediate region, or internationally. The centre accomplishes its mission by planning, implementing and evaluating study protocols or concepts with mutual cooperative agreements and contracts.

Current Research Activities:

- Screening and evaluation of potential volunteers for a trial in Thailand of a candidate Preventive HIV Vaccine
- A phase III trial of Aventis Pasteur Live Recombinant ALVAC-HIV (vCP1521) priming with VaxGen gp120 B/E (AIDSVAX® B/E) boosting in HIV-uninfected Thai adults
- Extended evaluation of the virologic, immunologic, and clinical course of volunteers who become HIV-1 infected during participation in a phase III vaccine trial of ALVAC-HIV and AIDSVAX® B/E.

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The Data Management Unit (DMU) was officially established by the Executive Committee of the Faculty of Tropical Medicine, Mahidol University on 12 March 1999 to fulfill national requirements under the Thailand National AIDS Committee in conducting the first large-scale HIV vaccine trial in Thailand. Its establishment and early-year operations were sponsored by VaxGen Inc., Brisbane, CA, U.S.A. Currently, the DMU gets funding and personnel support from the Faculty as well as the national and international pharmaceutical product development industry.

The DMU is functionally under the VTC, the Dean's Office, Faculty of Tropical Medicine. In 2002, DMU also rendered services in database development, consultation and training in data management and analysis for biomedical research through the Applied and Technological Service Centre of Mahidol University. The major objectives of the DMU include: (1) To establish a data management excellence centre in Thailand and serve as a reference centre for data management for vaccine and clinical trials in the region, (2) To serve as a collaborating centre for high-quality data management for vaccine and clinical trials within the Faculty and for other institutions, including international collaborators, (3) To provide training for Faculty staff and other institutions in clinical data management that complies with international standards and guidelines, and (4) To advise and/or develop data management and analysis for biomedical research and services.

The ultimate goal of the DMU is to provide data quality for a particular clinical trial or epidemiological study and, if required, data management in a regulatory compliance environment. Thus, the DMU has arranged its teams into three major areas. Besides the chief, administrative and secretarial staff, the data management personnel are divided into a "data quality group", an "information-communication technology (ICT) group" and a "quality assurance group". The number of personnel assigned to each group will depend on the complexity and amount of data and workload of the trial.

The DMU mission is accomplished through collaborative agreements, both academic and financial, among all parties involved. The Faculty renders all administrative and logistical support to facilitate the operation of the DMU to enable high-quality performance. The collaborator(s) enjoy the benefits of high-standard data management practices.

Currently, the DMU plays major roles in data management of the world's largest HIV vaccine trial, conducted in Thailand. In this trial, all data management processes for over 25,000 volunteers during the 5-year study period are performed within the DMU; and, as this is the first trial in Thailand to maintain a primary database subject to audit by the US FDA, the DMU has utilized the highest quality data management technology ever used in the region. Besides this vast experience in data management in a regulated environment according to international standards, the DMU collaborates with other institutions in conducting research studies as well as consultation and database development, for example, database development for quality control and assurance processes for the Department of Medical Science, Ministry of Public Health.

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Current Activities

1. A Phase III Trial of Aventis Pasteur Live Recombinant ALVAC-HIV (vCP1521) priming with VaxGen gp120 B/E (AIDSVAX™ B/E) boosting in HIV-uninfected Thai adults.

Objectives:

Primary Objective

- To determine whether immunization with an integrated combination of ALVAC-HIV (vCP1521) boosted by AIDSVAX™ gp120 B/E prevents HIV infection in healthy Thai volunteers.

Secondary Objectives

- To determine whether immunization with this vaccine combination results in reduced HIV viral load.
- To determine whether immunization with this vaccine combination results in increased CD4 count.
- To confirm the safety of the vaccine combination in Thai volunteers.
- To evaluate whether participation is associated with behavior change.

Vaccines:

Prime:

- ALVAC-HIV (vCP1521) is a recombinant canarypox vector vaccine and HIV-1 gag and protease (subtype B).

Boost:

- AIDSVAX B/E is a bivalent HIV gp120 envelope glycoprotein vaccine containing a subtype E and a subtype B.

Study sites:

- 4 clinics in Chonburi Province and 4 clinics in Rayong Province.

Current updates:

Screening:	26,644 persons
Enrollment:	16,402 persons
Follow-up:	continuing
Expected end date:	2009

2. Immunogenicity and safety of Quadrivalent HPV (Type 6, 11, 16, 18) L1 Virus Like Particle (VLP) Vaccine in 16 to 23-year-old women with an immunogenicity bridge between the HPV16 component of the quadrivalent vaccine and the monovalent HPV 16 vaccine pilot manufacturing material—The F.U.T.U.R.E. I Study (Females United to Unilaterally Reduce Endo/Ectocervical Disease).

Objectives:

- To demonstrate that quadrivalent HPV vaccine is generally well tolerated.
- To demonstrate that the Final Manufacturing Process (FMP) results in quadrivalent HPV vaccine.

Study design:

- 2 groups: a quadrivalent HPV vaccine group and a placebo group.
- Randomized, double-blind, placebo-controlled, multicenter study.

Current updates:

Screening 139 subjects
 Enrollment 134 subjects
 Completed vaccination (3 Doses) 130 subjects
 No of volunteers within 2.5 years 124 subjects

- 3 subjects lost to follow-up
- 3 subjects personal problems

Follow-up: continuing
 Expected end date: 2007

3. Safety, immunogenicity, and efficacy of Quadrivalent HPV (Types 6, 11, 16, 18) L1 Virus-Like Particle (VLP) Vaccine in mid-adult women—The FUTURE III (Females United To Unilaterally Reduce Endo-Ecto Cervical Cancer) Study.

Objectives:

- To demonstrate that a 3-dose regimen of Quadrivalent HPV (Type 6, 11, 16, 18) L1 VLP Vaccine is generally well tolerated in women 24 to 45 years of age.

Study design:

- 2 groups: a quadrivalent HPV vaccine group and a placebo group.
- Randomized, double-blind, placebo-controlled, multicenter study.

Current updates:

Screening 269 subjects
 Enrollment 246 subjects
 Completed vaccination no.1 246 subjects
 Completed vaccination no.2 240 subjects
 Completed vaccination no.3 236 subjects
 Follow-up: continuing
 Expected end date: 2009

4. Establishment of a *Shigella sonnei* challenge model for evaluation of future vaccine candidates

Objectives:

Primary Objective

- To identify a challenge dose of *S. sonnei* 53G that will cause disease in 70% of Thai adults.

Secondary Objectives

- To assess the *Shigella*-specific immune response, both humoral and cellular, in shigellosis patients.

Study Subjects

- 36 subjects with 12 alternates
- 20-40 years old, male or female

5. Randomized, double blind HIV vaccine trial to evaluate the immune profile of Aventis Pasteur Live Recombinant ALVAC-HIV (vCP1521) priming with VaxGen gp120 B/E (AIDSVAX® B/E) boosting in HIV-uninfected Thai adults.

Objectives:

Primary Objective

To identify the most sensitive validated cellular immune assays utilizing cryopreserved cells that retain specificity and correlate with the gold standard functional measurement of CD8 T-cell effector activity as measured by chromium (51Cr)-release cellular cytotoxicity assay for application to Phase III frozen samples. The primary objectives include:

- Clearly define the cellular immune profile of the ALVAC prime gp120 boost regimen being tested for efficacy in the RV144 trial;
- Technology transfer and validation of the PAVE ICC assay in Thailand on fresh and frozen samples during the conduct of the trial

to allow application of the validated assay to exploring correlates of protection in the RV144 efficacy trial;

- Compare the ICC and ELISpot cellular immune response assays standardized by PAVE on cryopreserved PBMC to the Cr release cytotoxicity assays on fresh samples, for specificity and sensitivity at 6 months following the completion of vaccination (month 12), the prime time point of maximal cells collected in the Thai Phase III trial (RV144) and the original time points in the Phase II study RV135 (time 6, 9, 12 months), confirm the immunogenicity

profile with the field's new validated cellular assessment assays.

Secondary Objectives

- To compare cellular immune responses (CD4 and CD8) following receipt of two doses of ALVAC-HIV (vCP1521) versus a full vaccination regimen consisting of four doses of vCP1521 and two doses of AIDS VAX® B/E boosting.

Study Subjects

- 300 Thai participants, male or female, aged 18-30 years old
- 4 clinics in the Bangkok area

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 Assoc. Prof. Benjaluck Phonrat
M.Sc.
 Dr. Valai Bussaratid
M.D.
 Dr. Wirach Maek-A-Nantawat
M.D.
 Dr. Jittima Dhitavat
M.D.

Secretarial Staff

Miss Sawanya Sritavil
 Miss Jariya Maharatchamongkol

Project Staff

- **Clinical Research Coordinator (CRC)**
 Kamonwan Srising
 Kannika Lothong
 Kessuda Maneegrajangseang
 Ketsuda Tanchun
 Pimonmard Chotchompoo
 Jirasanon Tepboon
 Jeerapa Tharasukh
 Jiraporn Charaspetch
 Jutarat Wattanakitwichai
 Chanida Liangthorachon
 Tanaporn Thammatuksa
 Tamonwan Petchsuk
 Napatsakorn Gonthong
 Navinda Kongmuang

Nawin Phudphad
 Nisakorn Ratnaratorn
 Narumon Thantamnu
 Adjhawee Chonweerawong
 Puntip Wongduen
 Pornrat Pansrimangkorn
 Maliwan Hongsuwan
 Rojchana Piyabanharn
 Rawiwan Rachsomboon
 Roongthip Boondao
 Rungnapa Chaiyapin
 Wanwisa Charoensin
 Sitawaas Sumrej
 Somchit Ruenthong
 Sarawan Maythaarttaphong
 Sukanya Tomkum
 Amonrat Aiyasiri
 Achariya Kanchanapradith
 Anchalee Yamklin
 Pratchayada Iammaleerat
 Urairat Phantong
 Wanida Noimontree
 Penpak Chantasorn
 Sunee Yam-wong
 Punnee Sangperm
 Montira Yuayai
 Doungngoan Khaminthakul
 V-na Yupu
 Sujantha Ittikusumarn
 Jiraporn Auetian
 Peingruthai Sirrat
 Pataramon Laowarakul
 Bussarin Thungmeephol
 Nonthiya Chaysrisiri
 Kanokporn Apichanapong
 Yupa Sabmee

Vanida Kwawong
 Kanokporn Jaikaew
 Kaewta Intalapaporn
 Waranya Yommakhot
 Yaowaree Charoensawat
 Jiraporn Khemngarm
 Lalida Chaiyasang
 Pornnapas Srisa-ard
 Pornpan Suntornsut
 Vatcharachai Ngamdee

- **Research Assistant/Pharmacist Assistant**
 Suntareya Kumtool
 Nirut Plangvattana
 Patchrin Lappichetpaiboon
 Siriprapha Paipob
 Rinfan Promthong
 Nongluk Pongsura
 Saowanee Thongnopakun
 Chatchai Kaewpreedee
 Onnuch Moudkoon
 Chanana Jhantasorn
 Rungtida Pinkrathok
 Wareerat Charatworapat
 Suntorn Khumcome
 Jantha Reaungchai
 Cheunhatai Arunwong
 Peerapong Ravejaradporn
 Saitip Inthum
 Vasana Yuenyong
 Sritham Srichoo
 Orawan Hermhan
 Waraporn Sriboon
 Warunyaporn Charuensomprasong
 Uraivan Ngamsrisakul
 Monsikam Petprasit

THE BANGKOK SCHOOL OF TROPICAL MEDICINE

GRADUATE DIPLOMA IN TROPICAL MEDICINE AND HYGIENE



Philosophy

The program emphasizes producing graduates with an in-depth knowledge of tropical medicine and hygiene. Graduates will be able to manage, and provide consultation on, common health problems and diseases in the tropics.

Objectives

1. To produce graduates with a good level of knowledge of tropical health problems and diseases, including epidemiology, etiology, pathogenesis, pathology, nutritional aspects, risk factors, and clinical manifestations.
2. To produce graduates with the competency to manage common health problems and diseases in the tropics, including diagnosis, treatment, prevention, control, and providing consultation.

This program is fully accredited by the American Society of Tropical Medicine and Hygiene (A.S.T.M.H.), is offered in the English language, and is open to participants of all nationalities.

Admission Requirements

1. Students must hold a M.D., M.B.B.S., or other qualification as a qualified medical doctor accepted by Mahidol University.
2. Pass the English Proficiency Examination according to the requirements of the Faculty of Graduate Studies, Mahidol University.

Note 1: Applicants should have a TOEFL English language proficiency level of 500 or more or an IELTS score level of 5.5 or more.

Note 2: Exceptions may be made by the Program Committee and the Dean of the Faculty of Graduate Studies. Other categories of student may be permitted to attend, and be provided with a "Certificate of Attendance".

Duration Of Study 6 months, April-September each year.

MASTER OF CLINICAL TROPICAL MEDICINE

Introduction

The Bangkok School of Tropical Medicine offers the international Master of Clinical Tropical Medicine program (M.C.T.M.) from the first week in April each year. The program is offered in English and is open to students of all nationalities.

Objectives

The M.C.T.M. was established to train medical graduates to be:

1. Well-versed and well-informed in tropical and endemic diseases with special reference to Southeast Asia in relation to their causes, epidemiology, pathogenic mechanisms, and prevention and control of diseases.
2. Able to efficiently examine, diagnose and treat the patients suffering from tropical and endemic diseases.
3. Able to provide consultation, and disseminate and impart knowledge of Tropical Medicine.
4. Able to conduct clinical research with special emphasis on problem solving that will lead to the autonomous initiation of new knowledge, and also to innovation and continuous academic advancement.

Admission Requirements

An applicant is required to:

1. Be a qualified, registered medical doctor, preferably with at least one year's clinical experience.
2. Be physically and mentally healthy;
3. Be proficient in English (reading, writing, speaking, listening).

English language proficiency requirements are as follows: TOEFL score of at least 500 or an IELTS score of at least 6.0. If it is not possible to undergo TOEFL or IELTS testing before commencing the program, applicants will be enrolled as trial students, who will be required to pass the English

Language Proficiency Examination of Mahidol University before graduation.

4. Persons who do not have the complete qualifications according to these regulations will be considered by the Postgraduate Committee of the Faculty of Tropical Medicine.

Duration Of Study

12 months, from the first week of April until the last week of March the following year.

MASTER OF CLINICAL TROPICAL PEDIATRICS

Introduction

The Bangkok School of Tropical Medicine offers the international Master of Clinical Tropical Pediatrics (M.C.T.P) program every year, from the first week in April. The program is taught in English and open to students of all nationalities.

Philosophy

The program places its emphasis on training medical graduates to be able to understand the diseases related to tropical pediatrics, with reference to endemic diseases, particularly in Southeast Asia, including etiology, incidence, pathogenesis, clinical features, prevention and control, and to continuing their medical education, which is in accordance with the national education developmental plan.

Objectives

To train medical doctors who have basic knowledge in pediatrics, to be able to:

- A. Plan appropriate investigations and manage common pediatric infectious diseases efficiently and effectively, with emphasis on tropical and endemic areas,
- B. Be consultants and transfer their knowledge of tropical pediatrics to other health personnel,
- C. Integrate curative services with preventive measures, including child health promotion,

- D. Plan and conduct research according to the proposed methodology, data analysis and writing up of the thematic paper related to pediatric tropical diseases. Afterwards, students will be able to conduct research efficiently and effectively, to improve the health status of the people in their own countries,
- E. Use and evaluate epidemiological data and medical biostatistics in solving child health problems,
- F. Use information technology to locate and update knowledge for continuing medical education related to tropical pediatrics,
- G. Possess responsibility, integrity, good morals and self-sacrifice for the welfare of the community.

Admission Requirements

Students must:

1. Hold a M.D., M.B.B.S. or other equivalent qualification that qualifies them to practice as a medical doctor, which is accepted by Mahidol University and have clinical experience in pediatrics of not less than 1 year.
2. Graduated in the D.T.M.&H., or equivalent, of which credit transfer may be considered by the Program Committee and the Dean of the Faculty of Graduate Studies.
3. Have good mental and physical health.
4. Pass the English Proficiency Examination offered by the Faculty of Graduate Studies, Mahidol University, or other qualified institutions, or have a TOEFL score of 500 or more.
5. For plan A(2) students should have a basic knowledge of clinical research by attending the research methodology and basic statistics for medical research.
6. Exceptions to the above items may be made by the Program Committee and the Dean of the Faculty of Graduate Studies.

Duration Of Study

12 months, from the first week of April until the last date of March the following year.

MASTER OF SCIENCE IN TROPICAL MEDICINE
DOCTOR OF PHILOSOPHY IN TROPICAL MEDICINE

Objectives

To build appropriate knowledge and skills for competency in research and the ability to deliver technical services related to tropical medicine, and, for the Ph.D., also to meet the urgent need to produce researchers who have in-depth knowledge and specialties in the field of tropical medicine and are capable of planning and undertaking research projects effectively.

Admission Requirements

For the M.Sc., applicants must hold an M.D., D.D.S., D.V.M., B. Pharmacy or B.Sc. degree.

For the Ph.D. Plan 1, applicants must hold:

1. M.Sc. in Tropical Medicine or related field, or
2. M.D., D.V.M., or D.D.S., and have at least 2 research publications, one as the first author, in a recognized journal.

For the Ph.D. Plan 2, applicants must hold:

1. M.Sc., M.D., D.V.M., or D.D.S., or
2. Be an M.Sc. (Trop.Med.) student who has completed the first year core subjects with a GPA of not less than 3.5, or hold a B.Sc. (Hon.).
3. Before enrolment into one of the above programs, an applicant must be accepted by an appropriate advisor.
4. Applicants should have a TOEFL English language proficiency level of 500 or more.
5. To graduate, all non-native English speakers must pass the English Language Proficiency Examination according to the requirements of the Faculty of Graduate Studies, Mahidol University.

6. Exceptions may be made by the Program Committee and the Dean of the Faculty of Graduate Studies.

Duration Of Study

For the M.Sc., a minimum of 2 years.

For the Ph.D. Plan 1, 3 year-course.

For the Ph.D. Plan 2, 3 year-course.

Commencement

Normally the first Monday of June each year.

There is another intake in November each year, by arrangement.

DOCTOR OF PHILOSOPHY IN CLINICAL TROPICAL MEDICINE

Introduction

The Doctor of Philosophy in Clinical Tropical Medicine is offered by the Bangkok School of Tropical Medicine every year. The program is offered in English and is open to students of all nationalities. The aim of the course is to produce medical graduates at Ph.D. level who are competent in performing research leading to the solution of clinical problems in the Tropics, and to improving the quality of life of the people of tropical countries, particularly Thailand and Southeast Asia.

Objectives

To provide appropriate knowledge and skills for competency in research and the ability to deliver technical services related to tropical medicine and also to meet the urgent need for researchers who have in-depth knowledge and specialities in the field of tropical medicine and are capable of planning and undertaking research projects effectively.

Duration Of Study Not more than 5 years.

Admission Requirements

A. Plan I

Candidates are required to:

1. Be certified in clinical specialties by the Board of the Thai Medicine Council, or its equivalent; and hold the Graduate Diploma in Tropical Medicine and Hygiene (D.T.M.&H.) from Mahidol University, or its equivalent;
2. Hold a license for general medicine (first class) in their domicile countries or in the countries where they graduated and held a license and have had a clinical appointment in a hospital for at least one year;
3. Have passed TOEFL with a score not less than 500 or have obtained an IELTS score of not less than 6.0 and not more than 2 years from the application date.

B. Plan II

1. Hold the Master of Clinical Tropical Medicine (M.C.T.M.) degree from Mahidol University, or its equivalent;
2. Hold a license for general medicine (first class) in their domicile countries or in the countries where they graduated and held a license and have had a clinical appointment in a hospital for at least one year;
3. Have passed TOEFL with a score not less than 500 or have obtained an IELTS score of not less than 6.0 and not more than 2 years from the application date.

THESIS TITLES

M. Sc. (Trop. Med.) 2005

DEPARTMENT	NAME	TITLE OF THESIS	ADVISOR
Helminthology	Miss Megumi Ishida	Discrimination of small liver and intestinal flukes eggs by ribosomal DNA-based PCR	Assoc. Prof. Jitra Waikagul
Medical Entomology	Miss Intira Pipitgool	Effectiveness of <i>Bacillus thuringiensis israelensis</i> , against temephos-resistant <i>Aedes aegypti</i> populations from Thailand, under laboratory conditions	Assoc. Prof. Somjai Leemingsawat
Social and Environmental Medicine	Miss Nipaporn Tewawong	Mimotope identification from monoclonal antibodies specific to house dust mite, using phage displayed random peptide library	Assist. Prof. Pongrama Ramasoota
Helminthology	Mr. Panupong Sahaisook	Analysis of crude and excretory-secretory antigens of <i>Dirofilaria immitis</i> adult worms against antibody of Brugian filariasis by ELISA and immunoblot	Assist. Prof. Paron Dekumyoy
Microbiology and Immunology	Miss Sunisa Malijunboa	Identification of genus-and /or species of <i>Aeromonas</i> by western blotting	Assist. Prof. Yuvadee Mahakhunkijchareon
Microbiology and Immunology	Maj. Orawan Nunthamongkol	Characterization of recombinant leptospiral lipoprotein	Assist. Prof. Thareerat Kalambaheti
Tropical Nutrition & Food Science	Miss Kulrat Chitcharoenrung	Identification of gene alteration in DNA fingerprinting amplified from AE3 primer in colorectal cancer	Assoc. Prof. Songsak Petmitr
Microbiology and Immunology	Miss Somrudee Attachit	Serodiagnosis of scrub typhus and melioidosis by dual immunoperoxidase test	Assist. Prof. Varee Wongchotigul
Clinical Tropical Medicine	Miss Juntima Sribabal	Effects of primaquine and its metabolites on the infectivity of <i>Plasmodium falciparum</i> gametocytes	Assist. Prof. Kesinee Chotivanich
Tropical Nutrition & Food Science	Miss Sudaporn Kengkarn	Determination of DNA amplification in DNA fingerprinting amplified from AD 15 primer in colorectal cancer by gene cloning and DNA sequencing	Assoc. Prof. Songsak Petmitr
Tropical Nutrition & Food Science	Miss Tawiwat Sareebot	Analysis of DNA amplification in colorectal cancer by AP-PCR using AB 19 primer, gene cloning and DNA sequencing	Assoc. Prof. Songsak Petmitr
Microbiology and Immunology	Miss Ampai Tanganuchitcharnchai	Production of monoclonal antibodies against clinically important <i>Aeromonas</i> spp.	Assist. Prof. Yuvadee Mahakhunkijchareon
Protozoology	Mr. Nitipan Tantawiwattananon	Viability of <i>Giardia</i> cysts in water from Thai frozen food industry	Assoc. Prof. Yaowalark Sukthana
Protozoology	Miss Charoonluk Sangloun	Effect of ultra-violet on viability of <i>Cryptosporidium</i> oocysts in water	Assoc. Prof. Yaowalark Sukthana
Social and Environmental Medicine	Miss Issariya Ieamsuwan	Mimotope identification from monoclonal antibody and patient sera specific to <i>Gnathostoma spinigerum</i> , using phage displayed random peptide library	Assist. Prof. Pongrama Ramasoota
Microbiology and Immunology	Miss Siriluk Feangvad	A comparative evaluation of four techniques for the serological diagnosis of scrub typhus infection	Assist. Prof. Varee Wongchotigul
Tropical Hygiene	Dr. Mohammad Jahirul Karim	Age-period-cohort analysis and spatial pattern of tuberculosis incidence in Bangladesh	Assoc. Prof. Pratap Singhasivanon

Ph.D (Trop. Med.) 2005

DEPARTMENT	NAME	TITLE OF THESIS	ADVISOR
Protozoology	Ms. Ruangrat Buddhirongawatr	Study of <i>Toxoplasma gondii</i> strain in Thai domestic and wild felid	Assoc. Prof. Yaowalark Sukthana
Social and Environmental Medicine	Ms. Pannamthip Pitaksajjakul	Construction of phage antibody library specific to H5N1 avian influenza virus	Assist. Prof. Pongrama Ramasoota
Medical Entomology	Miss Nuananong Jirakanjanakit	Morphometric analysis of wing geometry in the main dengue vector, <i>Aedes aegypti</i>	Assoc. Prof. Somjai Leemingsawat
Clinical Tropical Medicine	Dr. Srivicha Krudsood	New method for measurement of red blood cell destruction in malaria	Prof. Polrat Wilairatana
Tropical Hygiene	Dr. Md. Mushfiqur Rahman	The effect of adherence on the efficacy of artemether-lumefantrine (COARTEM) in the treatment of uncomplicated <i>Plasmodium falciparum</i> malaria in Bangladesh: a randomized controlled trial	Assoc. Prof. Pratap Singhasivanon
Tropical Hygiene	Ms. Tippawan Sungkapong	Identification of antigenic proteins of the surface of <i>P. vivax</i> -infected erythrocytes	Assist. Prof. Kesinee Chotivanich
Tropical Pathology	Mr. Kraisor Sappayatosok	Expression of NOS, VEGF, COX-2 and their clinicopathological correlation in oral and para-oral squamous cell carcinoma	Assist. Prof. Urai Chairri
Microbiology and Immunology	Ms. Natharinee Horata	Polymorphism and function of PfEMP1 extracellular domains in Thai <i>Plasmodium falciparum</i> isolates causing severe and uncomplicated malaria	Prof. Srisin Khusmith
Tropical Pathology	Ms. Navakanit Sachanonta	The effects of antimalarial drug-induced changes on <i>Plasmodium falciparum</i> and Pe-infected red blood cell ultrastructure	Assoc. Prof. Emsri Pongponratn
Clinical Tropical Medicine	Mrs. Piengchan Sonthayanon	Molecular diagnosis and multi-locus sequence	Prof. Sasithon Pukrittayakamee
Medical Entomology	Mrs. Raweewan Srisawat	The effect of gene mutations to the voltage gated sodium channel in resistant pyrethroid <i>Aedes aegypti</i>	Assoc. Prof. Narumon Komalamisara
Protozoology	Mr. Aongart Mahittikorn	Molecular and immunohistochemistry studies on tachyzoite and bradyzoite stage conversion in toxoplasmosis	Assoc. Prof. Yaowalark Sukthana
Tropical Nutrition & Food Science	Miss Ubol Chuensumran	Identification of genetic alterations in intrahepatic cholangiocarcinoma by arbitrarily primed-polymerase chain reaction (AP-PCR) and DNA sequencing	Assoc. Prof. Songsak Petmitr
Microbiology and Immunology	Mr. Trung Dac Nguyen	Molecular characterization of antibody resistance in clinical strains of <i>Salmonella enterica</i> serovar <i>typhi</i> from Vietnam	Assist. Prof. Usanee Suthisarnsunton
Microbiology and Immunology	Mr. Vu Phong Tuc	Impacts of pesticide exposure on sperm quality among male farmers in Thabinh Province, Vietnam	Assist. Prof. Voranuch Wangsuphachart
Tropical Hygiene	Mrs. Tassanee Silawan	The spatio-temporal dynamics of dengue infection in Northeastern Thailand	Assoc. Prof. Pratap Singhasivanon
Tropical Nutrition & Food Science	Mr. Kittisak Thawnashom	Gene polymorphisms in homocysteine pathway in relation to homocysteine and vitamin status in overweight/obese Thais	Assoc. Prof. Rungsunn Tungtrongchitr
Medical Entomology	Mr. Apiwat Tawatsin	Novel repellents derived from phytochemicals against mosquito vectors and common cockroaches in Thailand	Assoc. Prof. Narumon Komalamisara
Tropical Hygiene	Dr. Le Huu Tho	Alcohol consumption and sexual risk behaviors among adolescents and young adults in Nhatrang City, Vietnam: linear structural equation model	Assoc. Prof. Pratap Singhasivanon
Tropical Pathology	Ms. Jaiaue Wongtanachai	Effects of antimalarial drugs on <i>Plasmodium falciparum</i> : morphology, viability and multiplication potential	Assist. Prof. Urai Chairri



THE HOSPITAL FOR TROPICAL DISEASES

Telephone: (0) 2354 9154, (0) 2354 9100 ext 1624, 1625



Assoc. Prof. Wattana Leowattana

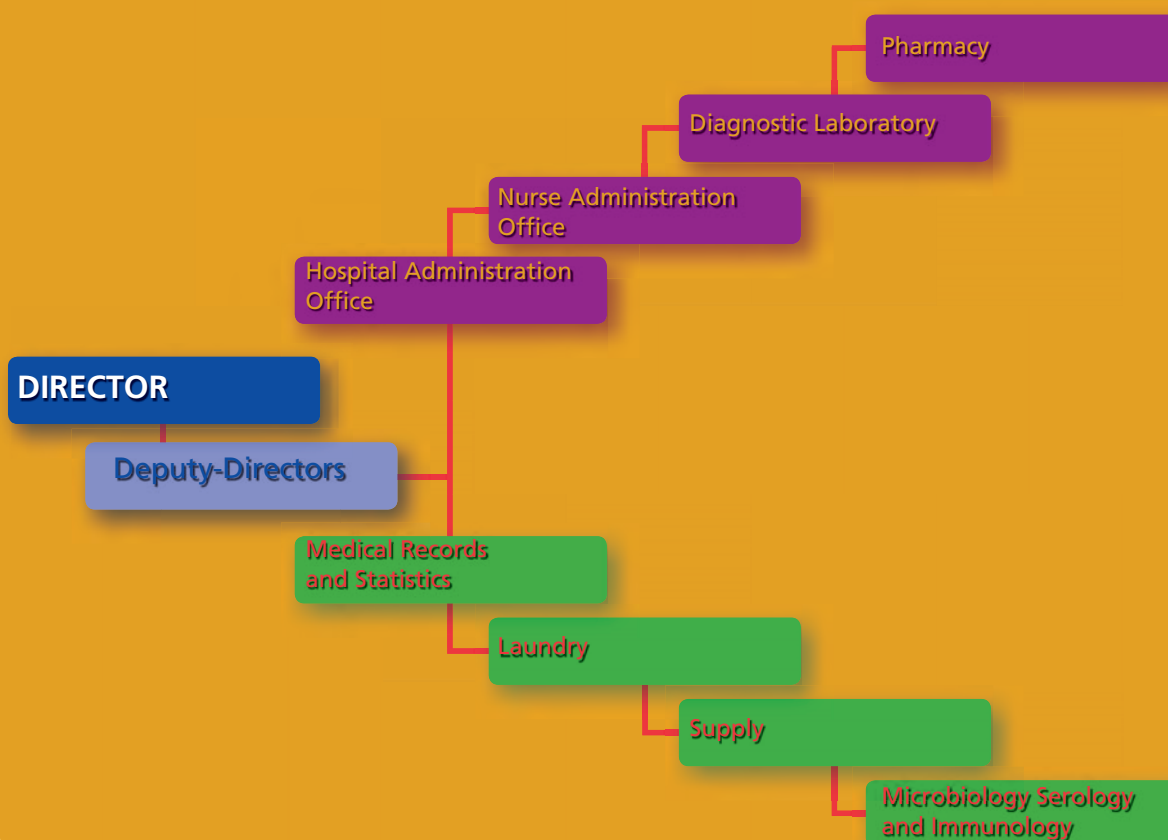
*B.Sc.(Med, M.D., M.Sc.(Clinical Science),
Diploma Thai Board of Clinical Pathology,
Diploma Thai Board of Family Medicine, F.R.C.P.(T)*

E-mail: leowattana@yahoo.com

Director

The Hospital for Tropical Diseases (HTD), a specialized research hospital, is one of the three hospital of Mahidol University, has operated since 1961. The HTD is an administrative structure at the Faculty of Tropical Medicine, Mahidol University that brings together a diverse group of faculty, staff and students from several different specialist whose research and teaching is focused on human pathogens and their invertebrate and vertebrate vectors, the diseases caused by these organisms, and the impact of these diseases on human society. Members of HTD are concerned in particular with the impact of infectious diseases in less developed parts of the world, and research interests of center members range from biomedical science to issues of human rights. Center members also work on new and emerging infectious diseases of importance in the tropical countries, especially those like Severe Acute Respiratory Syndrome (SARS) and Avia flu disease whose public health impact is significantly influenced by human impacts on the environment. Among the diseases studied at HTD are malaria, toxoplasmosis, tuberculosis, lymphatic filariasis, leishmaniasis, dengue, leptospirosis, and scrub typhus. Many faculty work specifically on arthropod vectors, particularly mosquito vectors of arboviruses, filarial worms, and malarial parasites.

ORGANIZATION AND ADMINISTRATION OF THE HOSPITAL FOR TROPICAL DISEASES



In the fiscal year 2005 the number of patients treated in the Hospital for Tropical Disease were classified by disease , as follows :

Diseases	No. of out-patients	No. of in-patients
1. Falciparum malaria	930	925
2. Vivax malaria	320	132
3. Mixed falciparum and vivax malaria	32	32
4. Malariae malaria	7	6
5. Unidentified infections	59	14
6. Scrub typhus	4	2
7. Typhoid	-	-
8. Diarrhea	150	28
9. Food poisoning	28	3
10. Hepatitis	846	15
11. Dengue hemorrhagic fever	138	101
12. Leptospirosis	-	-
13. Taeniasis	44	-
14. Hookworm	2	-
15. <i>Trichuris trichura</i>	3	-
16. Liver fluke	29	-
17. Pinworm	4	-
18. Strongyloidiasis	15	-
19. Gnathostomiasis	485	1
20. Filariasis	3	2
21. Dermatitis	2,737	11
22. Tuberculosis (pulmonary)	158	14
23. HIV infections	60	7
24. Hypertension	2,377	41
25. Diabetes mellitus	1,726	52
26. Hyperlipidemia	1,456	1
27. Diseases of oral cavity, salivary glands and jaws	324	200
28. Others	21,236	692
Total	33,173	2,279

Other Special Clinics are:

- **Dermatology clinic:**
Monday-Friday; 9.00-12.00 hr.
(Assoc. Prof. Wichai Supanaranond and Dr. Jittima Dhitavat)
- **Childrens clinic:**
Monday-Friday ; 9.00-12.00 hr.
(Assoc.Prof.Pornthep Chanthavanich, Assoc.Prof. Krisana Pengsaa, Assoc.Prof. Chukiat Sirivichayakul Dr.Keswadee Lapphra and Dr.Kriengsak Limkittikul)
- **Chest clinic:**
Tuesday ; 9.00-12.00 hr.
(Assist.Prof. Udomsak Silachamroon)
- **Gastroenterology clinic:**
Tuesday ; 9.00-12.00 hr.
(Prof. Polrat Wilairatana)
- **Liver clinic:**
Monday ; 9.00-12.00 hr.
(Assoc. Prof. Wattana Leowattana, Dr.Sombat Treeprasertsuk, Dr.Wichai Ekataksin)

- **Ear, nose, Throat clinic:**
Tuesday; 9.00-12.00 hr.
(Assoc. Prof. Yaowalark Sukthana)
- **Gnathostomiasis clinic:**
Wednesday and Friday; 9.00-12.00 hr.
(Assoc. Prof. Mario Riganti and Assist. Prof. Valai Bussaratid)
- **Nephrology clinic:**
Monday and Wednesday; 9.00-12.00 hr.
(Assist. Prof. Weerapong Phumratanaprapin and Dr. Wipa Thanachartwet)
- **Thai Traditional Massage:**
every day; 8.00-20.00 hr.
- **Traditional Chinese Acupuncture:**
Monday- Friday; 9.00-12.00 hr.
(Assoc. Prof. Wichai Supanaranond)

Central Laboratory Services

Test	No. of out-patients	No. of in-patients	Test	No. of out-patients	No. of in-patients
CBC	7,327	8,037	Phosphorus	169	1,967
Hb	7,214	8,379	Magnesium	53	839
Hct	7,266	12,004	Uric	3,009	1,782
Blood group	727	1,148	LDH	74	1,629
Reticulocyte count	360	1,573	CK	341	1,100
ESR	408	529	Amylase	19	515
HIV	-	8	HbA1c	512	80
Bleeding time	8	3	C.S.F-Protein	1	27
Malaria diagnosis	95	2,184	Urine Micro TP	44	5
Urine	4,946	4,757	Estradiol	23	1
Chloroquine	2	703	AFP	361	13
Stool examination	1,074	1,355	CEA	160	10
Occult blood	69	429	HBSAG	553	42
Glucose	6,145	5,991	Anti-HBS	487	42
BUN	4,712	7,833	Anti-HBE	109	3
Creatinine	5,300	7,235	HBEAG	290	8
Direct-bilirubin	1,687	6,262	Anti-HBC	389	39
Total-bilirubin	2,087	6,408	HBV-DNA	196	1
Total Protein	1,711	6,307	Anti-HCV	175	14
Albumin	1,985	7,171	HCG-BETA	201	3
ALP	4,767	6,796	LH	17	-
AST	6,596	7,699	Progesterone	21	-
ALT	6,614	7,707	Prolactin	36	2
GGT	203	2,578	Testosterone	13	-
Cholesterol	7,464	4,819	FSH	41	-
Triglyceride	7,226	1,229	G-6-PD	91	506
HDL	4,434	576	PT+PTT	29	648
Direct LDL	4,367	536	Hb typing	242	366
Sodium	1,125	7,889	CSF	-	22
Potassium	1,174	7,961	Cross-match	-	211
Chloride	1,117	7,785	HCT	76	1
CO2	1,118	7,751	Rh typing	-	10
Calcium	404	2,964			
Total			Total	107,464	164,492

SEAMEO TROPMED REGIONAL CENTRE FOR TROPICAL MEDICINE (TROPMED/THAILAND)

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Assoc. Prof. Pratap Singhasivanon

M.B.B.S., D.T.M. & H., DR.PH. (Epidemiology)

E-mail: tmpsh@mahidol.ac.th

Director

FACULTY OF TROPICAL MEDICINE, MAHIDOL UNIVERSITY, BANGKOK, THAILAND

The Faculty of Tropical Medicine (FTM), Mahidol University, Bangkok, Thailand has been appointed by the Southeast Asian Ministers of Education Organization (SEAMEO) as the TROPMED National Centre for Tropical Medicine since 1967 and was later promoted as the SEAMEO TROPMED Regional Centre for Tropical Medicine (TROPMED/Thailand) since 1994. Its objectives are to provide 3 major functions namely: 1) Teaching and training, 2) Research, and 3) Services.



For teaching, the Bangkok School of Tropical Medicine offers five regular international postgraduate programs:

- Diploma in Tropical Medicine and Hygiene
- Master of Clinical Tropical Medicine
- Master of Clinical Tropical Pediatrics
- Master of Science in Tropical Medicine
- Doctor of Philosophy in Tropical Medicine
- Doctor of Philosophy in Clinical Tropical Medicine

For research, the FTM encourages basic and applied research that leads to the solution of clinical problems in the Tropics, to improve the quality of life of the people, particularly in tropical and developing countries. Research activities are focused on the development of new knowledge or innovations for the practice of tropical medicine. Several related organizations within the Faculty were organized to support facilitate, improve, and maintain research quality e.g. Ethics Committees, Board of Research Consultants, and the Research and Academic Affairs Unit. We encourage collaborative studies through both local and international linkages. As part of our research activities, the Faculty is currently affiliated with more than twenty leading research institutes from all continents of the globe. The current research

programs include clinical trials in the Hospital for Tropical Diseases, laboratory research, field and epidemiology studies covering more than 20 diseases, including malaria, melioidosis, soil-transmitted diseases, and mosquito-borne diseases, HIV/AIDS, and the health effects of unpredicted natural hazards and disasters.

The FTM remains the leader in Asia in publishing research studies on malaria and other tropical diseases. We will continue to encourage, support, and facilitate research in tropical diseases and other related global health problems. The research activities of the Faculty of Tropical Medicine will continue to strive to improve the education and health of the people in this region.

For services, the Hospital for Tropical Diseases (HTD), a specialized research hospital, is one of the three hospitals of Mahidol University, has operated since 1961. The HTD is an administrative structure at the FTM, Mahidol University that brings together a diverse group of faculty, staff and students from several different specialists, whose research and teaching is focused on human pathogens and their invertebrate and vertebrate vectors, the diseases caused by these organisms, and the impact of these diseases on human society. Members of HTD are concerned in particular with the impact of infectious diseases in less developed parts of the world, and research interests of center members range from biomedical science to issues of human rights. Center members also work on new and emerging infectious diseases of importance in tropical countries, especially Severe Acute Respiratory Syndrome (SARS) and Avian flu, the public health impact of which is significantly influenced by human impacts on the environment. Among the diseases studied at HTD are malaria, toxoplasmosis, tuberculosis, lymphatic filariasis, leishmaniasis, dengue, leptospirosis, and scrub typhus. Many faculty members work specifically on arthropod vectors, particularly mosquito vectors of arboviruses, filarial worms, and malarial parasites.

Three functions of the TROPED/Thailand's activities are reported according to the 5 KEY RESULT AREAS, as follows:

KRA 1 ENHANCED PROGRAMME QUALITY AND RELEVANCE

1.1 Post-graduate regular courses. TROPED/Thailand offers six post-graduate regular courses at the international level, with a total of 236 students from 23 countries.

1.2 Undergraduate courses.

TROPED/Thailand also offers 2 undergraduate courses:

- 1) Elective Program in Tropical Medicine with 32 both medical doctors and medical students from 5 countries.
- 2) Nurse Assistant Certificate Program with 202 students.

In FY 2004, TROPED/Thailand had 470 students from 23 countries; among these, 322 were newly enrolled students. 452 of these students were fee-paying attendants.

Table 1: Number of students attending the 6 regular courses

Courses	Number	No. (Nationality)	No. of fee-paying Students	No. of Graduates
Postgraduate DTM&H 6-month course	32	18 (Australia, Bangladesh, Cambodia France, India, Indonesia, Japan, Lao PDR, Myanmar, Philippines, Spain, Sri Lanka, Switzerland, Thailand, United Kingdom USA, United Arab Emirates)	29 (90.62%)	19 (59.37%)
MCTM 1 year course	7	7 (Ethiopia, India, Lao PDR, Myanmar, Somalia, Sri Lanka, Switzerland)	5 (71.42%)	6 (85.71%)
MSc (TM) 1 st year	29	4 (Japan, Bangladesh, Nepal, Thailand)	72 (91.13%)	19 (24.05%)
2 nd year	17	3 (Nepal, Japan, Thailand)		
3 rd year (onward)	33	3 (Lao PDR, Thailand)		
PhD (TM) 1 st year	18	2 (Bangladesh, Thailand)	107 (95.53%)	13 (11.60%)
2 nd year	19	2 (Thailand, Vietnam)		
3 rd year	18	2 (Thailand, Vietnam)		
4 th - 9 th year	57	4 (Korea, Switzerland, Malaysia, Thailand)		
PhD (Clin. Trop. Med) 1 st year	2	2 (Myanmar, Nepal)	5 (83.33%)	1 (16.66%)
2 nd year (Onward)	4	3 (Japan, Myanmar, Thailand)		
Subtotal	236		218 (92.37%)	58 (24.57%)
Undergraduate Elective Programme in Tropical Medicine	32	5 (Austria, Canada, Japan, Malaysia, USA)	32 (100%)	32 (100%)
Nurse Assistant Certificate	202	1 (Thailand)	202 (100%)	202 (100%)
Sub Total	234		234 (100%)	234 (100%)
Grand Total	470	23	452 (96.17%)	292 (62.12%)

1.3 Training Course/Workshop/Meeting. Nine international short training courses with 66 participants from 27 countries and 1 international meeting (Joint International Tropical Medicine Meeting 2004) were convened during FY 2004, with a total of 643 participants from 25 countries.

KRA 2 INCREASED ACCESS TO MARKET

2.1 Active Marketing. Thirty TV series were broadcast, 9 news items published in local newspapers, journals and magazines, 10 radio announcements. 5,000 copies of 6 tropical diseases/related fields information leaflets were produced and distributed to the public. 1,250 copies of centre's internal journal were produced, and 92 news items announced on the Mahidol University website.

KRA 3 INCREASED LINKAGES

3.1 WHO Collaborating Centre: World Health Organization has designated the Faculty of Tropical Medicine a WHO Collaborating Centre for Environment of Disease Vector Control in Sustainable Development.

3.2 Visitors: Fifty-three visitors from 13 countries visited TROPMED/Thailand during FY 2004/2005, consisting of lecturers, assistant lecturers, academic staff, clinicians/medical doctors, medical students, public health personnel, scientists and researchers.

KRA 4 IMPROVED FINANCIAL STATUS

There were three sources of revenue for activities pertaining to the three major roles of TROPMED/Thailand: 1) Government budget, 2) Revenue from medical care fees, academic services and other activities, and 3) Research funds.

Table 2: Sources of revenue

Sources	Amount In million Baht	Percentage Increase/ Decrease
1. Government budget	125.46	+ 2.56%
2. Revenue from services and other activities	94.20	N/A
3. Research funds from other organizations	167.21	- 0.62%

KRA 5 ENHANCED QUALITY OF SEAMEO MANAGEMENT

TROPMED/Thailand has a total of 788 staff comprising 101 academic staff, 179 academic assistants and research staff, 378 administrative personnel and employees, 130 university employees. The qualifications and academic posts by these 101 academic staff in the year under review are shown in Table 3.

Table 3: Qualifications of 244 academic and academic assistant staff

Qualification	No	Percentage (%)
1. PhD	65	64.35 %
2. Master	25	24.72 %
3. Bachelor	11	10.89 %
Total	101	100 %

The academic posts of 101 academic staff compared to those of Mahidol University are shown in Table 4.

Table 4: Academic posts of 101 staff of TROPMED/Thailand

Academic Posts	Academic Posts	
	Holding by FTM Staff No. (%)	Holding by Mahidol Staff No. (%)
Professors	5 (05.15%)	124 (04.46%)
Associate Professors	33 (34.02%)	780 (28.08%)
Assistant Professors	30 (29.70%)	821 (29.56%)
Lecturers	31 (30.69%)	1,052 (37.88%)
Total	101 (100.00%)	2,777 (100.00%)

5.1 Number of staff promoted or obtaining higher qualifications

Table 5: Number of staff promoted

Academic rank:	Professors	= 2
	Associate Professors	= 2
	Assistant Professors	= 3
	Lecturers	= 2
Career rank	: Higher rank	= 51
Higher qualification	: Higher degree	= 9
Total		= 69

5.2 Number of research projects and publication. TROPMED/Thailand staff undertook 118 research projects with total research grants of 167.21 million Baht and published 117 research papers.

Table 6: Number of research projects and publications

	New Project	On-going	Accomplished
Number of research projects	17 (14.40%)	68 (57.62%)	33 (27.96%)
Number of published papers	117		

5.3 Number of staff taking study leave, attending training courses, and attending meetings/seminars/workshops.

Eleven staff (1.39%) took study leave for higher education. Seven hundred and twenty-five staff (92.00%) attended training, meetings, seminars, and workshops within country and abroad. One staff may attend more than one training/meeting/seminar/workshop.

Table 7: Staff development through higher study, training courses, seminars/workshops.

Category of staff development	In country	Abroad	Total
Study leave	6 (0.87%)	0 (0.0%)	6 (0.82%)
Attending training courses seminars, meetings workshops	682 (99.12%)	43 (100%)	725 (99.17%)
Number of staff	688 (100%)	43 (100%)	731 (100%)

5.4 Special talks / lectures

To develop and/or improve knowledge of staff, 17 lunch talks/lectures on various topics for 780 attendees were organized, 22 CME lectures (Continuing Medical Education) including 8 information technology training courses were organized for 406 attendees. 54 academic staff were invited to give lectures within country on various topics.

5.5 Patients treated for tropical diseases

The Hospital for Tropical Diseases offers medical care services to patients suffering from tropical and other diseases. The Hospital has 250 beds with 31 medical doctors, 83 nurses, and 81 nurse assistants. The total number of outpatients treated was 28,432, and 1,502 patients were admitted to the Hospital. Routine and special laboratory services for diagnosis of tropical infections were also provided.

5.6 Improved infrastructure

1. Rajanagarindra Tropical Diseases International Centre (RTIC) is a centre for conducting field research on tropical diseases, and is located in Suan Phung district, Ratchaburi Province.

2. The Tropical Diseases Research Centre Kanchanaburi is one of the Faculty's centres for conducting tropical disease research and is a field training center for students, located at the Kanchanaburi campus of Mahidol University.

3. Sixty computers were installed in the Computer Center for training and courses and administrative activities.

4. During FY 2004/2005, renovations of the Faculty were conducted, including the administrative building, the Hospital for Tropical Diseases, and the Bangkok School of Tropical Medicine, and some departments.

5. Since the International Guest House with 66 rooms was opened, 435 students/guests/visitors from 29 countries were served in FY 2004/2005.



OFFICE OF THE DEAN

Telephone: 0 2354 9100-19 ext. 1326, 1328; Fax: 0 2354 9139



Mrs. Vorapan Singhsilarak

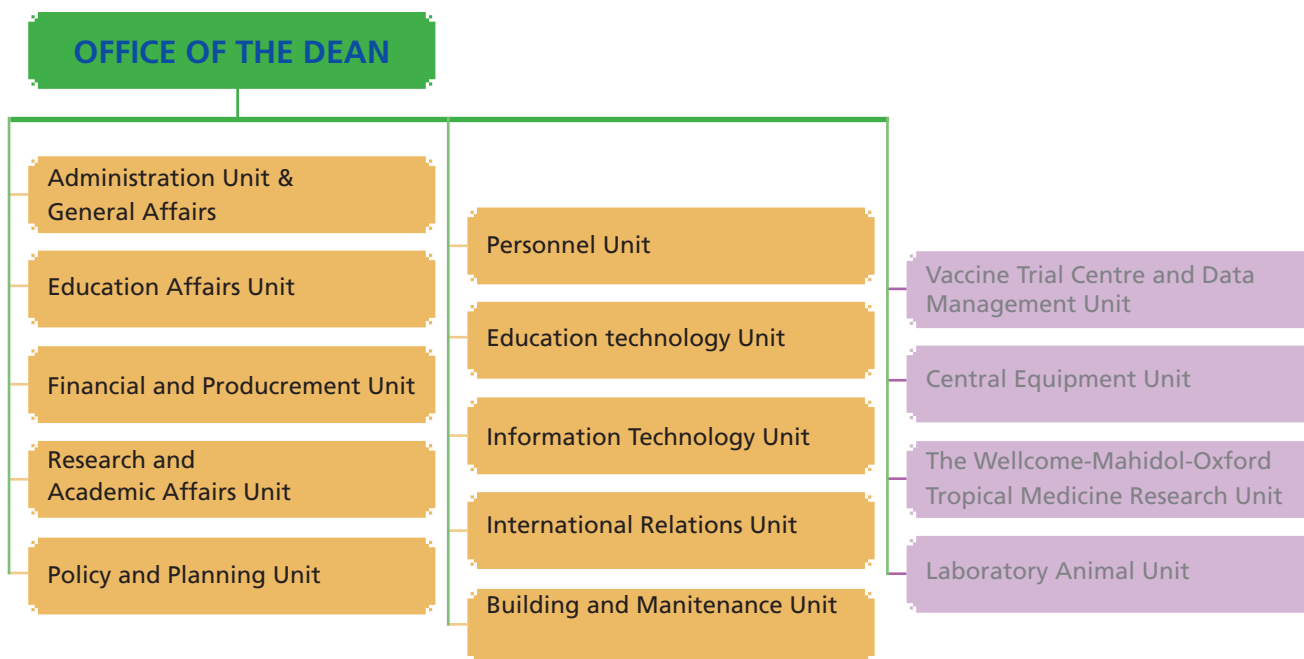
B.A.

Secretary of the Faculty

The Office of the Dean is a support unit facilitating the major tasks of the Faculty, such as teaching, research academic services, and hospital services, to meet the goals of the Faculty. The Office of the Dean is conducted under the authority and supervision of the Secretary of the Faculty and Deputy Deans with related duties. It can be differentiated into 10 major units, i.e., Administration and General Affairs Unit, Personnel Unit, Policy and Planning Unit, Financial and Procurement Unit, Educational Affairs Unit, Information Technology Unit, Educational Technology Unit, International Relations Unit, Area and Maintenance Unit, and Research and Academic Affairs Unit.

Vision for the Office of the Dean
“ PLEASED TO BE OF SERVICE ”

Organization Chart



Training Programs

Training Courses/Workshops, Faculty of Tropical Medicine, Mahidol University
FY 2005

No.	Courses/Workshops	Duration	Number of Participants	Countries Participated	Organized by
1.	Training in Vector-borne Diseases Control and Pest Control Operation Who	4-14 Jan 2005	2	PR China	The Faculty
2.	Special Training on Tropical Diseases Management of HIV/AIDS	10 Jan-4 Feb 2005	2	Japan	The Faculty
3.	Training Course on Clinical Epidemiology and Management of HIV/AIDS	14 Feb-11 March 2005	16	Japan, Cambodia, Myanmar, Vietnam Lao PDR, Thailand	The Faculty
4.	Application of GIS in Disease Surveillance with Special Reference to Spatial Analysis	18-25 April 2005	27	Cambodia, Lao PDR, Myanmar, PR China, Thai, Vietnam, Cambodia	Department of Tropical Hygiene
5.	International Training Course in Partnership Building for Healthy Borders	4 July-26 August 2005	22	Myanmar, Cambodia, Vietnam, PR China, Lao PDR, Thailand	The Faculty
6.	Laboratory Diagnosis of Malaria I	22-23 August 2005	60	Thailand	Department of Protozoology
7.	Laboratory Diagnosis of Malaria II	25-26 August 2005	59	Thailand	Department of Protozoology
8.	Participants of Master of Primary Health Care Management Degree Program Academic year 2005-2006 ASEAN Institute for Health development (AIHD), Mahidol University	26-27 August 2005	21	Bangladesh, Cambodia, China, Indonesia, Lao PDR, Nepal, Philippines, Srilanka, Thai, Vietnam	Department of Tropical Hygiene
9.	Refresher Course in Good Clinical Practice	4-5 September 2005	60	Thailand	Department of Tropical Pediatrics
10.	The International Training Course on Management of Malaria 2005	26-30 September 2005	19	Australia, Oman, Bhutan, Myanmar, Indonesia, Philippines, Solomon Islands, Japan	The Faculty
11.	Training Course on Management of Malaria 2005 (TICA)	26 Sept.-7 Oct. 2005	14	Madagascar, Burkina Faso, Sudan, Kenya, Uganda, Tanzania, Senegal, Nigeria	The Faculty
12.	Assessment and Research Methodology in Nutrition	25-27 October 2005	40	Thailand	Department of Tropical Nutrition & Food Science
13.	Training Course on Molecular and Radioisotope-based Techniques Applied to Malaria Epidemiology	3 October-30 December 2005	1	Myanmar	The Faculty
14.	Workshop in the Parasite Control for Latin American and Caribbean	23-24 Nov. 2005	14	South America	Department of Tropical Hygiene

MOUS/Agreements

between Faculty of Tropical Medicine and Oversea Institute
FY 2005

No.	Institute	Duration	Start	Finish	Remarks
1.	Chiangrai Regional Hospital, MoPH	5 yrs	15 June 2004	14 June 2009	MOU
2.	Department of Medical Sciences, MoPH	5 yrs	28 May 2004	27 May 2009	MOU
3.	Canadian Food Inspection Agency, Government of Canada, Saskatoon, Canada		3 Sep. 1998	Not specified	MOU
4.	University of Leicester, United Kingdom		1 April 2002	present	MOU
5.	Freie Universitat at Berlin		30 May 1985	present	Agreement
6.	The Swiss Tropical Institute, Basel, Switzerland		3 June 1998	present	MOU
7.	University of Innsbruck, Austria		12 May 1992	present	Agreement
8.	Nagasaki University, Japan	5 yrs	1 Nov. 1999	Automatically extended every 5 yrs	Agreement
9.	University of Shizuoka School of Pharmaceutical Science	5 yrs	2005	3000	MOU
10.	Department of Medical Sciences, MoPH	5 yrs	28 May 2004	2009	MOU
11.	The Wellcome Trust-Mahidol University, Oxford Tropical Medicine Research Programme	5 yrs	Sep. 2004	Sep. 2010	MOU
12.	Japan International Corporation of Welfare Services	1 month	Feb. 2005	March 2005	MOU
13.	Southeast Asian Ministers of Education Organization (SEAMEO) and the Government of Thailand		18 May 1971		MOU

INTERNATIONAL Linkages

1. Department of Immunology, University of Stockholm, Sweden
(Prof. Dr. Martia Troye-Blomberg)
2. Department of Pharmacology and Therapeutics, Liverpool School of Tropical Medicine, United Kingdom
(Dr. Alister Craig)
3. Department of Respiratory Diseases, Research Institute International Medical Center of Japan, Tokyo, Japan
(Prof. Dr. Naoto Keicho)
4. University of Shizuoka School of Pharmaceutical Sciences, Japan
(Prof. Dr. Yasuo Suzuki)
5. Institute of Tropical Medicine, Nagasaki University, Japan
(Prof. Dr. Kouichi Morita)

INTERNATIONAL Linkages *(Continued)*

6. Department of Human Genetics School of International Health Graduate School of Medicine, The University of Tokyo, Japan
(Prof. Dr. Katsushi Tokunaga and Dr. Jan Ohashi)
7. Institute Pasteur Unit of Molecular Immunology Parasites, France
(Prof. Dr. Odile Puijalon and Dr. Peter H. Pavid)
8. The University of Texas Health Science Center at Houston, U.S.A.
(Prof. Dr. Herbert Dupont)
9. Department of Microbiology Faculty of Medicine, Nursing and Health Sciences, Monash University, Australia
(Prof. Dr. Ben Adler)
10. Oita University, Japan
11. Liverpool School of Tropical Medicine, United Kingdom
12. Department of Parasitology, School of Veterinary Science, Murdoch University of South Street, Murdoch, Western Australia
13. Nuffield Department of Pathology, University of Oxford, John Radcliffe Hospital, UK
14. Department of Parasitology and Tropical Hygiene, Heidelberg University, Germany
15. Division of Electron Microscopy, Department of Cellular Pathology, The John Radcliff Hospital, Oxford University, United Kingdom
16. Department of Medical Zoology, Kagawa Medical University, Japan
17. Department of Immunology, The Wenner Gren Institute, Stockholm University, Sweden
18. Radiation Safety Research Center, Redox Regulation Research Group, National Institute of Radiological Sciences (NIRS), Japan
19. Department of Surgery, University of Heidelberg Medical School, Heidelberg, Germany
20. Department of Cell Biology and Anatomy, College Medicine, University of Arizona Health Sciences Center, Tucson, Arizona, USA
21. Department of Anatomy Division I, Tokyo Medical and Dental University School of Medicine, Tokyo, Japan
22. Department of Surgery, Nippon Medical College, Tokyo, Japan

VISITORS 2005

Name	Country	Name	Country
1. Dr. Hoang Trong Si	Vietnam	11. Dr. Tran Minh Thinh	Vietnam
2. Dr. Phan Than Hung	Vietnam	12. Dr. Nguyen Duy Luat	Vietnam
3. Dr. Le Xuan Truong	Vietnam	13. Dr. Nguyen Thi Van Hong	Vietnam
4. Dr. Nguyen Van Tam	Vietnam	14. Prof. Nguyen Tran Thi Giang Huong	Vietnam
5. Dr. Tran Duc Quy	Vietnam	15. Prof. Ha Van Quyet	Vietnam
6. Dr. Duong Thi Huong	Vietnam	16. Ms. Le Thi Yen	Vietnam
7. Dr. Pham Van Lai	Vietnam	17. Dr. Chu Van Loan	Vietnam
8. Dr. Le Thi Tuyet	Vietnam	18. Dr. Nguyen Van Thai	Vietnam
9. Dr. Pham Thien Dieu	Vietnam	19. Prof. Pham Van Than	Vietnam
10. Dr. Nguyen Kim Nghia	Vietnam	20. Ms. Cao Thi Hue Chi	Vietnam

VISITORS 2005 *(Continued)*

Name	Country	Name	Country
21. Prof. Tohru Shimizu	Japan	43. Ms. Marion Mathibedi	Ghana
22. Dr. Katherine Bond	Thailand	44. Ms. Thandi Sylvia Chaane	Ghana
23. H.E. Prof. Dr. Nguyen Minh Hien	Vietnam	45. Ms. Maphosa Ruth Gontsana	Ghana
24. H.E. Mr. Khamhoung Heuangvongsy	Lao P.D.R.	46. Ms. Marie Oniwa	Ghana
25. H.E. Dr. Carolyn Bennett	Canada	47. Ms. Kaori Mizumoto	Ghana
26. Ms. Yasmin Ratansi	Canada	48. Mr. Girindre Beeharry	Switzerland
27. Ms. Tricia Geddes	Canada	49. Mr. Dame Bridget Ogilvie	Switzerland
28. Mr. David Yasui	Canada	50. Mr. Chris Hentschel	Switzerland
29. Ms. Chi Nguyen	Canada	51. Mr. Peter Potter-Lesage	Switzerland
30. Ms. Alisa Udomweerakasm	Thailand	52. Mr. J Carl Craft	Switzerland
31. Ms. Cui Yili	China	53. Prof. Robert W. Snow	Kenya
32. Mr. Shang Li	China	54. Dr. Mohammed bin Ali Al Shafae	Oman
33. Mr. Chu Lixi	China	55. Dr. Satie Muqattash	Oman
34. Ms. Guo Jinglei	China	56. Dr. Shahina Daar	Oman
35. Dr. Md. Ridwanur Rahman	Bangladesh	57. Prof. Francesco Castelli	UK
36. Dr. P.L. Joshi	India	58. Prof. Carlo Collivignarelli	UK
37. Dr. Sanjib Mohanty	India	59. Prof. Luigidaniele Notarangelo	UK
38. Dr. Alan Roland Tumbelaka	Indonesia	60. A. Lee Willingham	Kenya
39. Dr. Bangkit Hutajulu	Indonesia	61. Dr. Sonja Marjanovic	UK
40. Dr. Phyu Aye Aye	Myanmar	62. Dr. Ms. Zheng Bin	China
41. Dr. Win Ni Aung	Myanmar	63. Prof. Glenn Morris	USA
42. Dr. Ronnatri Ruengveerayuth	Thailand	64. Dr. Azmi Mohd Tamil	Malaysia

Elective Program in Tropical Medicine, FY 2005

10 January – 4 February 2005

- Resident in Internal Medicine, U.S.A.
Dr. Stephen Sethi
- Lund University, Sweden
Dr. Par Andersson
- University of Toronto, Canada
Dr. Alireza Zahirieh

4 – 29 April 2005

- Albert Einstein Medical, U.S.A.
Dr. Margot Goodkin
- St. George's Hospital Medical School, UK
Ms. Christina Bull
Ms. Malathi Gunaratne
Mr. Pritish Morar
Mr. Nikunj Vadgama
- Nagoya City University Medical School, Japan
Mr. Keitaro Fukui
Ms. Mayuka Oe

20 June – 22 July 2005

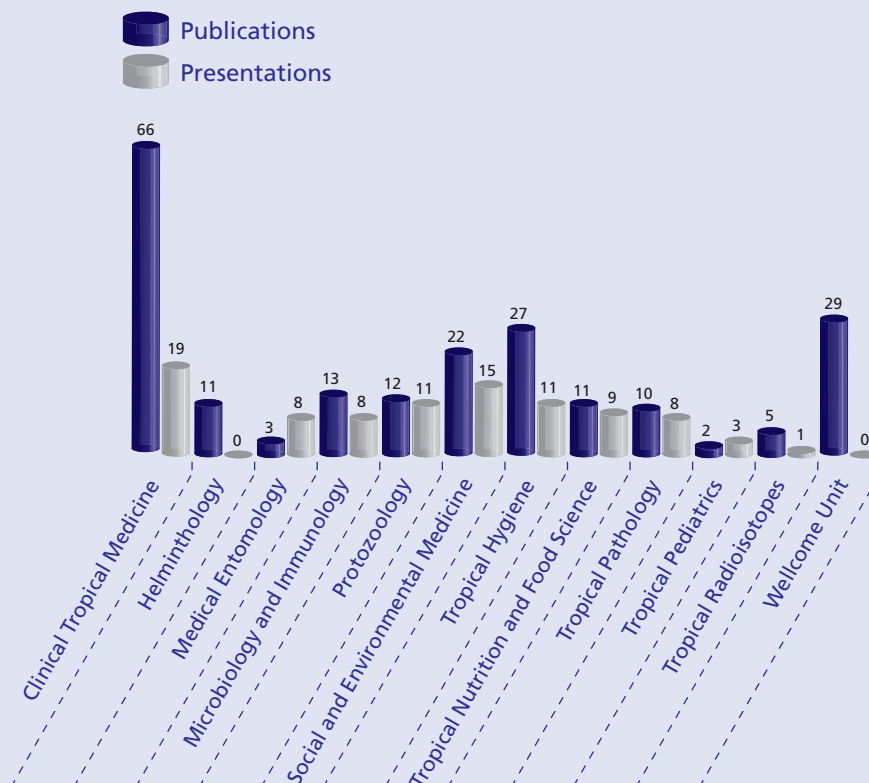
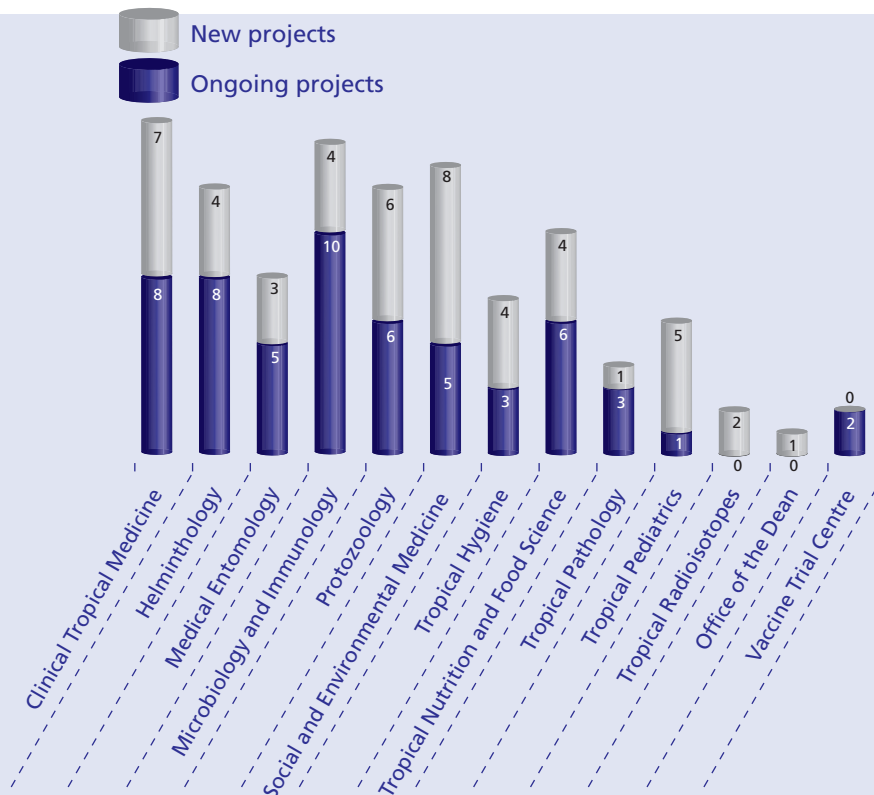
- Jikei University School of Medicine, Japan
Mr. Hikaru Kobayashi

- University of Vienna, Austria
Ms. Elisabeth Poppl
- University of Calgary, Canada
Ms. Nerissa Tyson
- University of Calgary, Canada
Ms. Melissa Jack

5 – 30 September 2005

- University of Innsbruck, Austria
Mr. Thomas Kranabetter
Mr. Manfred Nairz
Ms. Michaela Kogler
Ms. Barbara Erne
- University of Graz, Austria
Mr. Michael Meilinger
Ms. Barbara Mair
- Radboud University Medical Centre, Netherlands
Ms. Vivian Claessen
- St. Lukes/Roosevelt Hospital, USA.
Dr. Chilembwe Mason
- Royal Thai Army Medical Department
Lt Cdr Dr. Rico Muller

SUMMARY OF DEPARTMENTAL RESEARCH PROJECTS, PUBLICATIONS, AND PRESENTATIONS



Ongoing Research Projects of the Faculty of Tropical Medicine in Fiscal Year 2005

No.	Research Title	Grant	Principal Investigator
Department of Clinical Tropical Medicine			
1	A multicenter, randomized, double-blind, phase II study to evaluate the safety, tolerance and efficacy of multiple doses of SCH 56592 versus fluconazole in the treatment of oropharyngeal candidiasis (OPC) in HIV-positive patients	Schering Plough Research Institute	Prof. Punnee Pitisuttithum
2	Open-label, treatment protocol for the safety and efficacy of SCH 56592 (Oral Suspension) in the treatment of invasive fungal infections	Schering Plough Research Institute	Prof. Punnee Pitisuttithum
3	Observational probe study of <i>in vitro</i> immune response parameters to candidate HIV-1 vaccine antigens among subject from Thailand	MERCK and Co., Inc	Prof. Punnee Pitisuttithum
*4	Safety, immunogenicity, and efficacy of quadrivalent HPV (Types 6, 11, 16, 18) L1 Virus-Like Particle (VLP) vaccine in mid-adult women. The FUTURE III Study	MERCK and Co., Inc	Prof. Punnee Pitisuttithum
*5	A Phase III Trial of Aventis Pasteur Live Recombinant ALVAC-HIV (vCP1521) priming with VaxGen gp120 B/E (AIDSVAX B/E) Boosting in HIV-uninfected Thai adults (Clinic)	The Henry M. Jackson Foundation for The Advancement of Military Medicine, Inc. and The Government of Thailand Ministry of Public Health	Prof. Punnee Pitisuttithum
6	Research and development for Thai people living at Thai-Myanmar border to free from tropical diseases	Government Budget	Prof. Sornchai Looareesuwan
7	Research and development on drugs and diagnostic tools for diagnosis and treatment of tropical diseases in Thailand	Government Budget	Prof. Sornchai Looareesuwan
8	Liver megaproject Phase I: from basic research to education science and applied technology in clinical study	National Science and Technology Development Agency	Dr. Wichai Ekataksin
*9	Hospital based case-central study of leptospirosis	Government Budget	Assoc. Prof. Yupaporn Wattanaoorn
*10	Genotyping of <i>Plasmodium vivax</i> ; development of field methods	Wellcome Trust of Great Britain	Assist. Prof. Mallika Imwong
*11	Antimalarial drug susceptibility of <i>P. vivax</i> in Thailand	MMV	Assist. Prof. Kesinee Chotivanich
*12	Antimalarial drugs susceptibility of <i>P. vivax</i> in Korea and China	WHO	Assist. Prof. Kesinee Chotivanich
*13	Cell-derived microparticles in malaria infection	Wellcome Trust of Great Britain	Assist. Prof. Kesinee Chotivanich
14	Development of field methods and investigators of the molecular basis of sulfonamide resistance in <i>Plasmodium vivax</i>	Wellcome Trust of Great Britain	Assist. Prof. Mallika Imwong
15	Novel point mutations in the dihydrofolate reductase gene of <i>Plasmodium vivax</i> : evidence for sequential selection by drug pressure	Wellcome Trust of Great Britain	Assist. Prof. Mallika Imwong

* New project

ONGOING RESEARCH PROJECTS OF THE FACULTY OF TROPICAL MEDICINE IN FY 2005

No.	Research Title	Grant	Principal Investigator
Department of Helminthology			
16	Monoclonal antibody-based competitive ELISA and indirect ELISA for immunodiagnosis of trichinosis	Mahidol University	Mrs. Supaporn Nuamtanong
17	<i>Angiostrongylus cantonensis</i> : S-Adenosylmethionine decarboxylase	Government Budget	Mrs. Supaporn Nuamtanong
18	Comparison of biochemical extract preparations of <i>Cysticercus cellulosae</i> by SDS – polyacrylamide gel electrophoresis and immunoblot technique	Mahidol University	Assist. Prof. Paron Dekumyoy
19	Experimental infection of freshwater fish in Thailand with the infective stage of <i>Angiostrongylus cantonensis</i>	Mahidol University	Assist. Prof. Chalit Komalamisra
20	<i>Toxocara canis</i> larval antigens for serodiagnosis of human toxocarasis	Mahidol University	Assoc. Prof. Wanna Maipanich
*21	Helminthic infection in a tsunami-affected area: soil contamination and infection rates in the population	Brescia University, Italy	Assoc. Prof. Wanna Maipanich
22	Studies on the efficacy of Thai traditional herbal medicines in the treatment of opisthorchiasis in hamsters	Mahidol University	Assist. Prof. Panyawut Hiranyachattada
23	Research and development of the intergrated project on chemotherapy and control of malaria and parasitic infections	Government Budget	Assoc. Prof. Jitra Waikagul
24	Research and development of an application to purify <i>Bithynia</i> snail antigen in serodiagnosis of opisthorchiasis	Government Budget	Assoc. Prof. Jitra Waikagul
*25	Study on <i>Paragonimus</i> population: morphology, molecular biology, enzymology and epidemiology aspects	Ministry of Foreign Affairs	Assoc. Prof. Jitra Waikagul
*26	Control of soil-transmitted helminth through primary health care activities	Tropical Disease Trust	Assoc. Prof. Jitra Waikagul
*27	Molecular phylogenetics and biodiversity studies of <i>Paragonimus</i> spp. in Thailand using molecular biological approaches	Faculty of Tropical Medicine	Ms. Urusa Thaenkham
Department of Medical Entomology			
28	Specificity of the synthetic primers from sequencing DNA fragments of <i>Anopheles minimus</i>	Faculty of Tropical Medicine	Assoc. Prof. Narumon Komalamisra
29	Mosquito repellent from medicinal plants	Mahidol University	Assoc. Prof. Narumon Komalamisra
30	Effect of heavy metals (Pb ²⁺ , Cd ²⁺) on enzymes of <i>Culex quinquefasciatus</i> larvae	Mahidol University	Mrs. Raweewan Srisawat
31	Study on fauna of medically important vectors at Kanchanaburi Campus Sai Yok District, Kanchanaburi Province	Mahidol University	Assoc. Prof. Somjai Leemingsawat
32	DNA bank of mosquito vectors of Thailand	Government Budget	Assoc. Prof. Chamnarn Apiwathnasorn
*33	Efficacy of water dispersible granule formulation of <i>Bacillus thuringiensis israelensis</i> (VECTOBAC® WDG) and <i>Bacillus sphaericus</i> (VECTOLEX® WDG) to control <i>Culex sitiens</i> in brackish water ponds in Tsunami-affected areas of Phang-Nga Province, Southern Thailand	Brescia University, Italy	Dr. Yuwadee Trongtokit
*34	Field application of <i>Bacillus thuringiensis</i> (VECTOBAC® WDG) for the control of mosquito larvae in salt-marsh habitats in Tsunami-affected Areas, in Phang Nga Province, Thailand	Faculty of Tropical Medicine	Dr. Yuwadee Trongtokit
*35	Molecular study of <i>Anopheles sudaicus</i> in the coastal area of Andaman and the Gulf of Thailand	Faculty of Tropical Medicine	Ms. Peangpim Burivong

* New project

ONGOING RESEARCH PROJECTS OF THE FACULTY OF TROPICAL MEDICINE FY 2005

No.	Research Title	Grant	Principal Investigator
Department of Microbiology and Immunology			
36	Analysis of sequence polymorphism of T-cell epitope regions, Th2R and Th3R on <i>Plasmodium falciparum</i> circumsporozoite proteins in Thai isolates	The Thailand Research Fund	Prof. Srisin Khusmith
37	Cytokine gene polymorphism in severe malaria	The Thailand Research Fund	Prof. Srisin Khusmith
38	Relationship between cytokine gene polymorphism and severity of falciparum malaria	The Thailand Research Fund	Prof. Srisin Khusmith
39	Polymorphism of Pf EMP1 extracellular domain in Thai isolates causes severe malaria uncomplicated <i>P. falciparum</i> malaria	The Thailand Research Fund	Prof. Srisin Khusmith
40	Chemokine gene polymorphism and their susceptibility to tuberculosis	The Thailand Research Fund and Commission on Higher Education	Prof. Srisin Khusmith
*41	Dengue infection rates in <i>Aedes</i> related to environmental factors	Ministry of Public Health	Assoc. Prof. Wipawee Champangern
42	Typing of <i>Entamoeba histolytica</i> isolates obtained from Southeast Asian countries	Japanese Health Sciences Foundation (JHSF)	Assoc. Prof. Nitaya Thammapalerd
43	HLA typing of amoebiasis	Japanese Health Sciences Foundation (JHSF)	Assoc. Prof. Nitaya Thammapalerd
44	Study of the active site between the three-dimensional structure of R-PE-Mab complex	The Thailand Research Fund	Assoc. Prof. Nitaya Thammapalerd
45	Development of strategies for serovar identification of <i>Leptospira</i> sp. based on specific gene sequences within rfb locus	Thailand-Tropical Diseases Research Programmes	Assist. Prof. Thareerat Kalambaheti
*46	Study of the immunoreactive membrane protein of leptospirosis	Vejdusit Foundation	Assist. Prof. Thareerat Kalambaheti
47	Development of dipstick assay technology using <i>Plasmodium falciparum</i> as model	Mahidol University	Miss Jarinee Panitchakorn
*48	Identification of genus- and species-specific antigens of <i>Aeromonas</i> spp. by Western blotting with mouse polyclonal antibodies	Faculty of Tropical Medicine	Assist. Prof. Yuvadee Mahakunkijcharoen
*49	Determination of the receptor binding specificity of the H5N1 viruses isolated from Thailand	Faculty of Tropical Medicine	Dr. Pornsawan Leungwutiwong
Department of Protozoology			
50	Comparison of <i>Toxoplasma gondii</i> antibody detection isolation and characterization of DNA helicase from <i>Plasmodium falciparum</i>	Thanad-Molee Choman Foundation	Assist. Prof. Varaporn Suphadtanopongs
51	Detection of malaria parasites in after-drug treatment patients by using QBC method	Government Budget	Assist. Prof. Varaporn Suphadtanopongs
52	Isolation and characterization of DNA topoisomerase I from <i>Trichomonas vaginalis</i>	Mahidol University	Assoc. Prof. Porntip Petmitr
53	Purification and characterization of DNA polymerase B of <i>Plasmodium falciparum</i> and its role in base excision repair	Thailand-Tropical Diseases Research Programme	Assoc. Prof. Porntip Petmitr
54	Ultrastructure effects on <i>Toxoplasma gondii</i> tachyzoites after pyrimethamine and artemisinin derivative administration in animal model	The Thailand Research Fund (Royal Golden Jubilee)	Assoc. Prof. Yaowalark Sukthana
55	Dog and cat parasitic zoonoses	Tropical Disease Trust	Assoc. Prof. Yaowalark Sukthana

* New project

ONGOING RESEARCH PROJECTS OF THE FACULTY OF TROPICAL MEDICINE FY 2005

No.	Research Title	Grant	Principal Investigator
Department of Protozoology (Continued)			
*56	Viability study of <i>Giardia</i> cysts in water used in Thai frozen food industry	DAAD	Assoc. Prof. Yaowalark Sukthana
*57.	Biological contamination-free Thai frozen food	National Research Council of Thailand	Assoc. Prof. Yaowalark Sukthana
*58.	Development of differential diagnosis of <i>Entamoeba histolytica</i> , <i>Entamoeba dispar</i> and <i>Entamoeba histolytica</i> based on arbitrarily primed PCR and real time PCR	Government Budget	Assoc. Prof. Porntip Petmitr
*59.	PCR assays for detection of <i>Toxoplasma gondii</i> in Thai commercial meat products	Mahidol University	Ms. Rachatawan Chiabchalard
*60.	Detection of protozoal viability contamination of water used in Thai frozen food industry by cell culture PCR technique	Faculty of Tropical Medicine	Ms. Chantira Sutthikornchai
*61.	The development of differential characterization of <i>Plasmodium falciparum</i> strain based on Random Amplified Polymorphic DNA technique (RAPD)	Faculty of Tropical Medicine	Mr. Ittisak Subrungruang
Department of Social and Environmental Medicine			
62	Intergrated studies of human and animal heptospirosis in endemic areas of Nakhon Ratchasima, Thailand	Government Budget	Assoc. Prof. Wijitr Fungladda
63	Collaborative study to evaluated operational programme of insecticide treated bednets for malaria control in Thailand	WHO	Assoc. Prof. Piyarat Butraporn
*64	Modifying mosquito population age structure to eliminate dengue transmission	Gates Foundation	Assoc. Prof. Piyarat Butraporn
65	Factors associating with completion and default among DOTS and self-administered therapy (SAT) for treatment of TB	WHO	Assoc. Prof. Kamolnetr Okanurak
*66	Construction of monoclonal antibody phage library for developing avian influenza virus's diagnostic test	The Thailand Research Fund	Assist. Prof. Pongrama Ramasoota
*67	Mimotope identification from monoclonal antibody leptospiral serovar specific using phage display technique	Commission on Higher Education and The Thailand Research Fund	Assist. Prof. Pongrama Ramasoota
*68	Rapid detection of quinolone resistant Mycobacterium tuberculosis using molecular techniques	Thailand-Tropical Diseases Research Programme	Assist. Prof. Pongrama Ramasoota
*69	Rapid detection of multidrug resistant Mycobacterium tuberculosis (MDR-TB) from indoor air using molecular techniques	Thailand-Tropical Diseases Research Programme	Assist. Prof. Pongrama Ramasoota
*70	Rapid detection of Legionella pneumophilla from indoor air using molecular techniques	Faculty of Graduate Studies, MU	Assist. Prof. Pongrama Ramasoota
71	Development of a surveillance system for obesity among school children of high risk groups	WHO	Assist. Prof. Voranuch Wangsuphachart
72	Integrated Research Network on Tachin-Maeklong Basin	Mahidol University	Assist. Prof. Wanchai Phatihattakorn
*73	Improvement of the quality of well water in Tsunami affected area, Phang Nga Province, Thailand	Brescia University, Italy	Dr. Prapin Tharnpoophasiam
*74	Health watch on an everging of fresh- and brackish-water snails that transmit human parasitic diseases, after tsunami in Phang-Nga Province, Southern Thailand	Brescia University, Italy	Mrs. Pusadee Sri-aroon

* New project

ONGOING RESEARCH PROJECTS OF THE FACULTY OF TROPICAL MEDICINE FY 2005

No.	Research Title	Grant	Principal Investigator
Department of Tropical Hygiene			
75	Application of GIS in monitoring multi-drug resistant malaria in Greater Mekong Subregion of Southeast Asia(III)	EC RBM-WHO	Assoc. Prof. Pratap Singhasivanon
*76	Integrated GIS disease surveillance (Ids) system in Mekong Region	Rockefeller Foundation	Assoc. Prof. Pratap Singhasivanon
77	A phase III trial of Aventis Pasteur live recombinant ALVAC-HIV (vCP 1521) priming with VaxGen gp120 B/E (AIDSVAXTM B/E) boosting in HIV-uninfected Thai - adults (Data Management)	The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.	Assist. Prof. Joranit Kaewkungwal
78	A phase III trial of Aventis Pasteur live recombinant Thai adults	Walter Reed Army Institute of Research	Assist. Prof. Joranit Kaewkungwal
*79	Field based study of reappearance <i>Plasmodium vivax</i> malaria cases in the area near Thai-Myanmar border Suanphung Ratchaburi Province	Faculty of Tropical Medicine	Mr. Wanchai Maneeboonyoung
*80	Health behavior and risk factor of soil-transmitted helminth and malaria infection in primary schoolchildren in Saiyok District, Kanchanaburi Province	Faculty of Tropical Medicine	Ms. Pannamas Maneekarn
*81	Epidemiology and health education program and treatment evaluation of pediculosis capitis with Luch Lime cream in school children, Suan Phung District, Ratchaburi Province	Faculty of Tropical Medicine	Mr. Nipon Thanyavanich
Department of Nutrition and Food Sciences			
82	Food and health relationship in Asian population	Palm Oil Research Institute of Malaysia	Assoc. Prof.Supranee Changbumrung
83	Development of food and medicinal plants	Government Budget	Assoc. Prof.Supranee Changbumrung
84	Medicinal plants for treatment of hookworm	Government Budget	Assoc. Prof.Supranee Changbumrung
85	Medicinal plants against malaria	Government Budget	Assoc. Prof.Supranee Changbumrung
86	Identification of gene alterations in breast cancer	BIOTEC	Assoc. Prof. Songsak Petmitr
87	Determination of gene mutation in <i>hMSH2</i> and <i>hMSH6</i> in colon cancer	Government Budget	Assoc. Prof. Songsak Petmitr
*88	Determination of gene alterations in colon cancer using arbitrarily primed polymerase chain reaction and gene cloning	Government Budget	Assoc. Prof.Songsak Petmitr
*89	Development of health behaviors and nutritional status of the Tsunami victims in Phang-nga Province	Brescia University Italy	Assist. Prof.Karunee Kwanbunjan
*90	Purification and characterization of β -glucosidase specifically hydrolyzing iridoid glucoside from Thai plants	Commission on Higher Education	Dr. Dumrongkiet Arthan
*91	Polymorphism in methylene tetrahydrofolate reductase (MTHFR) in relation to homocysteinemia: cardiovascular risk factors in Thai smoker subjects	Faculty of Tropical Medicine	Ms. Apanchanid Thepouyporn

* New project

ONGOING RESEARCH PROJECTS OF THE FACULTY OF TROPICAL MEDICINE FY 2005

No.	Research Title	Grant	Principal Investigator
Department of Tropical Pathology			
92	Pathology and immunohistochemistry of liver in AIDS: a necropsy study	Mahidol University	Assoc.Prof.Parnpen Viriyavejakul
93	Causes of diarrhea in HIV/AIDS patients	Mahidol University	Assoc.Prof.Parnpen Viriyavejakul
94	The effects of <i>Plasmodium falciparum</i> -induced cellular responses on activation of endothelial cells	Mahidol University	Assoc.Prof.Yaowapa Maneerat
*95	<i>Plasmodium falciparum</i> induce IgE class switching	Swedish International Development Corporation A. (SIDA)	Assoc.Prof.Yaowapa Maneerat
Department of Tropical Pediatrics			
96	A phase II, pilot, randomized, open-label, single-center study to evaluate immunogenicity and safety after PCECV rabies vaccine (Rabipur®) administered concomitantly with Japanese encephalitis vaccine as a pre-exposure regimen in 12 to 18 month old toddlers in Thailand	Chiron Vaccines, Co., Ltd.	Prof. Arunee Sabchareon
*97	Evaluation of long-term immunity against rabies in children vaccinated with purified chick embryo cell rabies vaccine (Rabipur®) in different pre-exposure regimens and boosted after one year (Extension of study M49P2)	Department of Tropical Pediatrics	Assoc.Prof. Pornthep Chanthavanich
*98	Evaluation of long-term immunity against Japanese encephalitis in children vaccinated with Japanese encephalitis vaccine (Extension of study M49P2)	Department of Tropical Pediatrics	Assoc.Prof. Pornthep Chanthavanich
*99	Accuracy assessment of using WHO criteria in diagnosis of dengue infection	Department of Tropical Pediatrics	Assoc.Prof. Pornthep Chanthavanich
*100	Epidemiological study of dengue infection in children age 3-10 years in Ratchaburi Province	Ministry of Public Health	Assoc.Prof. Pornthep Chanthavanich
*101	Development of surveillance system for under five mortality in Samut Sakhon Province, Thailand	WHO	Assoc. Prof.Chukiat Sirivichayakul
Department of Tropical Radioisotopes			
*102	Studies on radiation effect on mouse macrophage cell line (RAW 264.7) and radioprotective effect by various Thai medicinal plants	Faculty of Tropical Medicine	Ms. Cheeraratana Cheeramakara
*103	Evaluation and diagnosis of emerging diseases	Commission on Higher Education	Dr. Duangkamol Viroonudomphol

* New project

ONGOING RESEARCH PROJECTS OF THE FACULTY OF TROPICAL MEDICINE FY 2005

No.	Research Title	Grant	Principal Investigator
Office of the Dean			
*104	Research management innovation in the Faculty of Tropical Medicine, Mahidol University	The Thailand Research Fund	Prof. Sasithon Phukrittayakamee
Vaccine Trial Centre			
105	A phase III trial to determine the efficacy of AIDSVAX™ B/E Vaccine in intravenous drug users in Bangkok, Thailand	AIDSVAX	Bangkok AIDS Vaccine Evaluation Group (Prof. Punnee Pitisuttithum)
106	A phase III trial of Aventis Pasteur live recombinant ALVAC-HIV (VCP1521) priming with Vaxgen gp 120 B/E (AIDSVAX B/E) boosting in HIV-uninfected Thai adults	Walter Reed Army Institute of Research	Dr. Supachai Ruekngam (Assoc. Prof. Punnee Pitisuttithum)

* *New project*

PUBLICATIONS 2005

International Publications

1. Amarapal P, Tantivanich S, Balachandra K, Matsuo K, Pitisutithum P, Chongsa-nguan M. The role of the tat gene in the pathogenesis of HIV infection. *Southeast Asian J Trop Med Public Health* 2005;36(2):352-361.
2. Anantapruti MT, Nuamtanong S, Dekumyoy P. Diagnostic values of IgG4 in human gnathostomiasis. *Trop Med Int Health* 2005;10:1013-21.
3. Anantrakulsil S, Maneerat Y, Wilairatana P, Krudsood S, Arunsuriyasak C, Atichartakarn V, Kumsiri R, Pattanapanyasat K, Looareesuwan S, Udomsangpetch R. Hematopoietic features and apoptosis in the bone marrow of severe *Plasmodium falciparum*-infected patients: preliminary study. *Southeast Asian J Trop Med Public Health* 2005 May;36(3):543-51.
4. Anderson TJ, Nair S, Qin H, Singlam S, Brockman A, Paiphun L, Nosten F. Are transporter genes other than the chloroquine resistance locus (pfcrt) and multidrug resistance gene (pfmdr) associated with antimalarial drug resistance? *Antimicrob Agents Chemother* 2005;49:2180-8.
5. Annerberg A, Singtoroj T, Tipmanee P, White NJ, Day NP, Lindegardh N. High throughput assay for the determination of lumefantrine in plasma. *J Chromatogr B Analyt Technol Biomed Life Sci* 2005;822:330-3.
6. Ashley EA, Krudsood S, Phaiphun L, Srivilairit S, McGready R, Leowattana W, Hutagalung R, Wilairatana P, Brockman A, Looareesuwan S, Nosten F, White NJ. Randomized, controlled dose-optimization studies of dihydroartemisinin-piperaquine for the treatment of uncomplicated multidrug-resistant falciparum malaria in Thailand. *J Infect Dis* 2005 Apr 1;191(7):1204.
7. Ashley EA, McGready R, Hutagalung R, Phaiphun L, Slight T, Proux S, Thwai KL, Barends M, Looareesuwan S, White NJ, Nosten F. A randomized, controlled study of a simple, once-daily regimen of dihydroartemisinin-piperaquine for the treatment of uncomplicated, multidrug-resistant falciparum malaria. *Clin Infect Dis* 2005;41:425-32.
8. Barnes KI, White NJ. Population biology and antimalarial resistance: The transmission of antimalarial drug resistance in *Plasmodium falciparum*. *Acta Trop* 2005;94:230-40.
9. Brouwer AE, Teparrukkul P, Pinpraphaporn S, Larsen RA, Chierakul W, Peacock S, Day N, White NJ, and Harrison TS. Baseline correlation and comparative kinetics of cerebrospinal fluid colony-forming unit counts and antigen titers in cryptococcal meningitis. *J Infect Dis* 2005;192:681-4.
10. Bussaratid V, Krudsood S, Silachamroon U, Looareesuwan S. Tolerability of Ivermectin In Gnathostomiasis. *Southeast Asian J Trop Med Public Health* 2005 May;36(3):644-9.
11. Chaiworaporn R, Maneerat Y, Rojekittikhun W, Ramasoota P, Janecharut T, Matsuda H and Kitikoon V. Comparative studies on The pathological findings and mortality in schistosoma mansoni infected mice after treatment with artesunate and The current antischistosomal drugs. *Southeast Asian J Trop Med Public Health* 2005;36:1118-24.
12. Chaiworaporn R, Maneerat Y, Rojekittikhun W, Ramasoota P, Janecharut T, Matsuda H, Kitikoon V. Therapeutic effect of subcurative dose praziquantel on Schistosoma mansoni infected mice and resistance to challenge infection after treatment. *Southeast Asian J Trop Med Public Health* 2005;36(4):846-52.

International Publications (Continued)

13. Chaowagul W, Chierakul W, Simpson AJ, Short JM, Stepniewska K, Maharjan B, Rajchanuvong A, Busarawong D, Limmathurotsakul D, Cheng AC, Wuthiekanun V, Newton PN, White NJ, Day NP, and Peacock SJ. Open-label randomized trial of oral trimethoprim-sulfamethoxazole, doxycycline, and chloramphenicol compared with trimethoprim-sulfamethoxazole and doxycycline for maintenance therapy of melioidosis. *Antimicrob Agents Chemother* 2005;49:4020-25.
14. Chariyalertsak S, Khuhaprema T, Bhudisawasdi V, Sripa B, Wongkham S, Petmitr S. Novel DNA amplification on chromosomes 2p25.3 and 7q11.23 in cholangiocarcinoma identified by arbitrarily primed polymerase chain reaction. *J Cancer Res Clin Oncol* 2005;131:821-8.
15. Cheeramakara C, Thanomsak W, Songmeang K, Nontprasert A, Sanghirun C, Suthisai N, Areekul S. Elevation of serum transcobalamin II in patients with scrub typhus. *Southeast Asian J Trop Med Public Health* 2005 Jan;36(1):113-7.
16. Cheng AC, Day NP, Mayo MJ, Gal D, Currie BJ. Burkholderia pseudomallei strain type, based on pulsed-field gel electrophoresis, does not determine disease presentation in melioidosis. *Microbes Infect* 2005;7:104-9.
17. Chiabchalard R, Wiengcharoen JT, Sukthana Y. Sensitivity and specificity of polymerase chain reaction for the detection of Toxoplasma gondii DNA added to laboratory samples. *Southeast Asian J Trop Med Public Health* 2005 Mar;36(2):408-11.
18. Chierakul W, Anunnatsiri S, Short JM, Maharjan B, Mootsikapun P, Simpson AJ, Limmathurotsakul D, Cheng AC, Stepniewska K, Newton PN, Chaowagul W, White NJ, Peacock SJ, Day NP, and Chetchotisakd P. Two randomized controlled trials of ceftazidime alone versus ceftazidime in combination with trimethoprim-sulfamethoxazole for the treatment of severe melioidosis. *Clin Infect Dis* 2005;41: 1105-13.
19. Chierakul W, Winothai W, Wattanawaitunechai C, Wuthiekanun V, Rugtaengan T, Rattanalernavee J, Jitpratoom P, Chaowagul W, Singhasivanon P, White NJ, Day NP, Peacock SJ. Melioidosis in 6 Tsunami survivors in southern Thailand. *Clin Infect Dis* 2005 Oct 1;41(7):982-90.
20. Chierakul W, Wuthiekanun V, Chaowagul W, Amornchai P, Cheng AC, White NJ, Day NP, Peacock SJ. DISEASE SEVERITY AND OUTCOME OF MELIOIDOSIS IN HIV COINFECTED INDIVIDUALS. *Am J Trop Med Hyg* 2005;73(6):1165-6.
21. Chimsumang S, Chettanadee S, Jitrathai S and Wongchotigul V. Indirect immunoperoxidase test for the diagnosis of leptospirosis. *Southeast Asian J Trop Med Public Health* 2005;36(2):296-301.
22. Cockburn R, Newton PN, Agyarko EK, Akunyili D, White NJ. The Global Threat of Counterfeit Drugs: Why Industry and Governments Must Communicate the Dangers. *PLoS.Med.* 2005; 2: e100.
23. Coplan PM, Gupta SB, Dubey SA, Pitisuttithum P, Nikas A, Mbewe B, Vardas E, Schechter M, Kallas EG, Freed DC, Fu TM, Mast C.T, Puthavathana P, Kublin J, Brown Collins K, Chisi J, Pendame R, Thaler SJ, Gray G, McIntyre J, Straus WL, Condra JH, Mehrotra DV, Guess HA, Emini EA, Shiver JW. Cross-reactivity of anti-HIV-1 T cell immune responses among the major HIV-1 clades in HIV-1-positive individuals from 4 continents. *J Infect Dis* 2005;191(9):1427-34.
24. De Fost M, Chierakul W, Pimda K, Dondorp AM, White NJ, Van Der PT. Activation of cytotoxic lymphocytes in patients with scrub typhus. *Am J Trop Med Hyg* 2005;72(4): 465-7.
25. Desakorn V, Dondorp AM, Silamut K, Pongtavornpinyo W, Sahassananda D, Chotivanich K, Pitisuttithum P, Day NPJ, White NJ, Smithyman AM. Stage-dependent production and release of histidine-rich protein 2 by Plasmodium falciparum. *Trans R Soc Trop Med Hyg* 2005;99(7): 517-24.
26. Devakul Na Ayutthaya W, Pramyothin P, Piyachaturawat P, Ekataksin W, Chavalittumrong P, Chivapat S, Chaichantipyuth C. Hepatotoxic effect of barakol in mice. *J Trad Med* 2005;22:9-14.

International Publications (Continued)

27. Dondorp AM, Desakorn V, Pongtavornpinyo W, Sahassananda D, Silamut K, Chotivanich K, Newton PN, Pitisuttithum P, Smithyman AM, White NJ, Day NP. Estimation of the Total Parasite Biomass in Acute *Falciparum* Malaria from Plasma PfHRP2. *PLoS Med* 2005; 2(8):788-97.
28. Flatt C, Mitchell S, Yipp B, Looareesuwan S, Ho M. Attenuation of Cytoadherence of *Plasmodium falciparum* To Microvascular Endothelium Under Flow By Hemodilution. *Am J Trop Med Hyg* 2005;72(6): 660-5.
29. Griensven FV, Pitisuttithum P, Vanichseni S, Wichienkuer P, Tappero JW, Sangkum U, Kitayaporn D, Phasithiphol B, Orelind K, Choopanya K. Trends in the injection of midazolam and other drugs and needle sharing among injection drug users enrolled in the AIDS VAX B/E HIV-1 vaccine trial in Bangkok, Thailand. *Int. J. Drug Policy* 2005; 16:171-5.
30. Gupta RK, Van Vugt M, Paiphun L, Slight T, Looareesuwan S, White NJ, Nosten F. Short report: no evidence of cardiotoxicity of atovaquone-proguanil alone or in combination with artesunate. *Am J Trop Med Hyg* 2005;73(2):267-8.
31. Hananantachai H, Patarapotikul J, Ohashi J, Naka I, Looareesuwan S, Tokunaga K. Polymorphisms of the *HA-B* and *HA-DRBI* Genes in Thai Malaria Patients. *Jpn J Infect Dis* 2005;58:25-8.
32. Hatabu T, Kawazu S, Kojima S, Sato K, Singhasivanon P, Looareesuwan S, Kano S. In vitro susceptibility and genetic variations for chloroquine and mefloquine in *Plasmodium falciparum* isolates from Thai-Myanmar border. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:73-9.
33. Havlik I, Looareesuwan S, Vannaphan S, Wilairatana P, Krudsood S, Thuma PE, Kozbor D, Watanabe N, Kaneko Y. Curdlan sulphate in human severe/cerebral *Plasmodium falciparum* malaria. *Trans R Soc Trop Med Hyg* 2005 May;99(5):333-40.
34. Helbok R, Dent W, Nacher M, Lackner P, Treeprasertsuk S, Krudsood S, Wilairatana P, Silachamroon U, Looareesuwan S, Schmutzhard E. The Use of The Multi-Organ-Dysfunction Score To Discriminate Different Levels of Severity In Severe And Complicated *Plasmodium falciparum* Malaria. *Am J Trop Med Hyg* 2005;72(2):150-4.
35. Ho M, Hoang HL, Lee KM, Liu N, MacRae T, Montes L, Flatt CL, Yipp BG, Berger BJ, Looareesuwan S, Robbins SM. Ectophosphorylation of CD36 regulates cytoadherence of *Plasmodium falciparum* to microvascular endothelium under flow conditions. *Infect Immun* 2005;73(12):8179-87.
36. Huis in 't Veld D, Wuthiekanun V, Cheng AC, Chierakul W, Chaowagul W, Brouwer AE, White NJ, Day NP, Peacock SJ. The role and significance of sputum cultures in the diagnosis of melioidosis. *Am J Trop Med Hyg* 2005;73(4):657-61.
37. Hutagalung R, Paiphun L, Ashley EA, McGready R, Brockman A, Thwai KL, Singhasivanon P, Jelinek T, White NJ, Nosten FH. A randomized trial of artemether-lumefantrine versus mefloquine-artesunate for the treatment of uncomplicated multi-drug resistant *Plasmodium falciparum* on the western border of Thailand. *Malar J* 2005 Sep 22;4:46.
38. Imwong M, Pukrittayakamee S, Looareesuwan S, Grüner AC, Rénia L, Letourneur F, White NJ, Snounou G. Practical PCR genotyping protocols for *Plasmodium vivax* using Pvcs and Pvmsp1. *Malar J* 2005;4(20):1-13.
39. Imwong M, Pukrittayakamee S, Looareesuwan S, White NJ, Day NPJ, Cheng Q, Moore C, Snounou G. Limited polymorphism in the dihydropteroate synthetase gene (dhps) of *Plasmodium vivax* isolates from Thailand. *Antimicrob Agents Chemother* 2005;49(10):4393-5.
40. Ishihara H, Tanaka I, Ishihara F, Suzuki K, Yoshino C, Cheeramakara C, Wan H, Akashi S. Transient reporter RNA assay: quantification of reporter gene mRNA during immediate early response in mammalian cells based on real-time reverse transcription polymerase chain reaction. *Anal Biochem* 2005 Jun 15;341(2):369-71.

International Publications (Continued)

41. Janhong K, Lohachit C, Butraporn P, Pansuwan P. Health promotion program for the safe use of pesticides in Thai farmers. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:258-61.
42. Jenkins RA, Thapinta D, Morgan PA, Wongkamhaeng S, Sornsathapornkul P, Bussaratid V, Sontirat A, Pitisuttithum P, Thongchareoen P, Khamboonruang C, Suriyanon V, Nitayaphan S, Brown AE, and the Thai AIDS Vaccine Evaluation Group. Behavioral and Social Issues Among Volunteers in a Preventive HIV Vaccine Trial in Thailand. *J Acquir Immune Defic Syndr* 2005;40(5):592-9.
43. Jimba M, Waikugul J, Kojima S, Takeuchi T, Singhasivanon P. Beyond deworming. *Lancet* 2005 Feb 26-Mar 4;365(9461):751.
44. Kantachuvessiri A, Sirivichayakul C, KaewKungwal J, Tungtrongchitr R, Lotrakul M. Factors associated with obesity among workers in a metropolitan waterworks authority. *Southeast Asian J Trop Med Public Health* 2005 Jul;36(4):1057-65.
45. Karnasuta C, Paris RM, Nitayaphan S, Brown AE, De Souza MS, Cox JH, McNeil JG, Bix DL, Pitisuttithum P, Thongchareoen P, Gurunathan S, Tartaglia J, Heyward WL. Antibody-dependent cell-mediated cytotoxic responses in participants enrolled in a phase I/II ALVAC-HIV/AIDS VAX® B/E prime-boost HIV-1 vaccine trial in Thailand. *Vaccine* 2005;23:2522-9.
46. Kengluetcha A, Singhasivanon P, Tiensuwan M, Jones JW, Sithiprasasna R. Water quality and breeding habitats of anopheline mosquito in northwestern Thailand. *Southeast Asian J Trop Med Public Health* 2005 Jan;36(1):46-53.
47. Kitvatanachai S, Apiwathnasorn C, Leemingsawat C, Wongwit W, Tornee S. Determination of lead toxicity in *Culex quinquefasciatus* mosquitoes in the laboratory. *Southeast Asian J Trop Med Public Health* 2005;36(4):862-74.
48. Knauer A, Das AK, Tansuphasawadikul S, Supanaranond W, Pitisuttithum P, Wernsdorfer WH. Clinical features, aetiology and short-term outcome of interstitial pneumonitis in HIV/AIDS patients at Bamrasnaradura Hospital, Nonthaburi, Thailand. *Wien Klin Wochenschr* 2005;117 Suppl 4:49-55.
49. Kojima S, Waikagul J, Rojekittikhun W, Keicho N. The current situation regarding the establishment of national ethical guidelines for biomedical research in Thailand and its neighboring countries. *Southeast Asian J Trop Med Public Health* 2005; 36: 728-32.
50. Krudsood S, Imwong M, Wilairatana P, Pukrittayakamee S, Nonprasert A, White NJ, Looareesuwan S, Snounou G. Artesunate-dapsone-proguanil treatment of falciparum malaria: Genotypic determinants of therapeutic response. *Trans R Soc Trop Med Hyg* 2005;99(2):142-9.
51. Kumkhaek C, Phra-Ek K, Renia L, Singhasivanon P, Looareesuwan S, Hirunpetcharat C, White NJ, Brockman A, Gruner AC, Lebrun N, Allouche A, Nosten F, Khusmith S, Snounou G. Are extensive T cell epitope polymorphisms in the *Plasmodium falciparum* circumsporozoite antigen, a leading sporozoite vaccine candidate, selected by immune pressure? *J Immunol* 2005 Sep 15;175(6):3935-9.
52. Kwanbunjan K, Saengkar P, Cheeramakara C, Thanomsak W, Sangmuaeng K, Buchachart K, Boontaveeyuwat N, Benjachai W, Laisupasin P. Low Folate status as a risk factor for cervical dysplasia in Thai women. *Nutr Res* 2005;25(7):641-54.
53. Le Thi Xuan, Nguyen Thien Hun, Jitra Waikagul. Cutaneous fascioliasis: a case report in Vietnam. *Am J Trop Med Hyg* 2005;72: 508-9.
54. Leelayoova S, Subrungruang I, Rangsin R, Chavalitshewinkoon-Petmitr P, Worapong J, Naaglor T, Mungthin M. Transmission of *Enterocytozoon bieneusi* genotype a in a Thai orphanage. *Am J Trop Med Hyg* 2005 Jul;73(1):104-7.
55. Lekkla A, Sutthikornchai C, Bovornkitti S, Sukthana Y. Free-living amoeba contamination in natural hot springs in Thailand. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:5-9.

International Publications (Continued)

56. Limkittikul K, Yingsakmongkon S, Jittmittraphap A, Chuananon S, Supakul W, Kowasupathr S, Rojanawatsirivit C, Usawattanakul W. Clinical differences among PCR-proven dengue serotype infections. *Southeast Asian J Trop Med Public Health* 2005; 36: 1-7.
57. Limmathurotsakul D, Wuthiekanun V, Chierakul W, Cheng AC, Maharjan B, Chaowagul W, White NJ, Day NP, Peacock SJ. Role and significance of quantitative urine cultures in diagnosis of melioidosis. *J Clin Microbiol* 2005;43:2274-6.
58. Lindegardh N, Annerberg A, Blessborn D, Bergqvist Y, Day N, White NJ. Development and validation of a bioanalytical method using automated solid-phase extraction and LC-UV for the *J Pharm Biomed Anal* 2005;37:1081-8.
59. Lindegardh N, Blessborn D, Bergqvist Y. Simultaneous quantitation of the highly lipophilic atovaquone and hydrophilic strong basic proguanil and its metabolites using a new mixed-mode SPE approach and steep-gradient LC. *J Chromatogr Sci* 2005; 43: 259-66.
60. Lindegardh N, Singtoroj T, Annerberg A, White NJ, Day NP. Development and Validation of a Solid-Phase Extraction-Liquid Chromatographic Method for Determination of Amoxicillin in Plasma. *Ther Drug Monit* 2005; 27: 503-8.
61. Lindegardh N, White NJ, Day NP. High throughput assay for the determination of piperazine in plasma. *J Pharm Biomed Anal* 2005;39 (3-4): 601-5.
62. Maharjan B, Chantratita N, Vesaratchavest M, Cheng A, Wuthiekanun V, Chierakul W, Chaowagul W, Day NP, Peacock SJ. Recurrent melioidosis in patients in northeast Thailand is frequently due to reinfection rather than relapse. *J Clin Microbiol* 2005 ;43(12):6032-4.
63. Marahatta SB, Sharma N, Koju R, Makaju RK, Petmitr P, Petmitr S. Cancer: determinants and progression. *Nepal Med Coll J* 2005;7(1):65-71.
64. McGready R, Ashiley EA, Moo E, Cho T, Barends M, Hutagalung R, Looareesuwan S, White NJ, Nosten F. A Randomized Comparison of Artesunate Atovaquone-Proguanil versus Quinine in Treatment for Uncomplicated Falciparum Malaria during Pregnancy. *J Infect Dis* 2005;192:846-53.
65. Medana IM, Lindert RB, Wurster U, Hien TT, Day NP, Phu NH, Mai NT, Chuong LV, Chau TT, Turner GD, Farrar JJ, White NJ. Cerebrospinal fluid levels of markers of brain parenchymal damage in Vietnamese adults with severe malaria. *Trans R Soc Trop Med Hyg* 2005; 99: 610-7.
66. Nacher M, Carme B, Singhasivanon P, Krudsood S, Phumratanapapin W, Vanaphan S, Tangpukdee N, Looareesuwan S. Inverse relationship between the number of fertilized *Ascaris* eggs excreted and fever, in patients co-infected with *Plasmodium vivax* and *Ascaris lumbricoides*. *Ann Trop Med Parasitol* 2005;99(6):623-5.
67. Nash D, Nair S, Mayxay M, Newton PN, Guthmann JP, Nosten F, Anderson TJ. Selection strength and hitchhiking around two anti-malarial resistance genes. *Proc Biol Sci* 2005; 272: 1153-61.
68. Newton PN, Chaulet JF, Brockman A, Chierakul W, Dondorp A, Ruangveerayuth R, Looareesuwan S, Mounier C, White NJ. Pharmacokinetics of oral doxycycline during combination treatment of severe falciparum malaria. *Antimicrob Agents Chemother* 2005;49:1622-5.
69. Ngarmamonpirat C, Waikagul J, Petmitr S, Dekumyoy P, Rojekittikhun W, Anantapruti MT. Analysis of sequence variation in *Gnathostoma spinigerum* mitochondrial DNA by single-strand conformation polymorphism analysis and DNA sequence. *Parasitol Int* 2005;54(1):65-8.
70. Nithikathkul C, Akarachantachote N, Wannapinyosheep S, Pumdonming W, Brodsky M, Sukthana Y. Impact of health educational programmes on the prevalence of enterobiasis in schoolchildren in Thailand. *J Helminthol* 2005 Mar;79(1):61-5.

International Publications (Continued)

71. Nontasut P, Muennoo C, Sa-nguankiat S, Fongsri S, Vichit A. Prevalence of *Strongyloides* in Northern Thailand and treatment with ivermectin vs albendazole. *Southeast Asian J Trop Med Public Health* 2005;36:442-4.
72. Ohashi J, Naka I, Doi A, Patarapotikul J, Hananantachai H, Tangpukdee N, Looareesuwan S, Tokunaga K. A functional Polymorphism in the *IL1B* gene promoter, *IL1B*-31 C>T, is not associated with cerebral malaria in Thailand. *Malar J* 2005;4:38.
73. Ohashi J, Naka I, Patarapotikul J, Hananantachai H, Brittenham G, Looareesuwan S, Clark AG, Tokunaga K. Strong linkage disequilibrium of a HbE variant with the (AT)₉(T)₅ repeat in the BP1 binding site upstream of the α -globin gene in the Thai population. *J Hum Genet* 2005;50:7-11.
74. Omodeo-Sale F, Motti A, Dondorp A, White NJ, Taramelli D. Destabilisation and subsequent lysis of human erythrocytes induced by Plasmodium falciparum haem products. *Eur J Haematol* 2005; 74: 324-32.
75. Pack R, Wang Y, Singh A, von Seidlein L, Pach A, Kaljee L, Butraporn P, Youlong G, Blum L, Bhutta Z, Santoso SS, Trach DD, Waluyo I, Nyamete A, Clemens J, Stanton B. Willingness to be vaccinated against shigella and other forms of dysentery: a comparison of three regions in Asia. *Vaccine* 2006 Jan 23;24(4):485-94.
76. Peacock SJ, Chieng G, Cheng AC, Dance DA, Amornchai P, Wongsuvan G, Teerawattanasook N, Chierakul W, Day NP, and Wuthiekanun V. Comparison of Ashdown's medium, *Burkholderia cepacia* medium, and *Burkholderia pseudomallei* selective agar for clinical isolation of *Burkholderia pseudomallei*. *J Clin Microbiol* 2005;43(10):5359-61.
77. Pengsaa K, Sirivichayakul C, Na-Bangchang K, Thaiarporn I, Chaivisuth A, Wongsuvan A, Attanath P, Pojjaroen-Anant C, Wisetsing P, Chanthavanich P, Sabchareon A. Life-saving rectal artesunate for complicated malaria in children. *Southeast Asian J Trop Med Public Health* 2005 May;36(3):597-601.
78. Phongnamy S, Phetsouvanh R, Sisouphone S, Darasavath C, Vongphachane P, Rattanavong O, Mayxay M, Ramsay AC, Blacksell SD, Thammavong C, Syhavong B, White NJ, Newton PN. A randomized comparison of oral chloramphenicol versus ofloxacin in the treatment of uncomplicated typhoid fever in Laos. *Trans R Soc Med Hyg* 2005; 99: 451-8.
79. Phongsakulchoti P, Sri-aroon P, Kerdpuech Y. Emergence of *Opisthorchis viverrini* cercariae from naturally infected *Bithynia* (*Digoniostoma*) *siamensis* goniomphalos. *Southeast Asian J Trop Med Public Health* 2005; 36(suppl.4): 189-91.
80. Pitaksajakul P, Wongwit W, Punprasit W, Eampokalap B, Peacock S, Ramasoota P. Mutations in the *gyrA* and *gyrB* genes of fluoroquinolone-resistant *Mycobacterium tuberculosis* from TB patients in Thailand. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:228-37.
81. Pitisuttithum P. HIV-1 prophylactic vaccine trials in Thailand. *Current HIV Research* 2005;3(1):17-30.
82. Pitisuttithum P, Negroni R, Graybill JR, Bustamante B, Pappas P, Chapman S, Hare RS, Hardalo CJ. Activity of posaconazole in the treatment of central nervous system fungal infections. *J Antimicrob Chemother* 2005 Oct;56(4):745-55.
83. Poosanthanasarn N, Lohachit C. The health of workers in a metal autoparts factory in Eastern Thailand. *Southeast Asian J Trop Med Public Health* 2005;36(3):783-9.
84. Poosanthanasarn N, Lohachit C, Fungladda W, Sriboorapa S, Pulkate C. An ergonomics intervention program to prevent worker injuries in a metal autoparts factory. *Southeast Asian J Trop Med Public Health* 2005;36(2):512-22.
85. Poosanthanasarn N, Sriboorapa S, Fungladda W, Lohachit C. Reduction of low back muscular discomfort through an applied ergonomics intervention program. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:262-70.

International Publications (Continued)

86. Popruk S, Tungtrongchitr R, Pongpaew P, Phonrat B, Tungtrongchitr A, Tribunyatkul S, Paksanont S, Vudhivai N, FP Schelp. Relationship between soluble leptin receptor, leptin, lipid profiles and anthropometric parameters in overweight and obese Thai subjects. *J Med Assoc Thai* 2005;88(2):220-7.
87. Prommano O, Chaisri U, Turner GD, Wilairatana P, Ferguson DJ, Viriyavejakul P, White NJ, Pongponratn E. A quantitative ultrastructural study of the liver and the spleen in fatal falciparum malaria. *Southeast Asian J Trop Med Public Health* 2005 Nov;36(6):1359-70.
88. Ramasoota P, Tungtrakanpoung R, Pitaksajjakul P, Ekpo P, Froman G, Chaicumpa W. Epitope mapping of monoclonal antibodies specific to serovar of *Leptospira*, using phage display technique. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:206-12.
89. Sawangjaroen N, Subhadhirasakul S, Phongpaichit S, Siripanth C, Jamjaroen K, Sawangjaroen K. The in vitro anti-giardial activity of extracts from plants that are used for self-medication by AIDS patients in southern Thailand. *Parasitol Res* 2005 Jan;95(1):17-21.
90. Schanonta N, Pongponratn E, Butraporn R, Chaisri U, Saelim B, Sumeteewatanakul B, Yamsaad T, Sawadrat N. Ultrastructural Changes of Pancreatic Islets Microcirculation in Nonobese Diabetic (NOD) Mice. *Southeast Asian J Trop Med Public Health* 2005;36(4):274-8.
91. Siddiqui AA, Brouwer AE, Wuthiekanun V, Jaffar S, Shattock R, Irving D, Sheldon J, Chierakul W, Peacock S, Day N, White NJ, Harrison TS. IFN-gamma at the site of infection determines rate of clearance of infection in cryptococcal meningitis. *J Immunol* 2005 Feb 1;174(3):1746-50.
92. Silachamroon U, Krudsood S, Thanachartwet W, Tangpukdee N, Leowattana W, Chalermrut K, Srivilairit S, Wilaiaratana P, Thimasarn K, Looareesuwan S. An Open, Randomized Trial of Three-Day Treatment with Artesunate Combined With A Standard Dose of Mefloquine Divided over either two or three days, for Acute, Uncomplicated *Falciparum Malaria*. *Southeast Asian J Trop Med Public Health* 2005;36(3):591-6.
93. Singhasivanon P, Krudsood S, Phumratanaprapin W, Vanaphan S, Tangpukdee N. Inverse relationship between the number of fertilized *Ascaris* eggs excreted and fever, in patients co-infected with *Plasmodium vivax* and *Ascaris lumbricoides*. *Ann Trop Med Parasitol* 2005; 99(6): 623-5.
94. Singhsilarak T, Leowattana W, Looareesuwan S, Wongchotigul V, Jiang J, Richards A, And Watt G. Short report : Detection of *Orientia tsutsugamushi* in clinical samples by quantitative real-time polymerase chain reaction. *Am J Trop Med Hyg* 2005; 72(5):640-1.
95. Siripanth C. Amphizoic amoebae: pathogenic free-living protozoa; review of the literature and review of cases in Thailand. *J Med Assoc Thai* 2005 May;88(5):701-7.
96. Siripanth C, Punpoowong B, Riganti M. Early detection and identification of amphizoic amoebae from nasal exudates of a symptomatic case. *J Med Assoc Thai* 2005 Apr;88(4):545-9.
97. Sri-aroon P, Butraporn P, Limsomboon J, Kerdpuech Y, Kaewpoolsri M, Kiatsiri S. Freshwater mollusks of medical importance in Kalasin Province, northeast Thailand. *Southeast Asian J Trop Med Public Health* 2005;36(3):653-7.
98. Sri-aroon P, Lohachit C, Harada M. Brackish-water mollusks of Surat Thani province, southern Thailand. *Southeast Asian J Trop Med Public Health* 2005; 36(suppl.4): 180-8.
99. Sukthana Y, Lekkla A, Sutthikornchai C, Wanapongse P, Vejajiva A, Bovornkitti S. Spa, springs and safety. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:10-6.
100. Sukthana Y, Rigunti M, Siripanth C, Kusolsuk T, Chintrakarn C, Kulpaditharom B. An exotic sinusitis. *Trans R Soc Trop Med Hyg* 2005 Jul;99(7):555-7.
101. Sutthikornchai C, Jantanavivat C, Thongrungrat S, Harnroongroj T, Sukthana Y. Protozoal contamination of water used in Thai frozen food industry. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:41-5.

International Publications (Continued)

102. Suwannaprapha P, Chaisri U, Riyong D, Maneerat Y. Improvement of function and morphology of tumor necrosis factor-alpha treated endothelial cells with 17-beta estradiol: A preliminary study for a feasible simple model for atherosclerosis. *Circ J* 2005;69:730-38.
103. Suwimonteerabutr J, Chongsa-nguan M, Kalambaheti T, Ramasoota P, Chaicumpa W, Tapchaisri P, Sakolvaree Y, Saengjaruk P, Virakul P. Evaluation of a monoclonal antibody-based dot-blot ELISA for detection of leptospira spp. in bovine urine samples. *Am J Vet Res* 2005;66(5):762-6.
104. Swan H, Sloan L, Muyombwe A, Chavalitshewinkoon-Petmitr P, Krudsood S, Leowattana W, Wilairatana P, Looareesuwan S, Rosenblatt J. Evaluation of a real-time polymerase chain reaction assay for the diagnosis of malaria in patients from Thailand. *Am J Trop Med Hyg* 2005 Nov;73(5):850-4.
105. Tangpukdee N, Krudsood S, Thanachartwet W, Chalermrut K, Pengruksa C, Srivilairit S, Silachamroon U, Wilairatana P, Phongtananant S, Kano S, Looareesuwan S. An Open Randomized clinical Trial of Artekin Vs Artesunate-Mefloquine in the Treatment of Acute Uncomplicated Falciparum Malaria. *Southeast Asian J Trop Med Public Health* 2005; 36(5):205-11.
106. Tantawiwat S, Wongwit W, Kitayapom D, Tansuphasiri U, Wongchotigul V. Development of multiplex PCR for the detection of total coliform bacteria for Escherichia coli and Clostridium perfringens in drinking water. *Southeast Asian J Trop Med Public Health* 2005;36(1):162-9.
107. Taruangsri P, Ong-Ajyooth L, Ong-Ajyooth S, Chaiyasoot W, Leowattana W, Sritippayawan S, Vareesangthip K, Chanchairujira T, Vasuvattakul S, Shayakul C, Vanichakarn S. Relationship between hyperhomocysteinemia and atherosclerosis in chronic hemodialysis patients. *J Med Assoc Thai* 2005 Oct;88(10):1373-81.
108. Thawnashom K, Tungtrongchitr R, Petmitr S, Pongpaew P, Phonrat B, Tungtrongchitr A, Schelp PF. Methyle netetrahydrofolate reductase (MTHFR) Polymorphism (C677T) In Relation to Homocysteine Concentration in Overweight and Obese Thais. *Southeast Asian J Trop Med Public Health* 2005;36(2):459-66.
109. Thetkathuek A, Mankhetkom S, Keifer M, Fungladda W, Kaewkungwal J, Padungtod C, Wilson B. Spectrophotometric determination of plasma and red blood cell cholinesterase activity of 53 fruit farm workers pre- and post-exposed chlorpyrifos for one fruit crop. *Chem Pharm Bull* 2005;53(4):422-4.
110. Tin EE, Desakorn V, Wilairatana P, Pitisuttithum P, Bowonwatanuwong C, Krudsood S. The efficacy and adverse effects of GPO-VIR (stavudine + lamivudine+nevirapine) in treatment-naïve adult HIV patients. *Southeast Asian J Trop Med Public Health* 2005;36(2):362-9.
111. Tiyawisutsri R, Peacock SJ, Langa S, Limmathurotsakul D, Cheng AC, Chierakul W, Chaowagul W, Day NP, and Wuthiekanun V. Antibodies from patients with melioidosis recognize *Burkholderia mallei* but not *Burkholderia thailandensis* antigens in the indirect hemagglutination assay. *J Clin Microbiol* 2005;43(9):4872-4.
112. Tornee S, Kaewkungwal J, Fungladda W, Silachamroon U, Akarasewi P, Sunakorn P. Factors associated with the household contact screening adherence of tuberculosis patients. *Southeast Asian J Trop Med Public Health* 2005 Mar;36(2):331-40.
113. Tornee S, Kaewkungwal J, Fungladda W, Silachamroon U, Akarasewi P, Sunakorn P. The association between environmental factors and tuberculosis infection among household contacts. *Southeast Asian J Trop Med Public Health* 2005;36 Suppl 4:221-4.
114. Treeratanapiboon L, Psathaki K, Wegener J, Looareesuwan S, Galla HJ, Udomsangpetch R. In vitro study of malaria parasite induced disruption of blood-brain barrier. *Biochem Biophys Res Commun* 2005;335(3): 810-8.
115. Trongtokit Y, Rongsriyam Y, Komalamisra N, Apiwathnasorn C. Comparative repellency of 38 essential oils against mosquito bites. *Phytother Res* 2005 Apr;19(4):303-9.

International Publications (Continued)

116. Tungtrongchitr R, Sricharoen P, Pongpaew P, Phonrat B, Arthan D, Vudhivai N, Tungtrongchitr A, Schelp FP. Adiponectin/ACP30, a collagen-like plasma protein in relation to anthropometric measurement in Thai overweight and obese subjects. *Int J Food Sci Nutr* 2005 May;56(3):193-201.
117. Urban BC, Hien TT, Day NP, Phu NH, Roberts R, Pongponratn E, Jones M, Mai NTH, Bethell D, Turner GDH, Ferguson D, White NJ, Roberts DJ. Fatal *Plasmodium falciparum* malaria causes specific patterns of splenic architectural disorganization. *Infect Immun* 2005;73:1986-94.
118. Vannaphan S, Saengnetswang T, Suwanakut P, Kllangbuakong A, Klinnak W, Rungmatcha P, Yeamput C, Tanachartwet W, Looareesuwan S, Krudsood S. The epidemiology of patients with severe malaria who died at the Hospital for Tropical Diseases, 1991-2004. *Southeast Asian J Trop Med Public Health* 2005;36(2):385-9.
119. Waikagul J, Watthanakulpanich D, Muennoo C, Maipanich W, Sa-nguankiat S, Phubampen S. Efficacy of benzimidazole carbamate on an intestinal fluke co-infected with nematodes. *J Med Assoc Thai* 2005;88:233-7.
120. Watthanakulpanich D, Waikagul J, Dekumyoy P, Muangkhum P, Praevanit R, Mongkhonmu S. Paragonimiasis in Nan Province, Northern Thailand. *Southeast Asian J Trop Med Public Health* 2005;36:193-7.
121. White NJ. Dynamic determinants of the cytoadherence of *Plasmodium falciparum*-infected erythrocytes. *Am J Trop Med Hyg* 2005; 72: 658-9.
122. White NJ. Intermittent Presumptive Treatment for Malaria. *PLoS Med* 2005; 2: e3.
123. Wongchotigul V, Waicharoen S, Riengrod S, Chimsumang S, Rattanadukul J and Chinprasatsak S. Development and evaluation of a latex agglutination test for the rapid diagnosis of scrub typhus. *Southeast Asian J Trop Med Public Health* 2005;36(1):108-12.
124. Wongwit W, Rivera E, Tao L-F. Effect of antisense-SGTPs on the glucose uptake of the blood fluke *Schistosoma mansoni*: Observations in adult worms and schistosomula. *Southeast Asian J Trop Med Public Health* 2005;36(1):83-8.
125. Wuthiekanun V, Cheng AC, Chierakul W, Amornchai P, Limmathurotsakul D, Chaowagul W, Simpson AJ, Short JM, Wongsuvan G, Maharjan B, White NJ, Peacock SJ. Trimethoprim/sulfamethoxazole resistance in clinical isolates of *Burkholderia pseudomallei*. *J Antimicrob Chemother* 2005;55(6):1029-31.
126. Wuthiekanun V, Desakorn V, Wongsuvan G, Amornchai P, Cheng AC, Maharjan B, Limmathurotsakul D, Chierakul W, White NJ, Day NP, Peacock SJ. Rapid immunofluorescence microscopy for diagnosis of melioidosis. *Clin Diagn Lab Immunol* 2005;12(4):555-6.
127. Wuthiekanun V, Mayxay M, Chierakul W, Phetsouvanh R, Cheng AC, White NJ, Day NP, and Peacock SJ. Detection of *Burkholderia pseudomallei* in soil within the Lao People's Democratic Republic. *J Clin Microbiol* 2005;43(2): 923-4.
128. Yeramian P, Meshnick SR, Krudsood S, Chalermrut K, Silachamroon U, Tangpukdee N, Allen J, Brun R, Kwiek JJ, Tidwell R, Looareesuwan S. Efficacy of DB289 in Thai patients with *Plasmodium vivax* or acute, uncomplicated *Plasmodium falciparum* infections. *J Infect Dis* 2005 Jul 15;192(2):319-22.
129. Yeung S, White NJ. How do patients use antimalarial drugs? A review of the evidence. *Trop Med Int Health* 2005; 10: 121-38.

Local Publications 2006

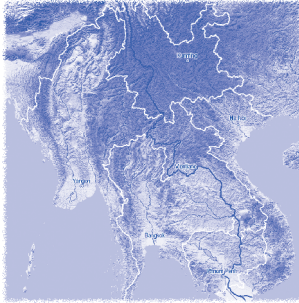
1. Ekataksin W, Chanwimalueang N, Pattanapen G, Hanboonkunupakarn B, Chirachariyavej T, Radomyos P, Riganti M, and Pongponratn E. Liver store of vitamin A was totally depleted in patient with cerebral malaria; A hitherto unreported hepatic involvement revealed by fluorescence microscopy. *Journal of Microscopy Society of Thailand* 2005;19: 41-2.

Local Publications 2006 (Continued)

2. Kitvatanachai S, Janyapoon K, Apiwathasorn C, Leemingsawat S. Distribution of important mosquitoes in Nava Nakorn industrial estate, Pathum Thani province, Thailand. *J Trop Med Parasitol* 2005;28(1):8-15.
3. Komalamisra C. Chromosomes and chromosome breakage in the lung fluke, *Paragonimus heterotremus*. *J Trop Med Parasitol* 2005;28:69-72.
4. Komalamisra C. Isozyme discrimination between *Paragonimus heterotremus* and *P. Miyazakii*. *J Trop Med Parasitol* 2005;28:48-53.
5. Komalamisra C, Bunchuen S, Waikagul J, Pongponratn E. Chaetotaxy of newly excysted metacercariae among five species of Thai *Paragonimus*. *J Trop Med Parasitol* 2005;28:1-7.
6. Muennoo C, Waikagul J, Maipanich W, Watthanakulpanich D, Sa-nguankiat S, Phubampen S, Nuamtanong S, Yoonuan T. Liver fluke and minute intestinal fluke infections in Sa Kaeo and Nan Provinces, Thailand. *J Trop Med Parasitol* 2005;28:16-21.
7. Pothipak N, Srivilairit S, Pengruksa C, Faithong S, Haoharn O, Chalermrut K, Tangpukdee N, Maneekarn P, Radomyos P, Wilairatana P, Looareesuwan S. Health status: Malaria, anemia and intestinal parasitic infections on the Thai-Myanmar Border. *J Trop Med Parasitol* 2005;28:26-30.
8. Suriyaprom K, Tungtrongchitr R, Pongpaew P, Harnroongroj T, Vudhivai N, Pooudong S, Phonrat B, Tungtrongchitr A, Paksanont S, Schelp FP. Homocysteine and vitamin status in healthy Thai smokers. *J Nutr Environ Med* 2005;15(1):9-21.
9. Wilairatana P, Krudsood S, Pothipak N, Srivilairit S, Vijaykadga S, Rojanawatsirivej C, Looareesuwan S. Efficacy of DB289 in Thai Patients with *Plasmodium vivax* or Acute, Uncomplicated *Plasmodium falciparum* Infections. *Siriraj Med J (Formerly: Siriraj Hosp Gaz)* 2005;57(6):177-81.
10. Wilairatana P, Krudsood S, Pothipak N, Srivilairit S, Vijaykadga S, Rojanawatsirivej C, Looareesuwan S. Medical Treatment of malaria in Thailand. *Siriraj Medical Journal* 2005;57(10):459-63.
11. Yoda T, Rakue Y, Mizota T, Looareesuwan S. The efficacy of anti-malaria drugs against *Plasmodium vivax* on the Thailand-Myanmar border. *Journal of Tokyo Medical University* 2005;63(2):140-3.
12. จิตติมา จิตวัฒน์. Current Issues in Dermatology 2005 สาขาจิตวิทยา ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

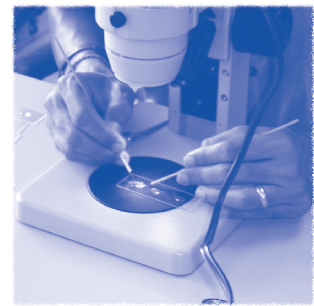
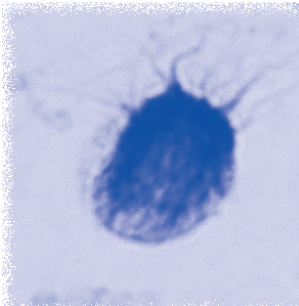
Tropmed's new books

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Editors: Punnee Pitisutithum, Donald P. Francis, José Esparza, Prasert Thongcharoen
2. International Handbook of Foodborne Pathogens.
Editors: Marianne D. Miliptis, Jeffrey W. Bier
 - *Opisthorchis viverrini*. By Yupaporn Wattanagoon and Swangjai Pungpak
 - Incidence of Foodborne Illness in Southesat Asia. By Punnee Pitisuttithum
3. ตำราวิทยาวัคซีน ว่าด้วยวัคซีนรุ่นใหม่
บรรณาธิการ พรรณี ปิติสุทธิธรรม และชยันต์ พิเชียรสุนทร



RESEARCH Abstracts

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HEMATOPOIETIC FEATURES AND APOPTOSIS IN THE BONE MARROW OF SEVERE *PLASMODIUM FALCIPARUM*-INFECTED PATIENTS: PRELIMINARY STUDY

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THE mechanism of anemia in severe falciparum malaria is still not completely understood. The purpose of this study was to determine whether apoptosis in the erythroid lineage causes anemia in falciparum malaria. Bone marrow aspirated from 8 severe falciparum malaria patients, 3 normal volunteers and 5 retrospective normal bone marrow smears were investigated. By light microscopic study, 5 of 8 hyperparasitemic patients had hypocellular bone marrows and erythroid hypoplasia, whereas the other 3 patients had normal cellularity. The mean myeloid : erythroid ratio of these 5 patients was significantly ($p < \text{or} = 0.05$) higher than normal. Apoptosis of bone marrow nucleated cells (BMNC) could be determined from the exposure of phosphatidylserine (PS) on the cell membrane but not DNA fragmentation (180-250 bp) or ultrastructural morphology. The percentages of apoptotic BMNC and apoptotic erythroid cells in bone marrow from each patient and controls varied from low to high, and were not associated with parasitemia. This study suggests that destruction of erythroid lineage, particularly through apoptosis regulation, cannot solely account for anemia in falciparum malaria.

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RANDOMIZED, CONTROLLED DOSE-OPTIMIZATION STUDIES OF DIHYDROARTEMISININ-PIPERAQUINE FOR THE TREATMENT OF UNCOMPLICATED MULTIDRUG-RESISTANT FALCIPARUM MALARIA IN THAILAND

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BACKGROUND Dihydroartemisinin-piperaquine (DP) is a new and relatively inexpensive artemisinin-containing fixed-combination antimalarial treatment. An adult treatment course contained 6.4 mg/kg dihydroartemisinin (DHA), which is >40% lower than the level in most artemisinin-containing combinations. This raised the possibility that the efficacy of the current coformulation may not be optimal in the treatment of multidrug-resistant falciparum malaria.

Methods In 2 large randomized, controlled studies in Thailand, the recommended dose of DP was compared with a regimen with additional artemisinin derivative (12 mg/kg; DP+) and with mefloquine plus artesunate (MAS3).

Results A total of 731 patients were included: 201 in a hospital-based study and 530 in a community study. Day-28 cure rates in the hospital-based study were 100% (95% confidence interval [CI], 93.9%-100%) in the MAS3 and DP+ groups and 98.3% (95% CI, 91%-99.7%) in the DP group, with a single recrudescence on day 21. In the community study, polymerase chain reaction genotyping-adjusted cure rates on day 63 were 96.1% (95% CI, 92.6%-99.7%) in the DP group, 98.3% (95% CI, 96.1%-100%) in the DP+ group, and 94.9% (95% CI, 91.2%-98.6%) in the MAS3 group ($P = .2$). Adverse events were few, with an excess of mild abdominal pain in the DP group

Conclusions The current dosage of DP (6.4 mg/kg DHA and 51.2 mg/kg piperaquine phosphate) given over the course of 48 h is highly effective, safe, and well tolerated for the treatment of multidrug-resistant falciparum malaria, and its efficacy is not improved by the addition of more DHA.

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TOLERABILITY OF IVERMECTIN IN GNATHOSTOMIASIS

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AT PRESENT, no universally-accepted effective treatment for cutaneous gnathostomiasis is available. At the Hospital for Tropical Diseases, Mahidol University, albendazole 400 mg twice a day for 14 days is commonly prescribed for patients diagnosed with cutaneous gnathostomiasis. The efficacy of albendazole to induce outward migration of the parasite was less than or around 20% in 2 studies. Research for alternative, more efficacious treatment, is needed. In this prospective open-labeled study, we assessed the safety of ivermectin in 20 Thai patients diagnosed with cutaneous gnathostomiasis. Ivermectin, one time only, at dosages of 50, 100, 150, or 200 microg/kg bodyweight,

was given orally to 4 groups of patients, 5 patients each group. Adverse events were recorded and laboratory tests were obtained before and after treatment. No serious adverse events occurred in this study. Forty adverse events were possibly related to ivermectin. The adverse events were malaise (35%), myalgia (30%), drowsiness (30%), pruritus (20%), nausea/vomiting (20%), dizziness (15%), diarrhea (15%), feeling of shortness of breath (10%), feeling of palpitations (10%), constipation (5%), anorexia (5%), and headache (5%). These adverse events were self-limited and not dose-related. Laboratory abnormalities were found in 3 patients (15%). Transient microscopic hematuria, pyuria, and mildly elevated liver enzymes were found in 1 patient each. Ivermectin single dose, of 50, 100, 150, and 200 microg/kg bodyweight, is considered safe in Thai patients. Future trials of ivermectin on human gnathostomiasis may be performed using dosages up to 200 microg/kg bodyweight.

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OPEN-LABEL RANDOMIZED TRIAL OF ORAL TRIMETHOPRIM-SULFANETHOXAZOLE, DOXYCYCLINE, AND CHLORAMPHENICOL COMPARED WITH TRIMETHOPRIM-SULFAMETHOXAZOLE AND DOXYCYCLINE FOR MAINTENANCE THERAPY OF MELIOIDOSIS

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MELIOIDOSIS (infection caused by *Burkholderia pseudomallei*) requires a prolonged course of oral antibiotics following initial intravenous therapy to reduce the risk of relapse after cessation of treatment. The current recommendation is a four-drug regimen (trimethoprim [TMP], sulfamethoxazole [SMX], doxycycline, and chloramphenicol) and a total treatment time of 12 to 20 weeks. Drug side effects are common; the aim of this study was to compare the efficacy and tolerance of the four-drug regimen with a three-drug regimen (TMP-SMX and doxycycline). An open-label, randomized trial was conducted in northeast Thailand. A total of 180 adult Thai patients were enrolled, of

which 91 were allocated to the four-drug regimen and 89 to the three-drug regimen. The trial was terminated early due to poor drug tolerance, particularly of the four-drug regimen. The culture-confirmed relapse rates at 1 year were 6.6% and 5.6% for the four- and three-drug regimens, respectively ($P = 0.79$). The three-drug regimen was better tolerated than the four-drug regimen; 36% of patients receiving four drugs and 19% of patients receiving three drugs required a switch in therapy due to side effects ($P = 0.01$). The duration of oral therapy was significantly associated with relapse; after adjustment for confounders, patients receiving less than 12 weeks of oral therapy had a 5.7-fold increase of relapse or death. A combination of TMP-SMX and doxycycline is as effective as and better tolerated than the conventional four-drug regimen for the oral treatment phase of melioidosis.

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TWO RANDOMIZED CONTROLLED TRIALS OF CEFTAZIDIME ALONE VERSUS CEFTAZIDIME IN COMBINATION WITH TRIMETHOPRIM-SULFAMETHOXAZOLE FOR THE TREATMENT OF SEVERE MELIOIDOSIS

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BACKGROUND: Two antibiotic regimens are used commonly in Thailand for the initial treatment of severe melioidosis: ceftazidime in combination with trimethoprim-sulfamethoxazole (TMP-SMX) and ceftazidime monotherapy. It is not known whether TMP-SMX provides an additional benefit.

Methods: Two prospective, randomized trials that compared these regimens for patients presenting with acute severe melioidosis were started independently at tertiary care hospitals in Ubon Ratchathani and Khon Kaen (in northeastern Thailand), and the results were analyzed together as a prospective, individual-patient data meta-analysis. The primary end point was in-hospital mortality rate.

Results: The in-hospital mortality rate among all enrolled patients ($n = 449$) was not significantly

different between those randomized to ceftazidime alone (25.1%; 56 of 223 subjects) and those randomized to ceftazidime with TMP-SMX (26.6%; 60 of 226 subjects; odds ratio [OR], 1.08; 95% confidence interval [CI], 0.7-1.7; stratified $P = .73$). Of the 241 patients with culture-confirmed melioidosis, 51 (21.2%) died. Of these 241 patients, 31 (12.9%) died ≥ 48 h after the time of study entry. Among patients with melioidosis, there was no difference in death rate between the 2 treatment groups for either all deaths (OR, 0.88; 95% CI, 0.48-1.6; stratified $P = .70$) or for deaths that occurred ≥ 48 h after hospital admission (OR, 0.88; 95% CI, 0.41-1.9; stratified $P = .73$). Conditional logistic regression analysis revealed that bacteremia, respiratory failure, and renal failure were independently associated with death and treatment failure. Drug regimens were not associated with death or treatment failure in this model.

Conclusion: We conclude that the addition of TMP-SMX to ceftazidime therapy during initial treatment of severe melioidosis does not reduce the acute mortality rate.

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MELIOIDOSIS IN 6 TSUNAMI SURVIVORS IN SOUTHERN THAILAND

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BACKGROUND: Six cases of melioidosis were identified in survivors of the 26 December 2004 tsunami who were admitted to Takuapa General Hospital in Phangnga, a region in southern Thailand where melioidosis is not endemic. All 6 cases were associated with aspiration, and 4 were also associated with laceration.

Methods: We compared the clinical, laboratory, and radiographic findings and the outcomes for these 6 patients with those for 22 patients with aspiration-related melioidosis acquired during 1987-2003 in a melioidosis-endemic region in northeast Thailand. Results of tests for detection of *Burkholderia pseudomallei* in soil specimens from Phangnga and from northeast Thailand were compared.

Results: The 6 patients (age range, 25-65 years)

presented with signs and symptoms of pneumonia 3-38 days (median duration, 6.5 days) after the tsunami. Chest radiograph findings at the onset of pneumonia were abnormal in all cases; 1 patient developed a lung abscess. *B. pseudomallei* was grown in blood cultures in 3 cases and in cultures of respiratory secretions in 4 cases. Two patients required ventilation and inotropes; 1 patient died. Compared with tsunami survivors, patients with aspiration-related melioidosis in northeast Thailand had a shorter interval (median duration, 1 day) between aspiration and onset of pneumonia; were more likely to exhibit shock, respiratory failure, renal failure, and/or altered consciousness ($P = .03$); and had a higher in-hospital mortality (64% [14 of 22 patients]; $P = .07$). These differences may be related to the severity of the near-drowning episode, the inhalation of sea water versus fresh water, the size of bacterial inoculum, and the possible acquisition (among tsunami survivors) of *B. pseudomallei* via laceration. Only 3 (0.8%) of 360 soil samples from Phangnga were positive for *B. pseudomallei*, compared with 26 (20%) of 133 samples from northeast Thailand ($P < .0001$).

Conclusions: Tsunami survivors are at increased risk of melioidosis if they are injured in an environment containing *B. pseudomallei*.

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DISEASE SEVERITY AND OUTCOME OF MELIOIDOSIS IN HIV-COINFECTED INDIVIDUALS

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THIS study examined whether coinfection with HIV and *Burkholderia pseudomallei* leads to altered disease severity or outcome associated with melioidosis. Coinfection was detected in only 8 of 524 (1.5%) adults with melioidosis in northeast Thailand. Clinical presentation and acute outcome were similar in HIV-positive and HIV-negative patients.

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CROSS-REACTIVITY OF ANTI-HIV-1 T CELL IMMUNE RESPONSES AMONG THE MAJOR HIV-1 CLADES IN HIV-1-POSITIVE INDIVIDUALS FROM 4 CONTINENTS

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BACKGROUND: The genetic diversity of human immunodeficiency virus type 1 (HIV-1) raises the question of whether vaccines that include a component to elicit antiviral T cell immunity based on a single viral genetic clade could provide cellular immune protection against divergent HIV-1 clades. Therefore, we quantified the cross-clade reactivity, among unvaccinated individuals, of anti-HIV-1 T cell responses to the infecting HIV-1 clade relative to other major circulating clades.

Methods: Cellular immune responses to HIV-1 clades A, B, and C were compared by standardized interferon- γ enzyme-linked immunospot assays among 250 unvaccinated individuals, infected with diverse HIV-1 clades, from Brazil, Malawi, South Africa, Thailand, and the United States. Cross-clade reactivity was evaluated by use of the ratio of responses to heterologous versus homologous (infecting) clades of HIV-1.

Results: Cellular immune responses were predominantly focused on viral Gag and Nef proteins. Cross-clade reactivity of cellular immune responses to HIV-1 clade A, B, and C proteins was substantial for Nef proteins (ratio, 0.97 [95% confidence interval, 0.89-1.05]) and lower for Gag proteins (ratio, 0.67 [95% confidence interval, 0.62-0.73]). The difference in cross-clade reactivity to Nef and Gag proteins was significant ($P < .0001$).

Conclusions: Cross-clade reactivity of cellular immune responses can be substantial but varies by viral protein.

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HEPATOTOXIC EFFECT OF BARAKOL IN MICE

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ACU TE and subacute hepatotoxicity induced by barakol was investigated in mice. Blood clinical biochemistry parameters (serum AST, ALT, total bilirubin, cholesterol, triglyceride and glucose) and histopathological examination were used as criteria for liver injury. Mice were given barakol in a single dose (100, 200, 300 and 400 mg/kg, p.o.) and repeated doses (100, 200 and 300 mg/kg/day, p.o., 28 days) for acute and subacute toxicity studies, respectively. The acute and subacute hepatotoxic findings included the increase in total bilirubin, AST and ALT levels and the decrease in cholesterol, triglyceride and glucose concentrations which corresponded to the histopathological examination showing the hydropic swelling of hepatocytes, scattered degree of necrotic cells around central vein spreading to periportal zone and finally apoptotic cell death around centrilobular zone spreading to periportal area. The degree of the severity of barakol induced liver injury was dose and time dependent. The mechanism involved may be the induction of necrosis and apoptosis, resulting in the disturbance of normal liver cell function. The ultimate outcome of hepatotoxicity by barakol depended on the balance between the extent of liver cell damage and its repair. There were signs of liver regeneration and recovery in all doses of barakol treatment. Reduction of total cytochrome P450 content with unchanged protein expression of CYP 3A1 and 2E1, inhibition of mitochondrial respiration and hemolysis of red blood cells may be involved in barakol induced hepatotoxicity.

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ESTIMATION OF THE TOTAL PARASITE BIOMASS IN ACUTE FALCIPARUM MALARIA FROM PLASMA PFHRP 2

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Background

IN falciparum malaria sequestration of erythrocytes containing mature forms of Plasmodium falciparum in the microvasculature of vital organs is central to pathology, but quantitation of this hidden sequestered parasite load in vivo has not previously been possible. The peripheral blood parasite count measures only the circulating, relatively non-pathogenic parasite numbers. P. falciparum releases a specific histidine-rich protein (PfHRP2) into plasma. Quantitative measurement of plasma PfHRP2 concentrations may reflect the total parasite biomass in falciparum malaria.

Methods and Findings

We measured plasma concentrations of PfHRP2, using a quantitative antigen-capture enzyme-linked immunosorbent assay, in 337 adult patients with falciparum malaria of varying severity hospitalised on the Thai–Burmese border. Based on in vitro production rates, we constructed a model to link this measure to the total parasite burden in the patient. The estimated geometric mean parasite burden was 7×10^{11} (95% confidence interval [CI] 5.8×10^{11} to 8.5×10^{11}) parasites per body, and was over six times higher in severe malaria (geometric mean 1.7×10^{12} , 95% CI 1.3×10^{12} to 2.3×10^{12}) than in patients hospitalised without signs of severity (geometric mean 2.8×10^{11} , 95% CI 2.3×10^{11} to 3.5×10^{11} ; $p < 0.001$). Parasite burden was highest in patients who died (geometric mean 3.4×10^{12} , 95% CI 1.9×10^{12} to 6.3×10^{12} ; $p = 0.03$). The calculated number of sequestered parasites increased with disease severity and was higher in patients with late developmental stages of P. falciparum present on peripheral blood smears. Comparing model and laboratory estimates of the time of sequestration suggested that admission to hospital with uncomplicated malaria often follows schizogony-but in severe malaria is unrelated to stage of parasite development.

Conclusion

Plasma PfHRP2 concentrations may be used to estimate the total body parasite biomass in acute

falciparum malaria. Severe malaria results from extensive sequestration of parasitised erythrocytes.

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ATTENUATION OF CYTOADHERENCE OF PLASMODIUM FALCIPARUM TO MICROVASCULAR ENDOTHELIUM UNDER FLOW BY HEMODILUTION

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THE cytoadherence of Plasmodium falciparum-infected erythrocytes (IRBCs) to endothelium is mediated by adhesion molecules within the physical constraints of a viscous fluid containing mostly erythrocytes. The volume fraction of erythrocytes (hematocrit) and their physical properties, such as deformability, are important properties of blood that affect cell recruitment to the vascular wall. In the present study, we examined the effect of hematocrit on IRBC rolling and adhesion on human microvascular endothelial cells in a flow chamber system in vitro. We found hematocrit to be a major determinant of IRBC/endothelial cell interactions. There was a 5-fold and 12-fold increase in IRBC rolling and adhesion, respectively, when hematocrit increased from 10% to 30%, as a result of changes in shear rate. Similar effects were seen in the presence of less deformable erythrocytes, serum proteins, and on endothelium stimulated with tumor necrosis factor- α . The results indicate that hemorheologic variations are an important determinant of the degree of cytoadherence.

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TRENDS IN THE INJECTION OF MIDAZOLAM AND OTHER DRUGS AND NEEDLE SHARING AMONG INJECTION DRUG USERS ENROLLED IN THE AIDSVAX B/E HIV-1 VACCINE TRIAL IN BANGKOK, THAILAND

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MIDAZOLAM injection may increase the hazards of drug use. Its ability to cause amnesia may be associated with increased HIV risk behaviour and its interaction with other licit and illicit drugs may cause overdose and death. We analysed midazolam injection among injecting drug users (IDUs) participating in the AIDS-VAX BIE HIV-1 vaccine trial in Bangkok, Thailand. From March 1999 to August 2000, 2545 IDUs were enrolled and randomised to receive AIDS-VAX BIE or placebo. An interviewer-administered questionnaire assessed demographics (at baseline) and drug use behaviour (every 6 months). Reports of midazolam injection were statistically evaluated. During 36 months of follow-up, injection of any drug decreased from 94 to 51 % and needle sharing decreased from 33 to 16%. Among those who continued to inject, midazolam injection increased from 10 to 31% (all $p < 0.0001$). Earlier study visit, lower education and less frequent injection were independently associated with less frequent midazolam injection; younger age, reports of needle sharing and receiving methadone treatment were independently associated with more frequent midazolam injection. Preventive interventions to educate IDUs and midazolam prescribers are urgently needed.

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NO EVIDENCE OF CARDIOTOXICITY OF ATOVAQUONE-PROGUANIL ALONE OR IN COMBINATION WITH ARTESUNATE

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COMBINATIONS are set to become the mainstay in treatment and prophylaxis of malaria due to *Plasmodium falciparum*. Various antimalarials have been implicated in cardiotoxicity via prolongation of the QTc interval. Atovaquone-proguanil is an effective and increasingly popular antimalarial choice when used alone or with artesunate in areas of drug resistance. We report the results of an investigation carried out on the Thai-Burmese border in 42 patients randomized to receive either atovaquone-proguanil or atovaquone-proguanil-artesunate for three days. Electrocardiographic recordings were made at baseline

and one hour after each dose. There was no statistically significant change in QTc interval between baseline and any subsequent readings in either treatment group or the cohort as a whole. We conclude that atovaquone-proguanil shows no evidence of cardiotoxicity either alone or when combined with artesunate.

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POLYMORPHISMS OF THE HLA-B AND HLA-DRB 1 GENES IN THAI MALARIA PATIENTS

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SUMMARY: The high degree of polymorphism of human leukocyte antigen (HLA) genes has been suggested to result from natural selection against susceptibility to a variety of infectious pathogens, including malaria. HLA molecules are considered to play a crucial role in the defense of the host against malarial infection, and different HLA class I and class II alleles have been reported to be associated with reduced susceptibility to malaria or the severity of malaria in different populations. To test for associations between HLA alleles and the severity of malaria in a Thai population, polymorphisms of HLA-B and HLA-DRB1 genes were investigated in 472 adult patients in northwest Thailand with *Plasmodium falciparum* malaria. In this study, malaria patients were classified into three groups: mild malaria, non-cerebral severe malaria, and cerebral malaria. Our results revealed that the allele frequencies of HLA-B*46, -B*56, and -DRB1*1001 were statistically different between non-cerebral severe malaria and cerebral malaria ($P = 0.005$), between mild malaria and cerebral malaria ($P = 0.032$), and between mild malaria and non-cerebral malaria ($P = 0.007$). However, our results may be showing false positives due to multiple testing. Thus, further study with a larger sample size must be conducted to obtain conclusive evidence of the association of these HLA-B and DRB1 alleles with the severity of malaria in Thailand.

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IN VITRO SUSCEPTIBILITY AND GENETIC VARIATIONS FOR CHLOROQUINE AND MEFLOROQUINE IN *PLASMODIUM FALCIPARUM* ISOLATES FROM THAI – MYANMAR BORDER

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In vitro drug susceptibility to chloroquine (CQ) and mefloquine (MF) were assessed in 39 *P. falciparum* isolates from the Thai-Myanmar border area. To further characterize CQ- and MF-resistance profiles in this area, we also analyzed pfcr1 K76T mutation that is critical for CQ resistance, and pfmdr1 polymorphism that has an association with MF resistance. Eighteen isolates were successfully examined by in vitro tests for CQ, and 17 of them had resistance to the drug. Geometric mean concentration of CQ that inhibited the growth of parasites at 50% (IC50) was 371 +/- 227 nM (105-971 nM). Sixteen isolates were successfully examined by in vitro tests for MF, and 8 of them were resistant to the drug. Geometric mean of IC50 for MF was 41 +/- 31 nM (4-125 nM). Genotypes of drug resistance, such as pfcr1 and pfmdr1 mutations, were also analyzed. All the 39 isolates had the same haplotype (CVIET) for PfCRT at its 72-76th amino acids. A pfmdr1 Y86 mutation was found in 95% of isolates. A pfmdr1 D1042 mutation was also present in 7 isolates, while no pfmdr1 Y1246 mutation was observed. These results indicated a correlation between CQ resistance and the pfcr1 T76 and pfmdr1 Y86 mutations.

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CURDLAN SULPHATE IN HUMAN SEVERE/ CEREBRAL *PLASMODIUM FALCIPARUM* MALARIA

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PRECLINICAL studies have shown that curdlan sulphate (CRDS), a sulphated 1→3-β-D glucan, inhibits *Plasmodium falciparum* in vitro and down-modulates the immune response. A direct, non-specific effect on cytoadherence and rosetting may be predicted, as has been described with other sulphated polysaccharides, e.g. heparin. The anticoagulant effect of CRDS is 10-fold lower than heparin. Curdlan sulphate has, therefore, emerged as a candidate for adjunct medication in the treatment of severe/cerebral malaria. Two clinical studies were conducted using CRDS as adjunct medication to conventional therapy (artesunate) in patients with severe and severe/cerebral malaria. Both studies were double-blind and placebo-controlled to evaluate the efficacy and safety of the combination. Curdlan sulphate appeared to reduce the severity of the disease process, e.g. fever clearance time was shortened. Due to the small number of patients, there was no difference in mortality. The two treatment arms in both studies showed similar results for all laboratory parameters. The only adverse event recorded during CRDS treatment was an increase in activated partial thromboplastin time. This can be monitored easily. It seems that the patients who may benefit most are severe/cerebral cases with no organ damage on admission.

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THE USE OF THE MULTI-ORGAN-DYSFUNCTION SCORE TO DISCRIMINATE DIFFERENT LEVELS OF SEVERITY IN SEVERE AND COMPLICATED *PLASMODIUM FALCIPARUM* MALARIA

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CLINICAL presentation of *Plasmodium falciparum* malaria reflects a continuum from asymptomatic to multi-organ manifestation and death. Severe malaria is defined by the World Health Organization as a qualitative variable. We used the multi-organ dysfunction score (MODS) as a quantitative approach for severity in 29 patients with severe and complicated *P. falciparum* malaria to test its usefulness in discriminating different severity levels. The MODS on admission was highly correlated with the duration of symptoms after admission (r = 0.73, P < 0.001) and the serum level of tumor necrosis factor alpha (r = 0.41, P = 0.03). In addition, the simplified MODS, based mainly on clinical findings, was also correlated with liver

and renal dysfunction during hospitalization (alanine transaminase, $r = 0.42$, $P = 0.02$; blood urea nitrogen, $r = 0.45$, $P = 0.015$). A score ≥ 16 was associated with significantly longer disease duration ($P = 0.018$). Thus, this score might provide a predictive value for morbidity in *P. falciparum* malaria.

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THE ROLE AND SIGNIFICANCE OF SPUTUM CULTURES IN THE DIAGNOSIS OF MELIOIDOSIS

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PNEUMONIA is a common manifestation of melioidosis, the disease caused by *Burkholderia pseudomallei*. In this study, we defined the prognostic significance of a positive sputum culture. A total of 712 patients presenting to Sappasithprasong Hospital, Ubon Ratchathani, Thailand, with melioidosis between January 1992 and December 2002 had a sputum culture performed during admission, which was positive for *B. pseudomallei* in 444 patients (62%). The median duration of sputum positivity was 9 days (range, 1 to 49 days). Sputum cultures were negative in 32% of patients with radiologic changes suggestive of pulmonary involvement. Overall in-hospital mortality was 48%. A positive sputum culture was associated with mortality (adjusted OR 2.8, 95% CI: 1.9, 4.0; $P < 0.001$). This was independent of renal disease, a prior history of melioidosis, positive blood cultures, and other potential confounders. The presence of *B. pseudomallei* in the sputum of patients with melioidosis is associated with a poorer prognosis.

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ECTOPHOSPHORYLATION OF CD36 REGULATES CYTOADHRENCE OF *PLASMODIUM FALCIPARUM* TO MICROVASCULAR ENDOTHELIUM UNDER FLOW CONDITIONS

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THE adhesion of *Plasmodium falciparum*-infected erythrocytes (IRBCs) to human dermal microvascular endothelial cells (HDMECs) under flow conditions is regulated by a Src family kinase- and alkaline phosphatase (AP)-dependent mechanism. In this study, we showed that the target of the phosphatase activity is the ectodomain of CD36 at threonine-92 (Thr⁹²). Mouse fibroblasts (NIH 3T3 cells) transfected with wild-type CD36 or a mutant protein in which Thr⁹² was substituted by Ala supported the rolling and adhesion of IRBCs. However, while the Src family kinase inhibitors PP1 and PP2 and the specific AP inhibitor levamisole significantly reduced IRBC adhesion to wild-type CD36 transfectants as with HDMECs, the inhibitors had no effect on IRBC adhesion to the mutant cells. Using a phosphospecific antibody directed at a 12-amino-acid peptide spanning Thr⁹², we demonstrated directly that CD36 was constitutively phosphorylated and could be dephosphorylated by exogenous AP. Endothelial CD36 was likewise constitutively phosphorylated. The phosphospecific antibody inhibited IRBC adhesion to HDMECs that could be reversed by preincubating the antibody with the phosphorylated but not the nonphosphorylated peptide. Pretreatment of HDMECs with AP abrogated the effect of PP1 on IRBC adhesion. Collectively, these results are consistent with a critical role for CD36 dephosphorylation through Src family kinase activation in regulating IRBC adhesion to vascular endothelium.

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LIMITED POLYMORPHISM IN THE DIHYDROPTEROATE SYNTHETASE GENE (DHPS) OF *PLASMODIUM VIVAX* ISOLATES FROM THAILAND

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ABSTRACTS

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THE dhps sequences of 55 *Plasmodium vivax* isolates (39 from Thailand and 16 from elsewhere) revealed mutant *Pvdhps* at codons 383 and/or 553 (A □G) in 33 isolates, all from Thailand. Mutations of *Pvdhps* and *Pvdhfr* were correlated. Multiple mutations were associated with high-grade sulfadoxine-pyrimethamine resistance.

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BEHAVIORAL AND SOCIAL ISSUES MAONG VOLUNTEERS IN A PREVENTIVE HIV VACCINE TRIAL IN THAILAND

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SUMMARY: Behavioral and social issues were investigated in 363 phase I/II preventive HIV-1 vaccine trial volunteers in Thailand. These issues included risk behavior, HIV knowledge, distress, and social consequences of vaccine trial participation. Data were collected at baseline and at 4-, 8-, and 12-month follow-up visits. Volunteers reported relatively low levels of risk behaviors at baseline and at follow-up. Overtly negative reactions from family or friends were reported by 5.9%. No experiences of discrimination in employment, health care, or insurance were reported. Mean levels of distress were low throughout the trial, and HIV-related knowledge was high, although it was common to consider the possibility of HIV transmission through casual contact. Findings add to the evidence that preventive HIV vaccine trials are feasible in Thailand.

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ANTIBODY-DEPENDENT CELL-MEDIATED CYTOTOXIC RESPONSES IN PARTICIPANTS ENROLLED IN A PHASE I/II ALVAC-HIV/AIDS VAX® B/E PRIME-BOOST HIV-1 VACCINE TRIAL IN THAILAND

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ANTIBODY-DEPENDENT cell-mediated cytotoxicity (ADCC) was assessed in volunteers participating in an ALVAC-HIV (vCP1521)/AIDS VAX® B/E gp120 prime-boost vaccine trial in Thailand. ADCC activity was measured using chromium release from gp120 subtype B- and CRF01_AE-coated targets in 95 vaccinees and 28 placebo recipients. There was a significant difference in the magnitude of the ADCC response to both targets between vaccinees and placebo recipients. The frequency of responders to subtype B and to CRF01_AE was 96% and 84% in the vaccine group versus 11% and 7% in the placebo group. The results demonstrate that this HIV vaccine is a potent inducer of ADCC activity and may be an additional protection of this prime-boost vaccine in preventing HIV disease.

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ARTESUNATE-DAPSONE-PROGUANIL TREATMENT OF FALCIPARUM MALARIA: GENOTYPIC DETERMINANTS OF THERAPEUTIC RESPONSE

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THE combination of chlorproguanil and dapsone is being considered as an alternative antimalarial to sulfadoxine-pyrimethamine in Africa, because of its greater efficacy against resistant parasites, and its shorter half-lives, which exert less selective pressure for the emergence of resistance. A triple artesunate-chlorproguanil-dapsone combination is under development. In a previous study of relatively low-dose chlorproguanil-dapsone in multidrug-resistant falciparum malaria in Thailand failure rates were high. Proguanil is inexpensive, widely available and very similar to chlorproguanil. The safety and efficacy of artesunate-dapsone-proguanil (artesunate 4 mg/kg, dapsone 2.5 mg/kg, proguanil 8 mg/kg daily for three days), was studied prospectively in 48 Thai adult

patients with acute falciparum malaria followed daily for 28 days. Eleven of these had a recrudescence of their infection. Genotyping of *Plasmodium falciparum* dihydrofolate reductase (dhfr) and dihydropteroate synthase (dhps) indicated that the *Pfdhfr* I164L mutation was the main determinant of therapeutic outcome; all 11 failures carried this mutation (failure rate 11/37; 30%) whereas none of the 11 infections with 'wild type' 164 genotypes failed. The addition of artesunate considerably augments the antimalarial activity of the biguanide-dapsone combination, but this is insufficient for infections with parasites carrying the highly antifol-resistant *Pfdhfr* I164L mutation.

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ARE EXTENSIVE T CELL EPITOPE POLYMORPHISMS IN THE *PLASMODIUM FALCIPARUM* CIRCUMSPOROZITE ANTIGEN, A LEADING SPOROZOITE VACCINE CANDIDATE, SELECTED BY IMMUNE PRESSURE

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PROTECTIVE cellular immune responses depend on MHC presentation of pathogen-derived Ag fragments. MHC diversity renders this process sensitive to point mutations coding for altered amino acid sequence of the short target Ag-derived peptides epitopes. Thus, in a given host, a pathogen with an altered epitope sequence will be more likely to escape detection and elimination by the immune system. At a population level, selection by immune pressure will increase the likelihood of polymorphism in important pathogen antigenic epitopes. This mechanism of immune evasion is found in viruses and other pathogens. The detection of polymorphic hot spots in an Ag is often taken as a strong indication of its role in protective

immunity. We provide evidence that polymorphisms in the T cell epitopes of a malaria vaccine candidate are unlikely to have been selected by immune pressure in the human host.

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CLINICAL FEATURES, AETIOLOGY AND SHORT-TERM OUTCOME OF INTERSTITIAL PNEUMONITIS IN HIV/AIDS PATIENTS AT BAMRASNARADUR HOSPITAL, NONTHABURI, THAILAND

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SUMMARY This prospective study was conducted at Bamrasnaradura Hospital from November 11, 2002, until January 5, 2003, in order to describe the clinical manifestations and determine the aetiologies as well as to assess the short-term outcome of interstitial pneumonitis in HIV/AIDS patients. 59 patients with interstitial infiltrates on chest radiographs were included in the study. Tuberculosis (TB) was the most common diagnosis (44%), followed by Pneumocystis pneumonia (PCP) (25.4%), bacterial pneumonia (20.3%) and fungal pneumonia (10.2%). In TB, compared to other diagnoses, a mild cough ($p = 0.031$), pallor ($p = 0.021$), lymphadenopathy ($p < 0.001$), an absence of skin lesions ($p = 0.003$), a higher mean body temperature ($p = 0.004$) and an absence of dyspnoea on exertion ($p = 0.042$) were significant findings. In PCP, compared to other diagnoses, dyspnoea on exertion ($p = 0.014$), nonpurulent sputum production ($p = 0.047$), a higher mean respiratory rate ($p < 0.001$), and an absence of lymphadenopathy ($p < 0.001$) were significant factors. In bacterial pneumonia, compared to other diagnoses, production of purulent sputum ($p = 0.014$), haemoptysis ($p = 0.006$), skin lesions ($p = 0.002$) and severe cough ($p = 0.040$) were significantly associated factors. In fungal pneumonia, compared to other diagnoses, headache and papulonecrotic skin lesions were common findings, but no factor showed a significant association. After four weeks, 59.3% patients were alive and 13.6% had died. Among those alive, 88.6% had clinically improved. The cumulative survival after 28 days was highest among PCP patients, followed by bacterial pneumonia, TB and fungal pneumonia, but these differences were statistically not significant ($p = 0.453$).

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ROLE AND SIGNIFICANCE OF QUANTITATIVE URINE CULTURES IN DIAGNOSIS OF MELIOIDOSIS

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MELIOIDOSIS is associated with significant mortality in countries in which it is endemic. Previous studies have demonstrated that quantitative *Burkholderia pseudomallei* counts in blood are predictive of mortality. Here we examine the relationship between outcomes and quantitative *B. pseudomallei* counts in urine. A total of 755 patients presenting to Sappasithiprasong Hospital, Ubon Ratchathani, northeast Thailand (in the northeast part of the country), with melioidosis between July 1993 and October 2003 had quantitative urine cultures performed within 72 h of admission. Urine culture results were divided into the following groups: (i) no growth of *B. pseudomallei* from a neat sample or pellet, (ii) positive result from a centrifuged pellet only (<10³ CFU/ml), (iii) detection of between 10³ CFU/ml and 10⁵ CFU/ml from a neat sample, or (iv) detection of ≥10⁵ CFU/ml from a neat sample. The overall in-hospital mortality rate was 45%. Patients with negative urine cultures had the lowest death rate (39%). Mortality rates rose with increasing *B. pseudomallei* counts in urine, from 58% for those with positive spun pellets only to 61% for those with between 10³ CFU/ml and 10⁵ CFU/ml and 71% for those with ≥10⁵ CFU/ml. This was independent of age, presence of bacteremia, known risk factors for melioidosis such as diabetes, and the prior administration of antibiotics. The presence of *B. pseudomallei* in urine during systemic infection is associated with a poor prognosis.

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RECURRENT MELIOIDOSIS IN PATIENTS IN NORTHEAST THAILAND IS FREQUENTLY DUE TO REINFECTION RATHER THAN RELAPSE

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HUMAN melioidosis is associated with a high rate of recurrent disease, despite adequate antimicrobial treatment. Here, we define the rate of relapse versus the rate of reinfection in 116 patients with 123 episodes of recurrent melioidosis who were treated at Sappasithiprasong Hospital in Northeast Thailand between 1986 and 2005. Pulsed-field gel electrophoresis was performed on all isolates; isolates from primary and recurrent disease for a given patient different by one or more bands were examined by a sequence-based approach based on multilocus sequencotyping. Overall, 92 episodes (75%) of recurrent disease were caused by the same strain (relapse) and 31 episodes (25%) were due to infection with a new strain (reinfection). The interval to recurrence differed between patients with relapse and reinfection; those with relapses had a median time to relapse of 228 days (range, 15 to 3,757 days; interquartile range [IQR], 99.5 to 608 days), while those with reinfection had a median time to reinfection of 823 days (range, 17 to 2,931 days; IQR, 453 to 1,211 days) (P = 0.0001). A total of 64 episodes (52%) occurred within 12 months of the primary infection. Relapse was responsible for 57 of 64 (89%) episodes of recurrent infection within the first year after primary disease, whereas relapse was responsible for 35 of 59 (59%) episodes after 1 year (P < 0.0001). Our data indicate that in this setting of endemicity, reinfection is responsible for one-quarter of recurrent cases. This finding has important implications for the clinical management of melioidosis patients and for antibiotic treatment studies that use recurrent disease as a marker for treatment failure.

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A RANDOMISED COMPARISON OF ARTESUNATE-ATOVAQUONE-PROGUANIL VERSUS QUININE IN TREATMENT FOR UNCOMPLICATED FALCIPARUM MALARIA DURING PREGNANCY

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BACKGROUND: There is no safe, practical, and effective treatment for pregnant women infected with multidrug-resistant *Plasmodium falciparum*.

Methods: We recruited pregnant Karen women in the second or third trimesters of pregnancy who had uncomplicated falciparum malaria for a randomized, open-label trial with a restricted sequential trial design of 7 days of supervised quinine (SQ7) versus 3 days of artesunate-atovaquone-proguanil (AAP).

Results: Eight-one pregnant women entered the study between December 2001 and July 2003; 42 were treated with SQ7 and 39 were treated with AAP. Fever, parasite clearance, and duration of anemia were significantly better with AAP; the treatment failure rate was 7 times lower (5% [2/39] vs. 37% [15/41]; relative risk, 7.1 [95% confidence interval, 1.7-29.2]; $P = .001$). There were no significant differences in birth weight, duration of gestation, or congenital abnormality rates in newborns or in growth and developmental parameters of infants monitored for 1 year.

Conclusion: AAP is a well-tolerated, effective, practical, but expensive treatment for multidrug-resistant falciparum malaria during the second or third trimesters of pregnancy. Despite the small number of subjects, our results add to the growing body of evidence that AAP is safe for the mother and the fetus.

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INVERSE RELATIONSHIP BETWEEN THE NUMBER OF FERTILIZED ASCARIS EGGS EXCRETED AND FEVER, IN PATIENTS CO-INFECTED WITH *PLASMODIUM VIVAX* AND *ASCARIS LUMBRICOIDES*

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No Abstract

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THE PHARMACOKINETICS OF ORAL DOXYCYCLINE DURING COMBINATION TREATMENT OF SEVERE FALCIPARUM MALARIA

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THE pharmacokinetics of oral doxycycline administered at 200 mg every 24 h were investigated in 17 patients recovering from severe *Plasmodium falciparum* malaria. The data suggest that the doses of doxycycline currently recommended (circa 3.5 mg/kg of body weight daily) may not be optimal.

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A FUNCTIONAL POLYMORPHISM IN THE IL 1 B GENE PROMOTER, IL 1 B - 31 C> T, IS NOT ASSOCIATED WITH CEREBRAL MALARIA IN THAILAND

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BACKGROUND: IL-1 β and IL-1RA levels are higher in the serum of cerebral malaria patients than in patients with mild malaria. Recently, the level of IL1B expression was reported to be influenced by a polymorphism in the promoter of IL1, IL1B -31C>T. METHODS: To examine whether polymorphisms in IL1B and IL1RA influence the susceptibility to cerebral malaria, IL1B -31C>T, IL1B 3953C>T, and IL1RA variable number of tandem repeat (VNTR) were analysed in 312 Thai patients with malaria (109 cerebral malaria and 203 mild malaria patients). RESULTS: In this population, IL1B -31C>T and IL1RA VNTR were detected, while IL1B 3953C>T (i.e., IL1B 3953T) was not observed in the polymorphism screening for 32 patients. Further analyses for IL1B -31C>T and IL1RA VNTR in 110 cerebral malaria and 206 mild malaria patients showed no significant association of these polymorphisms with cerebral malaria. CONCLUSION: The present results suggest that IL1B -31C>T and IL1RA VNTR polymorphisms do not play a crucial role in susceptibility or resistance to cerebral malaria.

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STRONG LINKAGE DISEQUILIBRIUM OF A HBE VARIANT WITH THE (AT)9(T)5 REPEAT IN THE BP1 BINDING SITE UPSTREAM OF THE β -GLOBIN GENE IN THE THAI POPULATION

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ABSTRACTS

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A BINDING site for the repressor protein BP1, which contains a tandem (AT)_x(T)_y repeat, is located approximately 530 bp 5' to the human β -globin gene (HBB). There is accumulating evidence that BP1 binds to the (AT)₉(T)₅ allele more strongly than to other alleles, thereby reducing the expression of HBB. In this study, we investigated polymorphisms in the (AT)_x(T)_y repeat in 57 individuals living in Thailand, including three homozygotes for the hemoglobin E variant (HbE; β 26Glu->Lys), 22 heterozygotes, and 32 normal homozygotes. We found that (AT)₉(T)₅ and (AT)₇(T)₇ alleles were predominant in the studied population and that the HbE variant is in strong linkage disequilibrium with the (AT)₉(T)₅ allele, which can explain why the β^E chain is inefficiently synthesized compared to the normal β^A chain. Moreover, the mildness of the HbE disease compared to other hemoglobinopathies in Thai may be due, in part, to the presence of the (AT)₉(T)₅ repeat on the HbE chromosome. In addition, a novel (AC)_n polymorphism adjacent to the (AT)_x(T)_y repeat (i.e., (AC)₃(AT)₇(T)₅) was found through the variation screening in this study.

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COMPARISON OF ASHDOWN'S MEDIUM, BURKHOLDERIA CEPACIA MEDIUM, AND BURKHOLDERIA PSEUDOMALLEI SELECTIVE AGER FOR CLINICAL ISOLATION OF BURKHOLDERIA PSEUDOMALLEI

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A SHDOWN'S medium, *Burkholderia pseudomallei* selective agar (BPSA), and a commercial *Burkholderia cepacia* medium were compared for their abilities to grow *B. pseudomallei* from 155 clinical specimens that proved positive for this organism.

The sensitivity of each was equivalent; the selectivity of BPSA was lower than that of Ashdown's or *B. cepacia* medium.

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HIV-1 PROPHYLACTIC VACCINE TRIALS IN THAILAND

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THE HIV epidemic has resulted in medical, social and economic consequences. There is general agreement that a safe, effective and affordable preventive HIV vaccine is urgently needed to control the epidemic. To date, over 60 phase I/II trials of about 30 candidate vaccines have been conducted worldwide. In 1991, Thailand was selected by WHO, UNAIDS as one of the countries for potential HIV vaccine evaluation sites, and 10 projects with HIV phase I, II and III trials have been conducted since 1994. Strong national commitment, collaboration both at national and international levels together with infrastructure strengthening and capacity building, are very important for success. The vaccine designs pursued included synthetic peptides, recombinant protein and recombinant viral vectors followed by or with boosting doses of recombinant proteins. All phase I/II trials indicated that the candidate vaccines were safe and produced binding and a certain level of neutralizing antibodies. The recombinant vector vaccines produced both humoral and cell-mediated responses. The AIDS-VAX phase III trial conducted in 1999 was the first efficacy trial of HIV vaccine in Thailand that brought valuable information for further HIV vaccine development. Recently, a phase III trial of ALVAC-HIV priming with AIDS-VAX B/E boosting was launched in 2003, and the findings of this trial will be shared with the international community. With committed parties in medical science, government, industry and the community, we hope that we can achieve success in developing a safe and effective HIV vaccine in the near future.

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ACTIVITY OF POSACONAZOLE IN THE TREATMENT OF CENTRAL NERVOUS SYSTEM FUNGAL INFECTIONS

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OBJECTIVES: A multinational, multicentre, open-label clinical trial was conducted to evaluate the safety and efficacy of posaconazole, an extended-spectrum triazole antifungal agent, in subjects with invasive fungal infections who had refractory disease or who were intolerant of standard antifungal therapy. In this subanalysis, we report on those subjects in this trial who had a fungal infection that involved the CNS.

Methods: Subjects received posaconazole oral suspension 800mg/day in divided doses for up to 1 year; however, subjects could receive additional therapy as part of a treatment-use extension protocol. A blinded, third-party data review committee determined subject eligibility and outcome.

Results: Of the 330 subjects who enrolled in the study, 53 had infections of the CNS, of which 39 were considered evaluable for efficacy. Most had refractory disease (37 of 39) and underlying HIV infection (29 of 39). Twenty-nine subjects had cryptococcal infections, and 10 had infections caused by other fungal pathogens [*Aspergillus* spp. (four), *Pseudallescheria boydii* (two), *Coccidioides immitis* (one), *Histoplasma capsulatum* (one), *Ramichloridium mackenziei* (one), and *Apophysomyces elegans* plus a *Basidiomycetes* sp. (one)]. Successful outcomes were observed in 14 of 29 (48%) subjects with cryptococcal meningitis and five of 10 (50%) subjects with CNS infections due to other fungal pathogens. Posaconazole was well tolerated.

Conclusions: These data suggest that posaconazole, as an oral medication, has clinical activity against fungal infections of the CNS and may provide a valuable alternative to parenteral therapy in patients failing existing antifungal agents.

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RELATIONSHIP BETWEEN SOLUBLE LEPTIN RECEPTOR, LEPTIN, LIPID PROFILES AND ANTHROPOMETRIC PARAMETERS IN OVER WEIGHT AND OBESE THAI SUBJECTS

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MEDIAN, range and 95% confidence interval (CI) for median of age, anthropometric variables, soluble leptin receptor, serum leptin and lipid profile levels of 48 overweight (Body mass index (BMI) = 25.00-29.99 kg/m²) and obese (BMI > or = 30.00 kg/m²) Thai males and 166 overweight and obese Thai females, compared with 26 males and 81 females in a control group (BMI = 18.50-24.99 kg/m²), were determined. The study subjects were persons who turned up regularly for physical check-ups at the Out-patient Department, General Practice Section, Ratchawithi Hospital, Bangkok, aged between 18-60 years. Serum leptin, triglyceride and low density lipoprotein cholesterol/high density lipoprotein cholesterol ratios (LDL-C/ HDL-C ratio) were significantly higher in the overweight and obese males and females. Soluble leptin receptor and HDL-C were significantly lower in the overweight and obese males and females. Cholesterol and LDL-C were significantly higher in the overweight and obese females, but there was no significant difference in the overweight and obese males when compared with the control males. Low soluble leptin receptor levels were found in 38.1% (8/21) of the overweight and obese males, while 31.5% (29/92) were found in the overweight and obese females. Elevated leptin levels were found in 66.7% (32/48) and 89.8% (149/166) of the overweight and obese males and females, respectively. Both low soluble leptin receptor levels and elevated leptin levels were found in 9.5% (2/21) and 29.4% (27/92) of the overweight and obese males and females, respectively. A significant positive correlation was found between soluble leptin receptor and cholesterol, and between weight, BMI, waist, hip and HDL-C, with leptin. Serum soluble leptin receptor levels were significantly negatively correlated with leptin and BMI. The results can elucidate the causes and consequences of obesity, and are expected to aid the provision of care for overweight and obese Thai people.

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HEALTH STATUS: MALARIA, ANEMIA AND INTESTINAL PARASITIC ON THE THAI – MYANMAR BORDER

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WEREPORT a study of the health status of Sai Yok people living in Kanchanaburi Province, western Thailand, on the Thai-Myanmar border. Our report focused particularly on malaria, anemia, and intestinal parasitic infections. Falciparum malaria appeared not to be seasonal, with the prevalence in the dry month of February 2003 similar to the wet month of July .2003. In lthe first survey in February 2003, the prevalence of *P. faldparum* and *P. vivax* was 0.1 and 0.5%, respectively. A second survey was conducted in July 2003, wJ1en the prevalen~e of *P. faldparum*, was 0.4% and *P. vivax* 0.6%. There was no difference in malaria prevalence between dry and rainy seasons. In February, anemia iq., malaria patient was only found in one asymptomatic faldparum malaria-patient (0.1%), whereas in July, anemia was not found in any .walaria patient; Intestinal parasites were found in 398 (~7.8%) of 587 people presenting for stool examination in February. The three most frequently” found intestinal parasites were *Entamoeba coli* (i9.4%), *Giardia lamblia* (13.1%), and *Endolimax nana* (10.0%). One month later, after the results of stool examinations had been obtained, antiparasitic drugs and health education were given to the infected population. In July, a second survey was conducted, and intestinal parasites were found in 323 (25.8%) of people coming for stool examination (n = 1,252). The three most frequently found intestinal parasites were *E. coli* (10.4%), *G. lamblia* (4.1%), and hookworm (2.2%). The prevalence of intestinal parasitic infections were reduced markedly from 67.8% in the first survey to 25.8% in the second survey (p < 0.05).

In summary, the prevalence of malaria and anemia was low « 2%) among the Sai Yok people. There was a high, but falling, rate of intestinal parasitic infections.

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AN OPEN, RANDOMIZED TRIAL OF THREE-DAY TREATMENT WITH ARTESUNATE COMBINED WITH A STANDARD DOSE OF MEFLOAUINE DIVIDED OVER EITHER TWO OR THREE DAYS, FOR ACUTE, UNCOMPLICATED FALCIPARUM MALARIA

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THE combination of artesunate and mefloquine is currently one of the most effective treatments for multidrug-resistant Plasmodium falciparum malaria. Simultaneous, rather than sequential treatment with the two drugs, would allow better patient compliance. We therefore evaluated three-day treatment with artesunate combined with either 2 or 3 days of mefloquine co-administered once a day with artesunate. The study was an open, randomized trial for acute, uncomplicated falciparum malaria and was conducted at the Bangkok Hospital for Tropical Diseases. One hundred and twenty adult patients were randomized to two treatment groups. Group 1 patients received 4 mg/kg/day of artesunate for 3 days and 3 daily doses of 8.0 mg/kg/day mefloquine given with artesunate. Group 2 patients received the same dose of artesunate and the same total dose of mefloquine (25 mg/kg). However, the mefloquine was given as 15 mg/kg on the first day and 10 mg/kg/ on the second day, again with artesunate. The baseline demographic and clinical characteristics of the patients in the two groups were similar. The cure rates for the 3-day and 2-day mefloquine regimens were 100% and 99%, respectively. There were no significant differences in either median fever clearance times (group 1=32 hours; group 2=33 hours) or mean parasite clearance times (group 1=42.3 hours; group 2=43.3 hours). Both regimens were well tolerated and there were no significant differences in the incidence of adverse effects. Nausea or vomiting occurred in 3.8% of patients in both groups and transient dizziness occurred in 4% of group 1 and 9% of group 2 patients. These results suggest that a 3-day regimen of mefloquine administered with artesunate is effective and well tolerated. This practical regimen could improve patient compliance.

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DETECTION OF *ORIENTIA TSUTSUGAMUSHI* IN CLINICAL SAMPLES BY QUANTITATIVE REAL-TIME POLYMERASE CHAIN REACTION

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O*RIENTIA tsutsugamushi* infection causes scrub typhus, a common zoonosis of rural Asia. *Orientia tsutsugamushi* was recently detected by a real-time quantitative polymerase chain reaction (qPCR) assay in animal specimens. We evaluated the same qPCR assay in specimens obtained from patients with serologically proven scrub typhus infections. The 47-kDa qPCR assay was more sensitive than was mouse inoculation; it was reactive in whole blood specimens from all 10 isolate-positive patients and in 7 of 17 isolate-negative individuals ($P = 0.003$, Fisher's two-tailed exact test). As few as 1,076 *O. tsutsugamushi* copies/ μL were detected in whole blood. Four of 7 sera from isolate-proven scrub typhus infections were also reactive by qPCR. The assay was unreactive in all 12 individuals without scrub typhus infection. This is the first demonstration of a sensitive and specific real-time qPCR assay for human scrub typhus infection.

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INVERSE RE RELATIONSHIP BETWEEN THE NUMBER OF FERTILIZED *ASCARIS* EGGS EXCRETED AND FEVER, IN PATIENTS CO-INFECTED WITH *PLASMODIUM VIVAX* AND *ASCARIS LUMBRICOIDES*

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EXAMINATION of a stool sample from a patient harbouring adult *Ascaris lumbricoides* worms usually reveals variable numbers of the fertilized and unfertilized eggs of the nematode. Fertilization depends on the presence of a mature male worm close to the female worm producing the eggs, the eggs being fertilized, *in utero*, following copulation. Fertilization triggers meiosis and leads to the morphological changes that allow the fertilized eggs to be differentiated from the unfertilized eggs under a light microscope (Gilles,

1996). Some helminths that infect humans, particularly *Ascaris*, may have affected the incidence and clinical evolution of human malaria (Nacher, 2002). Some appear to be associated not only with protection from severe malaria but also with increased malaria incidence (Nacher, 2002). It is assumed that there has been selection pressure for the helminth genotypes that, by protecting their hosts from fatal malaria, increase their own chances of survival and reproduction. If symptomatic malaria can interfere with helminth reproduction, it seems possible that helminth genotypes that reduce at least one symptom of malaria will emerge and spread. The aim of the present, retrospective study was to determine if, in patients co-infected with *A. lumbricoides* and *Plasmodium vivax*, the severity of malarial fever affected the excretion of fertile *Ascaris* eggs.

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EVALUATION OF A REAL-TIME POLYMERASE CHAIN REACTION ASSAY FOR THE DIAGNOSIS OF MALARIA IN PATIENTS FROM THAILAND

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WE compared the diagnosis of malaria in 297 patients from Thailand by a real-time polymerase chain reaction (PCR) assay using the LightCycler with conventional microscopy using Giemsa-stained thick and thin blood films. The PCR assay can be completed in one hour and has the potential to detect and identify four species of *Plasmodium* in a single reaction by use of melting temperature curve analysis (however, we did not detect *Plasmodium ovale* in this study). Blood was collected, stored, and transported on IsoCode STIX, which provide a stable matrix for the archiving and rapid simple extraction of DNA. A genus-specific primer set corresponding to the 18S ribosomal RNA was used to amplify the target sequence. Fluorescence resonance energy technology hybridization probes were designed for *P. falciparum* over a region containing basepair mismatches, which allowed differentiation of the other *Plasmodium* species. The PCR results correlated with the microscopic results in 282 (95%) of 297 patient specimens. Most of these were single-species infections caused by *P. vivax* (150) and *P. falciparum* (120), along with 5 *P. malariae*, 2 mixed infections (*P. falciparum* and *P. vivax*), and 5 negative specimens. No negative microscopy specimens were positive by PCR (100% specificity for detection of

any Plasmodium). The 15 discrepant results could not be resolved, but given the subjective nature of microscopy and the analytical objectivity of the PCR, the PCR results may be correct. The ability of the PCR method to detect mixed infections or to detect *P. ovale* could not be determined in this study. Within the limitations of initial equipment costs, this real-time PCR assay is a rapid, accurate, and efficient method for the specific diagnosis of malaria. It may have application in clinical laboratories, as well as in epidemiologic studies and antimalarial efficacy trials.

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AN OPEN RANDOMIZED CLINICAL TRIAL OF ARTEKIN VS ARTESUNATE-MEFLOQUINE IN THE TREATMENT OF ACUTE UNCOMPLICATED FALCIPARUM MALARIA

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MALARIA remains a major cause of morbidity and mortality in tropical countries and subtropical regions in the world. Southeast Asia has the most resistant malaria parasites in the world, which has limited treatment options in this region. In response to this situation, short-course artemisinin-based combination therapies (ACTs) have been developed. The combination of dihydroartemisinin (DHA) and piperaquine (PQP) in the form of Artekin has been developed as an alternative to established combinations, such as artesunate-mefloquine, primarily to reduce treatment costs and toxicity. We conducted a study comparing a standard treatment for acute uncomplicated falciparum malaria (artesunate 4 mg/kg/day together with mefloquine 8 mg/kg/day oral route once a day for 3 days) (Group A) and a combination of dihydroartemisinin 40 mg and piperaquine 320 mg in the form of Artekin given once a day for 3 days (Group B) to determine safety, efficacy, and tolerability. One hundred and eighty patients were randomly enrolled at the ratio of 1:2 into groups A:B. All patients had rapid initial clinical and parasitological responses. There were no significant differences in fever clearance time or parasite clearance time between both groups. The 28-day cure rates were high, at 100% and 99%, in groups A and B, respectively. We conclude that Artekin was as effective and well-tolerated as artesunate-mefloquine, and can be used alternatively as the current treatment for multidrug-resistant *P. falciparum* malaria.

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RELATIONSHIP BETWEEN HYPERHOMOCYSTEINEMIA AND ATHEROSCLEROSIS IN CHRONIC HEMODIALYSIS PATIENTS

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BACKGROUND: Hyperhomocysteinemia is an independent risk factor of coronary artery heart disease (CAHD) and atherosclerosis in a normal population. However, it is still controversial in end-stage kidney disease patients who underwent long-term dialysis. Carotid intima-media thickness (IMT) is the standard non-invasive measurement of atherosclerosis. The aims of the present study were to determine the homocysteine (Hcy) level, and to evaluate its role as a risk factor of atherosclerosis in hemodialysis (HD) patients.

Clinical data and blood chemistries were assayed in 62 HD patients. Atherosclerosis was defined by clinical presentations of CAHD, cerebrovascular or peripheral vascular diseases, or carotid plaque by ultrasound. IMT was also measured by ultrasound.

Plasma Hcy level in HD patients was significantly higher in HD patients than normal controls (28.3 +/- 8.3 vs 9.7 +/- 2.9 micromol/l, p < 0.001). Older age (p < 0.001), male sex (p = 0.05), longer duration of HD (p = 0.05), and higher plasma Hcy level (p = 0.01) correlated with atherosclerosis by univariate analysis, but plasma Hcy did not show significant correlation by multivariable analysis. There was also correlation between IMT and atherosclerosis in HD patients (p < 0.001) but no correlation was observed between plasma Hcy level and IMT.

Hyperhomocysteinemia is not an independent factor in the genesis of atherosclerosis in HD patients. Advanced age plays a major role of hyperhomocysteinemia and IMT is a useful marker of atherosclerosis in these patients.

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METHYLENETETRAHYDROFOLATE REDUCTASE (MTHFR) POLYMORPHISM (C677T) IN RELATION TO HOMOCYSTEINE CONCENTRATION IN OVERWEIGHT AND OBESE THAIS

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WE analyzed the association between MTHFR (C677T) gene polymorphism with serum concentrations of homocysteine, folate, and vitamin B12 in 37 male and 112 female overweight/obese Thai volunteers (BMI \geq 25.00 kg/m²), and compared them with 23 male and 90 female control subjects (BMI = 18.5-24.99 kg/m²). Statistically significant higher levels of serum homocysteine were found in the overweight/obese subjects than the control subjects ($p < 0.05$). Serum folic acid levels in the overweight/obese subjects were significantly lower than the control subjects ($p < 0.05$). When the data were grouped according to homocysteine concentration and MTHFR gene polymorphism, there were significantly higher homocysteine concentrations in the overweight/obese subjects than the control subjects in wild type gene polymorphism (CC) in the hyperhomocysteine group (homocysteine >10.0 mmol/l) ($p < 0.05$), but in genotype polymorphism (CC, CT, TT) there were lower folic acid and vitamin B12 concentrations in the overweight/obese subjects than in the control subjects. In the hyperhomocysteine groups, there was no significant difference in the frequencies of MTHFR (C677T) gene polymorphism between the overweight/obese subjects and the control subjects. Folic acid and gene polymorphism were found to be significantly related to the overweight/obese and control groups in logistic regression analysis ($p < 0.05$). The results support the supposition that folic acid is more important than vitamin B12.

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THE EFFICACY AND ADVERSE EFFECTS OF GPO-VIR (STAVUDINE+LAMIVUDINE+NEVIRAPINE) IN TREATMENT-NAÏVE ADULT HIV PATIENTS

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A DESCRIPTIVE, combined retrospective and prospective study was conducted at the Anonymous Clinic, Chon Buri Hospital, Chon Buri Province, Thailand from November 10, 2003 to January 4, 2004. A total of 83 adult HIV-treatment-naïve patients undergoing treatment with GPO-VIR (stavudine, lamivudine, and nevirapine) for at least one year were studied. The objectives of the study were to assess the efficacy of GPO-VIR by evaluating body weight changes, CD4 T-cell count changes, the occurrence of opportunistic infections, and long-term side effects,

such as lipodystrophy, during treatment. Of 83 studied patients, approximately half (52.3%) of them had a body weight increase $> 10\%$ of pre-treatment body weight after 12 months treatment. After taking GPO-VIR, CD4 T-cell counts increased rapidly, by a median of 78×10^6 cells/l during the first three months. 39.5% of the patients attained median CD4 counts $> 200 \times 10^6$ cells/l, and 11.6% achieved $> 500 \times 10^6$ cells/l after 2 years of treatment. The occurrence of opportunistic infections was significantly lower after treatment with GPO-VIR ($p = 0.001$). Subjective assessment of lipodystrophy by physicians and patients showed that 16.8% had symptoms of lipodystrophy within 2 years of GPO-VIR treatment. There was a significant association between older age group (40-49 years) and occurrence of lipodystrophy ($p = 0.043$). GPO-VIR is an inexpensive and effective antiretroviral drug regimen for initiating treatment of naïve patients, but careful assessment for lipodystrophy is necessary, especially after one year of treatment.

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ANTIBODIES FROM PATIENTS WITH MELIOIDOSIS RECOGNIZE *BURKHOLDERIA MALLEI* BUT NOT *BURKHOLDERIA THAILANDENSIS* ANTIGENS IN THE INDIRECT HEMAGGLUTINATION ASSAY

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THE indirect hemagglutination assay routinely used to detect antibodies to *Burkholderia pseudomallei* was modified to detect cross-reactivity of antibodies to *B. pseudomallei*, *B. mallei*, and *B. thailandensis* antigens. We demonstrate a lack of cross-reactivity between *B. pseudomallei* and *B. thailandensis* but marked cross-reactivity between *B. pseudomallei* and *B. mallei*.

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IN VITRO STUDY OF MALARIA PARASITE INDUCED DISRUPTION OF BLOOD-BRAIN BARRIER

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THE mechanism of blood–brain barrier breakdown in the complex pathogenesis of cerebral malaria is not well understood. In this study, primary cultures of porcine brain capillary endothelial cells (PBCEC) were used as in vitro model. Membrane-associated malaria antigens obtained from lysed Plasmodium falciparum schizont-infected erythrocytes stimulated human peripheral blood mononuclear cells (PBMC) to secrete tumor necrosis factor alpha. In co-cultivation with the brain endothelial cell model, the malaria-activated PBMC stimulated the expression of E-selectin and ICAM-1 on the PBCEC. Using electric cell–substrate impedance sensing, we detected a significant decrease of endothelial barrier function within 4 h of incubation with the malaria-activated PBMC. Correspondingly, immunocytochemical studies showed the disruption of tight junctional complexes. Combination of biochemical and biophysical techniques provides a promising tool to study changes in the blood–brain barrier function associated with cerebral malaria. Moreover, it is shown that the porcine endothelial model is able to respond to human inflammatory cells.

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THE EPIDEMIOLOGY OF PATIENTS WITH SEVERE MALARIA WHO DIED AT THE HOSPITAL FOR TROPICAL DISEASES, 1991-2004

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THIS study is a retrospective case series of the causes of death among patients with severe malaria. Data from the medical records of patients who were admitted to the Intensive Care Unit (ICU) of the Hospital for Tropical Diseases, Mahidol University, Bangkok, Thailand between 1991 and 2004 were analyzed. The overall hospital mortality rate was 0.2%

and the ICU mortality rate was 1.8% for patients with malaria. Thirty-five patients died of malaria in the ICU during the study period, while a total of 1,866 patients were treated for malaria in the ICU during the study period. The most common complication of malaria was cerebral malaria (77.1%). The socioeconomic and demographic characteristics of those who died are examined here, as well as the cost of their treatment.

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EFFICACY OF DB289 IN THAI PATIENTS WITH PLASMODIUM VIVAX OR ACUTE, UNCOMPLICATED PLASMODIUM FALCIPARUM INFECTIONS

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BACKGROUND: DB289 is the orally active prodrug of the diamidine DB75, which was developed for the treatment of human African trypanosomiasis.

Methods: We tested the safety and efficacy of DB289 for the treatment of Plasmodium vivax and acute, uncomplicated P. falciparum infections in an open-label pilot study at the Hospital for Tropical Diseases in Bangkok. Nine patients with P. vivax infections and 23 patients with P. falciparum infections were admitted and treated with 100 mg of DB289 given orally twice a day for 5 days and were followed for 28 days. Patients with P. vivax infections were also treated with primaquine on days 10-23.

Results: All patients cleared parasites by day 7, with a mean ± SD clearance time of 43 ± 41 h. One patient with a P. vivax infection had a recurrence of parasitemia on day 9. Of the 23 patients with P. falciparum infections, 3 had recurrences of parasitemia caused by P. vivax and 2 had recurrences of parasitemia caused by P. falciparum. In only 1 of 2 recurrences of parasitemia caused by P. falciparum were the parasites genotypically distinct from the infecting parasites the patient had at enrollment, which means there was a 96% cure rate.

Conclusions: DB289 is a promising new antimalarial compound that could become an important component of new antimalarial combinations.

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MEDICAL TREATMENT OF MALARIA IN THAILAND

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MALARIA is the most important parasitic infection in people, accounting for more than one million deaths a year'. Malaria has become a priority for the international health community, and it is now the focus of several new initiatives. Prevention and treatment of malaria could be greatly improved with existing methods if increased financial and labour resources were available. However, new approaches for prevention and treatment are needed. Several new drugs are under development, which are likely to be used in combinations to show the spread of resistance, but the high cost of treatments would make sustainability difficult. Malaria infection is caused by coccidian protozoan parasites of the genus *Plasmodium* carried by female *Anopheles* spp. mosquitoes. The clinical disease in humans may vary widely according to the species of the parasites -- *Plasmodium falciparum*, *P. vivax*, *P. ovale* or *P. malariae* -- and the genetics, immune status and the age of the host. These variables have a major influence on all aspects of the disease, including epidemiology, pathogenesis, clinical features and management.

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SUBCUTANEOUS MYCOSES

พรทิพย์ ภูวบัณฑิตสิน, วัฒนศรี สิริภักดิ์, นกต นพคุณ, วิวัฒน์ ก่อกิจ, ประวีตร อู่สวนนท์, ศิริวรรณ วานานุกูล, ชมนาด วงษ์กระจ่าง, วนิตา ลิ้มพงศานุรักษ์, วิชัย หงส์จาร์, ถนอม บรรประเสริฐ, สิริ เชี่ยวชาญวิทย์, นุชา เนียมประดิษฐ์, จิตติมา จิตวิวัฒน์, กัญญรัตน์ ทรัพย์วิเชียร

การติดเชื้อมาลาเรียในชั้นใต้ผิวหนังมักเกิดจากเชื้อราเข้าสู่ผิวหนังโดยตรงทางบาดแผล เชื้อเหล่านี้จะเริ่มแบ่งตัวบริเวณบาดแผลแล้วลามออกไปยังผิวหนังชั้นต่างๆ โดยรอบ โรคมักจะเป็นเฉพาะที่ การติดเชื้อมักแพร่ไปอย่างช้าๆ และกระจายทางน้ำเหลือง พบการกระจายของเชื้อทางกระแสเลือดได้น้อยมาก โรคติดเชื้อมาลาเรียในชั้นใต้ผิวหนังมีลักษณะทางคลินิกแตกต่างกันหลายแบบโรคที่พบบ่อยคือ sporotrichosis, chromoblastomycosis, phaeoerythromycosis, eumycetoma และ hyalohyphomycosis โรคเหล่านี้พบในเขตร้อนชื้นยกเว้น sporotrichosis ซึ่งพบอัตราการเกิดโรคสูงในเขตอบอุ่นเช่นกัน โรค

ติดเชื้อมาลาเรียในชั้นใต้ผิวหนังสามารถพบได้ในคนปกติส่วนในคนที่ภูมิคุ้มกันบกพร่องโรคอาจลามกระจายไปทั่วร่างกายได้ การรักษาต้องใช้ยาต้านเชื้อมาลาเรียและ/หรือการทำศัลยกรรมร่วมด้วย โรคเหล่านี้หายช้าและอาจกลับเป็นซ้ำดังนั้นการเพาะเชื้อราที่เป็นสาเหตุมีความสำคัญในการพยากรณ์โรคและการให้การรักษา การพัฒนาด้านเชื้อมาลาเรียใหม่ๆ หรือการให้การรักษาหลายชนิดร่วมกันทำให้การหายของโรคดีขึ้น

ในบทนี้จะกล่าวถึงโรคติดเชื้อมาลาเรียในชั้นใต้ผิวหนัง 2 โรคที่พบบ่อยคือ chromoblastomycosis และ mycetoma

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LIVER DYSFUNCTION IN PATIENTS INFECTED WITH *PLASMODIUM MALARIAE*

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WE performed a prospective laboratory study on 54 patients with acute *Plasmodium malariae* infection admitted to Bangkok Hospital for Tropical Diseases between 1999 and 2004. The objective of the study was to document changes in hepatic biochemical indices after treatment with artemisinin derivatives. Thirteen patients (24%) were lost to follow up a median of 20 days after admission (range 14-21 days) for reasons not related to adverse effects. Forty-one patients (76%) completed the 28 day follow up period. On admission, 8 patients (15%) had slight increases in both direct and total bilirubin; median (range) values were 0.91 mg/dL (0.67-1.50) and 2.04 mg/dL (1.30-2.68), respectively. Twelve patients (23%) had raised alkaline phosphatase levels (median 234.5U/L, range 153.0-322.0). Eighteen patients (34%) and 17 patients (32%) had slight increases in serum aspartate aminotransferase and serum alanine aminotransferase; median (range) values were 60.0 U/L (40.0-216.0) and 54.0 U/L (40.0-385.0), respectively. Twenty-five patients (47%) had hypoalbuminemia; median (range) value was 3.0 g/dL (2.1-3.5). Serum liver function tests and physical examinations were performed weekly during the 28 day follow-up period. Serum bilirubin, aspartate aminotransferase and albumin returned to normal within one week, and serum alkaline phosphatase and alanine aminotransferase returned to normal within two weeks. We conclude that patients with *Plasmodium malariae* infection had minimal abnormalities in liver biochemical indices, predominantly raised alkaline phosphatase and aminotransferase levels, and hypoalbuminemia. These minor abnormalities return to normal within two weeks after antimalarial drugs were administered.

Presented at: Presented at the XVIth. International Congress for Tropical Medicine and Malaria. Marseille, France 11-15 Sep 2005; Abstract no. P009, page 132.

CLINICAL TRIAL OF ARTESUNATE AND PRIMAQUINE FOR TREATMENT OF VIVAX MALARIA IN THAILAND

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PLASMODIUM VIVAX, a common cause of malaria in Asia and South America, causes a clinically benign illness but relapse is frequent. Radical cure requires primaquine treatment but, in Thailand, 10-15% of vivax infections now seem refractory to standard doses (15 mg once daily for 14 day). Chloroquine-resistant *P. vivax* is found in the region and mixed infections with multi-drug resistant *P. falciparum* may be present. Accordingly, new therapeutic regimens are needed that can be used in the absence of accurate microscopic diagnosis. We studied 399 Thai patients with acute, symptomatic *P. vivax* malaria to determine the efficacy, safety and tolerability of artesunate with selected regimens of primaquine. Patients were randomly assigned to one of six treatment groups: all patients received artesunate, 100 mg once daily for 5 days. Group 1 to 5 then received primaquine, 30 mg once daily for 5, 7, 9, 11 and 14 days, respectively. Group 6 received primaquine 30 mg twice a day for 7 days. The 28-day cure rates were 85%, 89%, 94%, 100%, 100%, 96%, respectively. Treatment of vivax malaria with artesunate for 5 days followed by high-dose primaquine is highly effective, well-tolerated and equivalent or superior to standard treatment with low-dose primaquine alone.

Presented at: Presented at the XVIth. International Congress for Tropical Medicine and Malaria. Marseille, France 11-15 Sep 2005; Abstract no. P035, page 138.

SERUM DEHYDROEPIANDROSTERONE SULFATE PROFILE, HEMOGLOBIN CONCENTRATIONS AND PARASITE DENSITY IN FALCIPARUM MALARIA PATIENTS

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IT has been proposed that severe malarial anemia, a major cause of morbidity and mortality in endemic areas, is multifactor. Dehydroepiandrosterone (DHEA) and DHEA-sulfate (DHEAS), which are the most abundant hormones secreted by the adrenal cortex may be one of those factors. We examined the relationship between *Plasmodium falciparum* parasitemia, hemoglobin (Hb) concentrations and serum DHEAS in Thai patients living along the Thai-Myanmar border. During 28 days of treatment, serum DHEAS and Hb levels were analyzed on days 0, 7, 14, 21 and 28 for monitoring the association. We found that, DHEAS levels were not significantly associated with decreased parasite density, and also not significantly associated with hemoglobin levels through 4 weeks of follow up, even after adjustment for other determinants of hemoglobin level. These findings not support the hypothesis that DHEAS, an adrenal androgen which is low in childhood and rises with the development of secondary sexual characteristics, is necessary for resistance to malarial infection. Although the physiological hormone DHEAS is a potent inhibitor of G6PD activity, and G6PD deficiency is known to exert antimalarial protection via enhanced opsonization and phagocytosis of rings, the early forms of the parasite. This study suggests that DHEAS should not be used as adjuvant to stimulate red blood cell production in severe falciparum malaria patients.

Presented at: Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005. Abstract page 165.

SERUM CYTOKINE PROFILES IN FALCIPARUM MALARIA PATIENTS: A COMPARISON BETWEEN SEVERE AND UNCOMPLICATED CASES

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THE relative balance between Th1 and Th2 cytokines appears important, since the role of cytokines has been reported in several studies by comparison of clinically heterogeneous groups of patients. This study is aim to determine the role of interleukin-1 (IL-1), IL-1, IL-2, IL-4, IL-6, IL-8, IL-10, gamma interferon (IFN-), and alpha-tumor necrosis factor (TNF-) in a group of patients with uncomplicated *Plasmodium falciparum* malaria compared with severe cases. Levels of cytokine profile in serum for 40 patients with severe falciparum malaria (SFM), 36 patients with uncomplicated falciparum malaria (UFM) and 10 healthy volunteer subjects were determined by an Evidence Investigator Biochip Array (Randox, UK). Serum levels of IL-2 were not significantly different between SFM and UFM on admission and decreased rapidly 1 day later in both groups. After successful treatment, serum levels of IL-2 were slightly increased to the levels that higher than the levels on admission. Serum levels of IL-4, IL-6, IL-8, IL-10, IFN- and TNF- were significantly different between SFM and UFM on admission and decreased rapidly in SFM group until the levels were normal at day 28 of hospitalization, but in UFM group, serum levels of IL-6 and IL-10 increased rapidly 1 day later and slightly decreased until touch the normal levels. In conclusion, the increase of serum IL-6, IFN- and TNF- level (Cytokines that mediate natural immunity) during the acute phase of falciparum malaria may reflect and early and effective immune response. Moreover, the increase of serum IL-2, IL-4, IL-8, and IL-10 (Cytokines that regulate lymphocyte growth, activation and differentiation) may play a role in limiting progression from uncomplicated malaria to severe and life-threatening condition.

Presented at: *Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005. Abstract page 166.*

AUTORADIOGRAPHY OF MOUSE BRAIN AFTER INTRAMUSCULAR INJECTION OF C¹⁴-LABELED ARTEETHER

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INTRAMUSCULAR administration of high doses of artemether and arteether to experimental animals produces selective damage to brain stem centres involved predominantly in auditory processing and vestibular reflexes. We investigated the distribution and accumulation of oil-soluble arteether intramuscularly

(C¹⁴-labeled arteether, 20 µCi/kg body weight) in a mouse model. The results showed that the main localization of labeled arteether was found in the hind brain when compared to the other parts of the mouse brain (p = 0.001). Other organs where the drug accumulated included the intestine, heart, spleen, liver, lung, kidney. Cmax (mean ± SD) of arteether in whole blood was reached after 36 ± 8.215 minutes after injection. The terminal half-life of this labeled arteether was 1.8 hours. The blood / brain ratios at 4 hours after drug injection was 8 : 1. These findings suggest that labeled arteether can pass the blood-brain barrier of the mouse brain and accumulated mainly in the hind brain which is corresponding to our previous clinical and neuropathological findings of artemether toxicity.

Presented at: *Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005. Abstract page 166.*

SCREENING AND BASELINE EPIDEMIOLOGIC PROFILE OF PARTICIPANTS IN THE PHASE I HIV VACCINE TRIAL IN TAHILAND

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BACKGROUND: Established the ptofile of potential panicipants in the HIV vaccine trials provides valuable guidance for conducting future trials. The aim of this study is to describe baseline epidemiologic characteristics of volunteers at the Vacine Trial Center, as a part of the phase I, multicenter, double-blind, placebo-controlled study of an experimental HIV vaccine.

Methods: Fifty-seven healthy volunteers 18-50 years of age were screened. Recruitment strategies, demographics and risk behaviors were assessed. Baseline laboratory data were performed. HIV status was determined by using Sanofi and Abbott ELISA.

Results: From October 2003 through October 2004, 29 of 57 volunteers screened were enrolled. Nineteen were excluded on unacceptable laboratory results. including 1 with HIV infection; 3 with medical problems; 2 pregnancies; and 1 unable to turn up for enrollment. Three were eligible but the quata was full. Successful recruitment methods were referrals from volunteers and staff. Most volunteers were men (32/57), young (median, 27 years), single (38/57). Buddhism (56/57), employed (45/57) and had no nsk for HIV dung the past 6 months (56/57). The most common contraceptive meth. ods were abstinence and usage of male condoms.

Conclusion: Healthy volunteers were successfully enrolled in the phase I HIV vaccine trial. Results of this dose-escalating study are expected in 2009.

Presented at: ICAAP KOBE 2005 "Bridging Science and Community" Kobe Convention Center, Japan.

TREATMENT OF MALARIA: THE PRESENT STATUS AND UPDATE ON NEW ANTIMALARIALS

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NEW antimalarial drugs that have been investigated at the Hospital for Tropical Diseases, Faculty of Tropical Medicine, Mahidol University, in recent years are as follows. atovaquone, a hydroxynaphthoquinone, was evaluated and it was found that atovaquone alone proved safe and effective. All patients treated had clinical cure, however, one third of patients had late recrudescence (RI). When it was combined with proguanil, the cure rate increased to 100%. This combination has now been developed into a fixed drug named Malarone. Artemisinin derivatives such as artesunate, artemether, arteether and dihydroartemisinin are also tested at the Bangkok Hospital for Tropical Diseases. Artesunate and artemether alone at a total dose of 600 to 750 mg. given over 5-7 days produced cure rates of 80 to 95%. Artesunate or dihydroartemisinin suppositories at a dose of 10 mg/kg/day have been proved successful for the treatment of severe malaria. The artemisinin derivatives, (4 mg/kg/day) when used in combination with mefloquine (8 mg/kg/day) given once a day for 3 days gave improved cure rates, up to 95-100%. Dihydroartemisinin alone with a total dose of 480 mg given over 5 days gave a cure rate of 90%. Arteether, a WHO/TOR supported drug, has been evaluated in the Hospital and now has been registered for use (the same dose of artemether) in severe malaria under the name Artemotil.~ Other combinations (artemisinin derivatives combined with tetracycline or doxycycline and mefloquine combined with tetracycline or doxycycline) have also been evaluated with improvement in cure rates. Recently, a fixed drug (artemether plus lumefantrine) named Coartem~ (six doses given over 72 hours) proved to be a safe and effective drug (cure rate over 95%) for the treatment of falciparum malaria and it has been registered for use in many western countries. At present, studies with combinations of artemisinin derivatives plus mefloquine (in various doses and durations of treatment) are being investigated. Recently we have finished the double-blind, randomized, comparative study of 200 patients (adults and children) with falciparum malaria treated by a pre-packed blister approach (4 mg/kg/

day artesunate and 8 mg/kg/day given once a day for 3 days) and found that this approach proved safe and effective and this approach could translate clinically into a better patient compliance. Other fix-combinations (Artecom~, Artekin~) proved safe and efficacious (cure rate over 98%) and could be an alternative antimalarial drugs. In general, artemisinin derivatives (12 mg/kg total dose given in 3 days) combined with mefloquine (25 mg/kg total dose given in 3 days) have been a standard regimen for the treatment of multidrug resistant falciparum malaria in Thailand. Until proven otherwise, drug combinations are still recommended for all adult patients suffering from acute uncomplicated falciparum malaria contracted in multidrug resistant areas. The treatment for uncomplicated malaria is aimed at producing a radical cure using the combination of either (1) artesunate (4 mg/kg/day) plus mefloquine (8 mg/kg/day) for 3 days; (2) a fixed dose of artemether and lumefantrine (20/120 mg tablet) named Coartem (4 tablets twice a day for three days for adults weighing more than 35 kg); (3) quinine 10 mg/kg 8-hourly plus tetracycline 250 mg 6-hourly for 7 days (or doxycycline 200 mg once a day for 7 days as an alternative to tetracycline) in patients aged 8 years and over; and (4) a combination of atovaquone and proguanil called Malarone (in adult, 4 tablets given daily 3 days). In treating severe malaria, early diagnosis and early treatment with a potent antimalarial drug is recommended to save the patient's life. The antimalarial drugs of choice are: intravenous quinine or a parenteral form of an artemisinin derivative (artesunate Lv./Lm. 2.4 mg/kg followed by 1.2 mg/kg injection at 12 and 24 hr and then daily for 5 days; artemether Lm. 3.2 mg/kg injection followed by 1.6 mg/kg at 12 and 24 hrs and then daily for 5 days; artemether Lm. (Artemotil) with the same dose of artemether; artesunate suppository (5 mg/kg) given rectally 12 hourly for 3 days). Oral artemisinin derivatives (artesunate, artemether, dihydroartemisinin with the dose 4 mg/kg/day should replace parenteral forms when patients can tolerate oral medication. Oral mefloquine (25 mg/kg divided into two doses 8 hrs apart) should be given at the end of the artemisinin treatment course to reduce recrudescence. The treatment of vivax malaria in Thailand is still using chloroquine and primaquine. However with the ineffective to primaquine (15 mg/kg/day for 14 days with relapse rate of 15%) the higher dose (30 mg/kg/day for 14 days) is recommended. The efficacy studies of primaquine in various regimen given together with Sulfadoxin/Pyrimethamine or artemisinin derivatives are in progress. Tefenoquine\& phase III study in the planning stage for clinical trial in our setting in Thailand is in progress.

Presented at: 15th European Congress of Clinical Microbiology and Infections Diseases, Copenhagen, Denmark, 2 – 5 April 2005.

UPDATE ON THE MANAGEMENT OF MALARIA

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THE In:almenl for uncomplicated malaria is aimed at producing a radical cure using the combination of either (1) artesunate (1mg/kg/day) pills melloquine (1 mg/kg/day) for 3 days; (2) a fixed dose of artemether allil lumdanlrine (20/120 mg tablet) named Co-artem" (4 tablets twice a day for three days for adults weighing more than 35 kg); (3) quinine 10 mg/kg X-hourly plus telracycline 250 mg 6-hourly for 7 days (or doxycycline 100 mg once a day for 7 days as an alternative 10 mg/kg 6-hourly plus telracycline) in patients aged 10 years and over; and (4) a combination of alovaquone and proguanil called Malaranc" (for adults, 4 tablets given daily - 3 days).

Presented at: 24th International Congress of Chemotherapy,
4 – 6 June 2005, Manila Philippines.

THE EXTRALOBULAR ARACHNOCYTES: A HITHERTO UNRECOGNIZED VITAMIN A-STORING SITE IN MAMMALIAN LIVER

Narumon Chanwimalueang, Wichai Ekataksin,
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BACKGROUND Recent reports show that vitamin A may have an immunological role in pathogenesis of malaria (Shankar et al, 1999; Serghides and Kain, 2001, 2002). Vitamin A is stored exclusively in the liver by hepatic stellate cells (Blomhoff and Wake, 1991), known also as Ito cells, retinol-storing cells, or arachnocytes (Ekataksin and Kaneda, 1999). The cells are located in the perisinusoidal spaces of Disse within the lobules (Wake, 1971, 1950, 1988; Wake and Safo, 1993; Zou et al., 1995). In the course of our study to morphologically characterize liver store of vitamin A, we could identify a so-far-unreported mesenchymal cell type outside liver lobules with vitamin A-containing lipid droplets. **Materials and Methods** Fresh pig livers were flushed with saline and perfuse-fixed with cooled 1.5% glutaraldehyde in 0.062 M cacodylate buffer (pH 7.4) containing 1% sucrose. Sampled blocks were post-fixed in 0.1 M phosphate buffered (pH 7.4) 1% osmium tetroxide for 2 h at room temperature, dehydrated through alcohol series, and embedded in Poly/Bed S12. Semithin sections were prepared at 0.5-1.0 μm

thickness, stained with toluidine blue, and carefully rinsed with 70% ethanol to create a differential stain pattern. Airdried specimens were mounted in Permunt and examined under an ultrawide-field microscope (Olympus Provis AX80) with an ultrahigh-resolution digital camera (Olympus DP70). Panoramic reconstruction was applied and the mappings of 1.2-1.6 GB file size were outputted via an HP Designjet 5;00 large format printer. Unfixed livers were cut frozen section (Carl Zeiss, Microm K400) at 50 μm thickness and observed by wide UV fluorescence (330-355 nm). Results Under toluidine blue preparation, liver lobules were demarcated with interlobular connective tissue. Hepatocytes appeared with a spectrum of bluish purple stains. From portal to central zones, sinusoids were well defined with endothelial cells, Kupffer cells, and arachnocytes. The latter were distinguished at every 40-60 μm interval by the presence of green lipid droplet(s), single or double, fully occupying each cell body. The droplets characteristically were very large, especially in the periportal areas, compressing deeply upon the nucleus. In the hepatocytes, fat vacuoles also stained greenish, but mostly were small in size and their profile did not deform the nuclei. In the septa, bundles of collagen fibrils/fibers crisscrossed through the honeycomb structure formed by fibroblasts (Ekataksin et al, 2000). Among them we identified occasional mesenchymal cells bearing a large, green lipid droplet tightly invaginating the nucleus; some were in the intralobular septum, others interlobular septa, but never found at the corner portal tract. They lay against the limiting plate in apposition with a sinusoid or capillary, or stayed surrounded by fibrous interstitium in the septum. Though sporadic, their entity was by no means rare; we encountered as many as 7 cells in one semithin toluidine blue section, or up to 2-3 cells per lobule. Under fluorescence microscopy, myriads of retinol-containing lipid droplets were glaringly luminescent, light blue or bright green, that faded within 20-200 seconds after exposure. Occasional fluorescent droplets could be confirmed inside the septum under objectives of high magnifications.

Discussion and Conclusions Findings are clear that capacity of vitamin A storage is responsible for by the retinol-storing arachnocytes in the lobules. This overwhelming abundance apparently masks the presence of retinol-containing lipid droplets in some mesenchymal cells residing in the interstitial spaces. With aid of supermegapixel digital microscopy and map reconstruction imaging visualized at ultrahigh resolution with large format printing, it becomes clear that the task of presenting rare structure as of extralobular arachnocytes is highly credible and convincing. The entity's immediate impact is upon our understanding of hepatic fibrogenesis to not refuse the retinoid storage function. Supported by RBD Project Grant #4703 (to

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TOTAL DEPLETION IN LIVER STORE OF VITAMIN A: A HITHERTO UNRECOGNIZED NATURE OF CEREBRAL MALARIA

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BACKGROUND Malaria accounts for more than one million deaths each year. We learn from textbook that *Plasmodium falciparum* sporozoites inoculated by Anophiline mosquito proliferate into schizonts inside liver cells, followed by hepatocyte eruption, releasing matured merozoites into circulation to parasitize erythrocytes. Little is ever questioned about role of vitamin A-storing hepatic stellate cells.

Materials and Methods Fresh livers of patients (n=3) with cerebral malaria obtained from autopsy with informed consents were examined by fluorescence microscopy of 50 µm-thick frozen sections for retinol contents, by Golgi silver impregnation for visualizing perisinusoidal stellate cells, and by oil red O for lipid stain. Control specimens (n=2) were derived from forensic autopsy without liver disorders.

Results Under ultraviolet (330-385 nm) exposure, normal human livers were observed with fluorescence signals emitted from vitamin A storing stellate cells. They were uniformly bright and evenly distributed in the lobules, but absent in the portal and hepatic tracts. In malaria, autofluorescence was null; all liver sections of patients were nonfluorescent. Oil red O preparations demonstrated lipid droplets of stellate cells in control livers, but failed to visualize so in malarial livers. Golgi preparations showed the presence of stellate cells with lipid droplets in normal liver, but without lipid droplets in malarial livers. The latter exhibited stellate cells that appeared with abundant cytoplasmic processes, contrasting strongly with that of normal human.

Discussion Without doubt, lack of autofluorescence in the livers reflects the absence of retinol storage in hepatic stellate cells. This study represents the first of its kind to examine malarial livers with fluorescence microscopy. Earlier studies reported

that malaria patients have decreased serum retinol levels (Thumham and Singkamani, 1991). Supplementation of vitamin A reduces morbidity due to *P. falciparum* (Shankar et al, 1999). Host resistance against malaria is potentiated with 9-cis-retinoic acid, a metabolite of vitamin A (Serghides and Kain, 2002). Most recently, antimalaria effect of retinol has been demonstrated *in vitro* (Hamzah et al, 2004). The body could be utilizing retinol rapidly to produce plasma membrane of red blood cells. Our study suggests strongly that liver store of vitamin A is probably a prime indicator in determining the resistance or tendency to develop severe malaria. This also implies the prophylactic/therapeutic use of vitamin A to safeguard susceptible population in endemic areas is justified. (Supported by RBD Project #4703).

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THE DIVERSE PATHOLOGIES OF INFECTED LIVER WITH *OPISTHORCHIS VIVERRINI*

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OVIVERRINI (Liver fluke) is one of the causative agent of food-borne parasitic zoonoses, which infects animals or humans mainly in the North and the Northeast Thailand, Laos and Kampuchea. Transmission to humans occurs often from eating raw fish, raw crayfish, etc., containing viable metacercariae. We performed a retrospective study of the twenty-nine autopsy cases of patients from the Northeastern part of Thailand, aged from 7 to 68 years, whose fecal examination was positive for the *O. viverrini* eggs. By gross examination, the liver appeared with hepatomegaly (28 cases), dilation of the bile ducts (16 cases at intrahepatic, 13 cases at subcapsular), fibrosis (7 cases at portal area, 4 cases at periductal of the bile ducts), intrahepatic tumors (10 cases), and congestion of the either organ (5 cases). The adult worms were found in the bile ducts of all cases. The livers were processed for microscopic examination. The diverse pathologies were pericholangitis (28 cases), fibrous tissue infiltration at the wall of the bile ducts (27 cases), adenomatous formation (25 cases), dilatation of the bile ducts (24 cases), hyperplasia of epithelium (21 cases), desquamation of epithelium (20 cases), proliferation of epithelium (19 cases), dense fibrous tissue at portal areas (16 cases), cholestasis (12 cases), adenocarcinoma of the bile ducts (8 cases), hepatocellular carcinoma (2 cases), ruptured dilated bile duct with peritonitis (1 case) and perioval granuloma (0 case). The data presented in this

study indicated that in the patients with *O. viverrini* eggs in the feces, the adult worms are always ably identified in the biliary tract system. Enlargement of the liver was the common finding. Pathological changes are diverse, of which most are confined to the large-and medium-sized bile ducts where the worms inhabited.

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THE DIVERSE PATHOLOGIES OF INFECTED LUNG WITH *PARAGONIMUS HETEROTREMUS*

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PBETEROTREMUS (lung fluke) is one of the causative agent of food-borne parasitic zoonoses which infects animals and humans. More than 40 species of *Paragonimus* have been identified so far. Paragonimiasis is found mainly in Asia, part of West Africa and Central America. In Thailand, the first case of human paragonimiasis was reported from Petchaboon Province in 1928. Since then, the studies on paragonimiasis both epidemiological and taxonomic aspects have been carried out continuously. Six species of *Paragonimus* were found, among with *P. heterotremus* is of the etiologic significant in man. We performed an experimental study to examine the diverse pathologies of cat lung which was infected with *P. heterotremus* by feeding with infected mountain crab, harboring metacercaria. By gross examination, the cat lung appeared with small hemorrhagic spots. The worms were ably seen in the pleural cavity together with turbid pleural serosanguinous effusion. In the parenchyma were found miliary lung abscesses and cystic lesions containing adult worms with dense fibrous connective tissue around the cysts. The visceral pleura covering the cyst was thickened and inflamed. By microscopic examination, cross sections of the worm were located in the dilated bronchus which had already undergone squamous metaplasia. Surrounding the worm was a large granulomatous tissue containing yellowish brown operculated eggs with and without miracidium. The cystic lesions were surrounded by bands of thick fibroconnective tissue. The adjacent lung tissue showed marked diapedesis, congestion, atelectasis and pneumonia. *Paragonimus* can infect various kinds of mammalian hosts but the infection rate, the development of the worms and the pathology in their hosts may differ. In this study, we found the pathologies associated not only with the adult worms

but also with the eggs. The irritation from the motility of the worms caused disruption of the bronchiolar mucosa which brought about the leakage of the eggs into the adjacent alveolar spaces and may form thereby granulomatous lesions.

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LIVER STORE OF VITAMIN A WAS TOTALLY DEPLETED IN PATIENT WITH CEREBRAL MALARIA: A HITHERTO UNREPORTED HEPATIC INVOLVEMENT REVEALED BY FLUORESCENCE MICROSCOPY

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BECAUSE hepatic manifestation of malarial patient is generally minor, the study of liver in malariology has so far not received much attention. Despite its being the prime organ for parasite multiplication, still we know very little what role the liver plays in plasmodium infection and pathogenesis. The liver, 1410 g, was removed from a male patient, 22 y/o, with severe cerebral malaria at autopsy with informed consents. Brain smear revealed negative result for parasite load. The liver was challenged for an unprecedented investigation using fluorescence microscopy (Olympus Provis AX80) of frozen sections (50-100 J.1m thickness) and optical confocal digital microscopy with depth reconstruction at 12 megapixel resolution of Golgi-Kopsch silver preparations. Lipid droplet visualization was conducted with oil red O stain. Control liver was obtained from a forensic case of acute heart failure. Under wide UV (330-385 nm), normal human liver appeared with glowing spots densely and evenly distributed throughout the lobules, except for the portal and hepatic tract. The greenish fluorescence faded within 30-200 seconds after exposure. With higher magnification, each spot was found as composed of large and small lipid droplets closely grouped together, representing a single arachnocyte storing retinol in multiple lipid droplets in the cytoplasm (see also Chanwimalueang et al. in this issue). In malaria-infected liver, the fluorescence was null; we were startled at the complete lack of autofluorescence normally seen in any liver. Oil red O preparations demonstrated lipid droplets of arachnocytes in control liver, but failed to visualize so in the malarial liver. Golgi preparations showed the presence of arachnocytes with lipid

droplets in normal liver (see also Pattanapen *et al.* in this issue), but without lipid droplets in the malaria liver. The latter exhibited arachnocytes that appeared with abundant cytoplasmic processes, contrasting strongly with that of normal human. There is little doubt that the lack of autofluorescence in liver of cerebral malaria patient reflects the absence of retinol storage in arachnocytes. This study represents the first of its kind to examine the liver affected by *Plasmodium falciparum* with fluorescence microscopy. It has been reported that patients with malaria have decreased serum retinol levels (Thumham and Singkamani, 1991). Supplementation of vitamin A reduces morbidity due to *Plasmodium falciparum* (Shankar *et al.*, 1999). Host resistance against malaria is potentiated with 9-*cis*-retinoic acid, a metabolite of vitamin A (Serghides and Kain, 2002). Most recently, antimalaria effect of retinol has been demonstrated *in vitro* (Hamzah *et al.*, 2004). It is not without support to think that liver store of vitamin A could be an important factor in determining the resistance or tendency to develop severe malaria. To state this with certainty, more studies are required. Supported in part by RBD Project Grant #4703 (to WE), National Science and Technology Development Agency, and by Toxicology Graduate Program (to NC), Faculty of Science, Mahidol University.

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VISUALIZATION OF HUMAN ARACHNOCYTES FOR THE FIRST TIME WITH GOLGI SILVER IMPREGNATION: MORPHOLOGICAL COMPARISON OF HEPATIC STELLATE CELLS FROM PIG AND MAN

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IN the previous report (Pattanapen *et al.*, 2003), we distinguished the arachnocytes in pig liver into three major types, consolidated, typical, and liquidified arachnocytes with additional three intermediary forms, metaconsolidated, early typical, and preliquidified arachnocytes. In this study, the shape and form of typical arachnocytes of pig liver are compared with that of arachnocytes visualized for the first time of human liver. Liver samples obtained at autopsy cases free of liver disease from Ramathibodi Hospital, were subject to Golgi-Kopsch chromic silver method (pattanapen, 2004), and studied under light microscopy at oil-

immersion objective. The impregnated arachnocytes were photographed under differential focuses for 5080 levels by an Olympus Provis AX80 with a microscopic digital camera DP70 at 4080 x 3072 pixels, using 2-3 gigabytes of disk spaces per one cell. Six series of cells were analyzed. The serial images were reconstructed precisely on Adobe Photoshop, and compared with the existing data of porcine arachnocytes. In human, arachnocytes contained multiple droplets of various sizes, unlike that of pig which stored vitamin A ~n mono- or bi- lipid droplets. Typical arachnocytes of pig with full-blown and wide spread processes surrounded the sinusoids in a well-defined manner, but the processes of human arachnocytes were poorly organized. Their arms/ legs and fingers were literally irregular, qualitatively and quantitatively, with uneven thicknesses and difficult-to-predict orientations. Their outline was characterized by frequent knobs and notches, making a "polygenu" profile with multiple angulations. Cell body was rather rich in cytoplasm. Hairs or microspines which were typical of pig arachnocyte, were very rare in human. This observation is the first of its kind to visualize the arachnocytes in human liver. Their processes were unexpectedly very irregular. The observed structures suggest little to support the idea that arachnocytes would actively contract "to control sinusoidal caliber. Rather the processes represent a passive reinforcement of the sinusoids. The multiple angulations in their processes with many knobs and notches suggest most likely that they are "collapsible" structure to accommodate the frequently-occurring collapse of the sinusoids. Supported by the Reverse Brain Drain (RBD) Project Grant #4703 (to WE), and NationScience and Technology Development Agency, Thailand.

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FLUORESCENCE MICROSCOPY: A HITHERTO UNOBSERVED NATURE OF ARACHNOCYTES

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THE principal vitamin A compounds such as retinol and retinyl esters, can be found primarily in the hepatic stellate cells or arachnocytes (Ekataksin and Kaneda, 1999). Under physiological conditions, arachnocytes store 80% of total vitamin A in the whole body as lipid droplets in the cytoplasm, and regulate

both transport and storage of vitamin A. Parenchymal liver disease can interfere with hepatic store and metabolism of vitamin A. Chronic liver injury leading to collagen deposition has been found associated with altered retinol storing function of arachnocytes. Retinoid loss is a notable feature characteristic of fibrosis, and is assumed as a prerequisite in response to injury and subsequent fibrogenic pathogenesis. We applied the fluorescence microscopy to detect subtle changes in autofluorescence of retinyl esters; the latter serves as an indicator of vitamin A status. Livers of healthy subjects and alcoholics were obtained from Forensic Autopsy Unit with informed consents of Human Ethical Committee, Ramathibodi Hospital. The alcoholic patient had history of habitual drinking and the liver was documented as having a mild fatty change with a tan-yellowish appearance. After flushing with normal saline and perfusion-fixation with double strength formalin, frozen sections of liver tissue were performed at 50 μ m thickness on a sliding microtome (Sakura, Pteratome CRM440) with an electronic freezing unit (Carl Zeiss, Microm K400) and immediately examined by DV fluorescence microscopy (Olympus Provis AX80). Frozen sections were also stained for oil red O with hematoxylin as counterstain. Routine liver preparations were stained for H&E and Masson trichrome. Under wide ultraviolet fluorescence, 330-385 nm excitation, morphological examination revealed heretofore undocumented patterns in the human liver. In normal liver, the autofluorescence from lipid droplets appeared with a homogeneous distribution in all zones, exhibiting a more or less tendency of higher intensity in the peripheral zone. However, in alcoholic patient, the fluorescence was inhomogeneous. Clusters of increased fluorescence brilliantly glaring were observed here and there; for every 5-20 lobules at least one cluster was encountered. The cluster assumed a round, ovoid or ill-defined shape. The diameter of a cluster ranged between 200-800 μ m covering a good number, 20-70, of aggregated lipid droplets. Each of these aggregates represented an individual vitamin A-storing cell in which a few to dozens of various-sized droplets were closely packed together. A small cluster could be found in peripheral, intermediate, or centrilobular zone, while a larger cluster could span over two or three zones. While the droplets of general arachnocytes had a dimension of 2-6 μ m, that of the arachnocytes within the cluster were invariably noticed with extraordinary sizes, measuring 12-20 μ m in diameter. These gigantic droplets emitted accentuated fluorescence that lasted several minutes before fading. Occasionally, a gigantic droplet was present solitarily in an arachnocyte unassociated.

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DEVELOPING A HISTOLOGY ATLAS LARGEST IN THE WORLD: PANORAMIC RECONSTRUCTION COMBINED

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THE education of histology is achieved through microscopic training. However, the field of visual perception under the lens is limited to the small area which will be further sacrificed at the higher magnification. During the course of medical school, many students have experienced a hard time identifying the structures assigned, due to the imperfection of specimens, quality and quantity; excellent specimens are precious and sometimes difficult to reproduce or unaffordable by the Course budget. With the advent of multimegapixel digital camera and high-resolution large-format printing technology, we now can produce a large-scale mapping of histological structures, which has proved as a powerful educative/illustrative medium to medical students and public alike. Preparations of different organ systems from Liver Research Unit collections were carefully selected and scrutinizingly evaluated. To create the large-scale map, i.e., a gigantic image, the specimens were photographed under appropriate magnification through an Olympus Provis AX80 with a microscopic digital camera DP70 at highest resolution 12 megapixels (4080 x 3072); a single image TIFF file was 35.7 MB in size. Serial images were taken in a matrical series, 50-700 shots per one mapping and 1.7-23.6 GB of hard disk spaces were required for raw TIFF files of one job series. Images were processed and reconstructed on Apple computers Power Macintosh 04 or 05 and saved as a Photoshop ROB at 150-400 dpi. Using a ColorOate software, post RIP (Rasterized Image Processing) file sizes were expanded to 1.5-3.0 folds of the originals. The final files were outputted on a large-format inkjet printer (HP DesignJet 5500) using 6 colors at 600 dpi. Maps were laminated for anti-DV protection prior to public display. A usual finished dimension was 1-1.5 m in width and 1.2-3 m in height. We have generated more than thirty large-scale histology maps, about twenty of them were of hepatobiliary system in health and diseases. The extrahepatic organs included esophagogastric junction, stomach, cervix, testis, pituitary, and spinal cord. The printed work could be either placed flat on a large viewing table or hung vertical on a sliding rail. Each had been found with so-far unforeseen benefits with points of interest and artistic virtues. Liver maps well illustrated both familiar and unfamiliar structures in close vicinity, such as liver lobules and isolated arteries², respectively. Esophagogastric

junction and stomach maps clearly demonstrated the position and transition of different cell types and their relations. The tremendously dense venous sinus in the lamina propria was strikingly recognized in the map of cervix uteri with fornix vaginae. The honeycomb architecture³ was beautifully shown in testicular interstitium. The distribution of acidophils, basophils, and chromophobes in pituitary.

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MICROCIRCULATORY IMPAIRMENT IN HEPATIC ISCHEMIA-REPERFUSION INJURY: A MORPHOLOGICAL STUDY OF PIG LIVER UNDER EXPERIMENTAL TRANSPLANTATION

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BACKGROUND: Liver transplantation is a treatment of choice for patients with end-stage liver diseases. However, the operation involves the state of ischemia followed by reperfusion (I/R) which worsens the results and exacerbates the complications. Among the recognized determinants of graft function during the early postoperative course after transplantation is the altered portal and arterial circulation (Klar *et al*, 1996). The microcirculatory impairment, which can be induced by I/R, is strongly associated with poor graft survival rate. Recently, it was reported that large amount of arterial blood escapes from parenchymal perfusion into systemic circulation, leading to organ failure (Mehrabi *et al*, 1998). To date, the morphofunctional mechanism(s), including the pathway that can account for circulatory redistribution, in the liver under IIR injury has not been identified.

Objectives: We aimed to characterize the structural changes that can account for the dramatic reduction in portal inflow and the drastic increase in hepatic arterial influx, and to identify the most-likely shunt pathway(s).

Materials and Methods: Experimental liver transplantation was prepared in pigs (n=6). Under general anesthesia, laparotomy was performed, followed by a dissection of porta hepatis. Portal vein and hepatic artery were clamped for 30 minutes, and then released (pringle’s maneuver). After 10 minutes

of reperfusion, the livers were perfused with sterile saline until perfusate became clear. Vascular injection was done with calored-gelatin for examination under light microscopy (IM) and Batson #17 plastic mixture for microcorrosion casts studied under scanning electron microscopy (SEM). The gelatin-injected liver was cut perpendicular to the longitudinal axis into 12.14 segments and processed routinely.

Results: Under IM, hydropic swelling was striking in parenchymal cells. In the lobules, hepatocytes assumed round-shaped cells mostly in the intermediate zone, whereas in the peripheral and centrilobular zones they formed rosette. White cell aggregations were frequently encountered along the narrowed sinusoids, forming chains and clusters. Endothelial cells showed varying degrees of swelling as evidenced by the thickened cytoplasm and enlarged nuclei. The lobular profiles were distinguished into two types, occluded lobules, recognized with diffusely collapsed sinusoids and distinctly shrunk central veins, and unoccluded lobules, recognized with open sinusoids and widened central veins. Morphoquantitative mapping revealed that the occluded lobules in different segments accounted for 80% rostrally and 60% caudally. In portal tracts, distended hepatic arteries and recoiled portal veins were common. The isolated arterioles were found with a prominent diameter. Hepatic vein’s wall was filled with dilated vasa venarum which emptied through the transintimal vasal outlets measuring 20-25 Jlm in width. Under SEM, the dense plexus of vasa were observed. Their drainage through vasal outlets were found as plastic globes sprouting into the luminal surface of hepatic vein, continuous with the venules of the vasa via a slender connector.

Discussion and Conclusions: The narrowing of sinusoids, white cell sequestration, endothelial cell swelling, hepatocyte ballooning, and rosette formation increased sinusoidal resistance. The recoil of portal vein and the shrinkage of central vein suggested the elevation of presinusoidal and postsinusoidal resistance, respectively. This reduces portal flow while increases arterial, resulting in a redistribution of intrahepatic circulation and a subsequent arterosystemic shunt. The data from SEM show an increased arterial circulation in the extraportal compartment, indicative of a functional arterosystemic shunt pathway. With the increasing practice of partial liver transplantation, the implication of inhomogeneous injury in different organ segments, as revealed by the two lobular populations, would significantly influence the process of making decision in selecting donor grafts to best fit recipient individuals of years to come.

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DOWN – REGULATION OF TIGHT JUNCTION MRNAS IN HUMAN ENDOTHELIAL CELLS CO – CULTURED WITH PLASMODIUM FALCIPARUM – INFECTED ERYTHROCYTES

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TO understand the mechanism of sequestration in the microvasculature of patients with falciparum malaria, we examined the patterns of expression of mRNAs for adhesion molecules (ICAM-1, VCAM-1, and E-selectin) and tight junction molecules (occludin, vinculin, and ZO-1) in human umbilical vein endothelial cells (HUVECs) co-cultured with Plasmodium falciparum-parasitized red blood cells (PRBCs) in vitro. The PRBCs were collected from patients with uncomplicated, severe, or cerebral malaria (CM). Patterns of mRNA expression in HUVECs co-cultured with PRBCs were examined by real-time quantitative reverse transcription-polymerase chain reaction (RT-PCR). Levels of mRNAs for all the three adhesion molecules increased with increased culture time within 3 h, regardless of the source of the PRBCs. In contrast, the patterns of mRNA expression for the tight junction molecules varied between the different co-cultures. When HUVECs were cultured with PRBCs from uncomplicated malaria patients, levels of mRNAs for tight junction molecules increased according to the culture time. HUVECs co-cultured with PRBCs from severe malaria patients showed no change in the mRNAs levels during 3 h of observation. When HUVECs were cultured with PRBCs from CM patients, levels of mRNAs for tight junction proteins decreased according to the culture time. Although the mechanisms underlying these phenomena are not clear, our results suggest that PRBCs can alter expression of tight junction proteins in endothelial cells at the site of sequestration and thereby influence disease severity.

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NEUROTOXIC EFFECT OF THE INTERMITTENT INJECTION OF ARTEMETHER IN A MOUSE MODEL

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INTRAMUSCULAR administration of high doses of the oil soluble antimalarial artemisinin derivatives artemether and arteether to experimental mammals produce an unusual pattern of selective damage to brainstem centres predominantly involved in auditory processing and vestibular reflexes. We have shown recently in an adult Swiss albino mouse model that constant exposure either from depot intramuscular injection of artemether, or constant oral intake results in more neurological abnormalities and mortality than either artemether or artesunate given by any other route. The present study shows the neurotoxic effect depending on the total doses of intramuscular artemether injection in mice. Intramuscular artemether given at a total dose of 1400 - 2800 mg/kg caused dose-dependent neuropathological damage to the brainstem even in mice without behavioural change. There was no neurotoxicity in mice receiving at a total dose of equal or less than 700 mg/kg. The correlation between severity score of neuropathology and balance was observed in the experimental mice ($p = 0.002$). The neurons in the mid brain trapezoid nucleus and the pontine reticular nucleus were the most sensitive to the toxic effects of artemether. Most of the mice with neuropathological changes showed behavioural changes, whereas in some mice without gait disturbance, had neuropathological damage. There may be a reversible component to artemether neurotoxicity in a mouse model. This finding suggested that intramuscular artemether is neurotoxic even given spacing doses of 3, 6 or 8 weeks gap.

EFFICACY OF BENZIMIDAZOLE CARBAMATE ON AN INTESTINAL FLUKE CO-INFECTED WITH NEMATODES

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THE efficacy of a single dose of benzimidazole, drugs commonly used for the treatment of *Ascaris* and hookworm, was evaluated against one of the tiny-sized intestinal flukes, *Haplorchis* sp. in the endemic area where mixed infections of roundworms and flatworms existed. At day 7 after treatment, albendazole (400 mg) induced 42.5% cure rate, mebendazole (500 mg) a cure rate of 32.4%, on the other hand, praziquantel (40 mg/kg) gave 94.6% cure rate and the placebo at 15.9%. At the single dose, benzimidazole could not completely expelled the haplorchid; but could reduce one third to two fifth of the infection, similar to the drugs efficacy against *Trichuris* infection.

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CUTANEOUS FASCIOLIASIS: A CASE REPORT IN VIETNAM

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A 40 year-old woman living in Gialai, Kontum, Vietnam, developed a red solid mass in the epigastric region. From ultrasound investigation, liver abscess and myositis of the intercostal muscle was diagnosed. Two weeks after treatment with antibiotics, the mass disappeared, but a migratory track developed in the right upper quadrant of the abdomen. An aspiration of the vesicular end of the serpiginous track showed a light brown, living worm that was later identified as an immature *Fasciola* sp. This is the first case report of cutaneous fascioliasis in the form similar to creeping eruption.

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ANALYSIS OF SEQUENCE VARIATION IN GNATHOSTOMA SPINIGERUM MITOCHONDRIAL DNA BY SINGLE-STRAND CONFORMATION POLYMORPHISM ANALYSIS AND DNA SEQUENCE

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MORPHOLOGICAL variations were observed in the advance third stage larvae of *Gnathostoma spinigerum* collected from swamp eel (*Fluta alba*), the second intermediate host. Larvae with typical and three atypical types were chosen for partial cytochrome c oxidase subunit I (COI) gene sequence analysis. A 450 bp polymerase chain reaction product of the COI gene was amplified from mitochondrial DNA. The variations were analyzed by single-strand conformation polymorphism and DNA sequencing. The nucleotide variations of the COI gene in the four types of larvae indicated the presence of an intra-specific variation of mitochondrial DNA in the *G. spinigerum* population.

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THE CURRENT SITUATION REGARDING THE ESTABLISHMENT OF NATIONAL ETHICAL GUIDELINES FOR BIOMEDICAL RESEARCH IN THAILAND AND ITS NEIGHBORING COUNTRIES

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THIS study discusses the establishment of ethical guidelines for ethical review for biomedical research performed in Thailand, and to some extent, in neighboring countries. There are differences, from country to country, at national and institutional levels regarding guidelines for ethical review committees. Only a handbook issued by Mahidol University describes guidelines for human genetic research and on research dealing with reproductive technology. Both these areas require special consideration to avoid violating human dignity, rights, and confidentiality. This indicates that further efforts should be made to establish research guidelines and/or principles dealing with the human genome.

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DIAGNOSTIC VALUES OF IgG4 IN HUMAN GNATHOSTOMIASIS

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THE diagnostic values of immunoglobulin G subclass antibodies from patients with gnathostomiasis were assessed by immunoblot technique. Antigen was prepared from crude extracts of *Gnathostoma spinigerum* advanced third-stage larvae obtained from naturally infected eels. The sera were obtained from 14 parasite-confirmed gnathostomiasis cases, 63 patients with other helminthic infections and 13 healthy controls. Nine prominent IgG4 reactive bands appeared with molecular weights of 94, 51, 47, 43, 38, 24, 21, 20 and 15 kDa. The diagnostic sensitivity of each of the nine reactive bands ranged from 100% to 64.3% in 14 parasite-confirmed gnathostomiasis cases. All (100%) confirmed cases recognized the 21 kDa antigenic band, but not other helminthic infections or parasite-free control. Recognition of 21 kDa antigen in *G. spinigerum* advanced third-stage larvae crude extracts is the most specific diagnostic marker for human gnathostomiasis, with 100% sensitivity and specificity. The 20 and 24 kDa protein bands were additional diagnostic bands for confirming diagnosis of infection where the 21 kDa band was faint. No specific binding of IgG1, IgG2, or IgG3 antibodies was observed in any sera from confirmed gnathostomiasis cases.

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PREVALENCE OF STRONGYLOIDES IN NORTHERN THAILAND AND TREATMENT WITH IVERMECTIN VS ALBENDAZOLE

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THE stools of 697 cases were examined by agar plate technique at Tambon Makam Luang, Sun Pa Tong District, Chiang Mai; there were *Strongyloides stercoralis* 15.9%, *Opisthorchis viverrini* 5.1%, intestinal fluke 0.1%. Treatment with ivermectin 78 cases and albendazole 33 cases of strongyloidiasis gave cure rates at 98.7% and 78.7%, respectively. Alkaline phosphatase in some patients were increased at mild level after treatment. Side effects in ivermectin group were anorexia, nausea, diarrhea, diffuse itching and drowsiness; and in albendazole group were nausea and diarrhea. The efficacy of single dose and mild

side effects suggest ivermectin as drug of choice for strongyloidiasis treatment.

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LIVER FLUKE AND MINUTE INTESTINAL FLUKE INFECTIONS IN SA KAO AND NAN PROVINCES, THAILAND

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STOOLS were examined for the prevalence of liver fluke infection (*Opisthorchis viverrini*) by Kato's modified thick smear technique in Aranyaprathet District, Sa Kaeo province, eastern Thailand, in January 2004. Of the 545 stool samples collected, 261 (47.9%) contained small-sized eggs resembling *O. viverrini* eggs. The detected prevalence rate was higher than the prevalence in the same region reported by the Ministry of Public Health, at 5.3%. Fifty-nine infected cases were dewormed. After administration of praziquantel followed by laxative, whole-day stool samples were collected and washed by sedimentation method. Worms were collected under a stereomicroscope. *O. viverrini* adult worms were recovered in all 59 cases, and only 4 had mixed infections with minute intestinal flukes (*Haplochis taichui*). The same study was performed in Chaloem Phra Kiat and Ban Lung Districts, Nan Province, in northern Thailand, where the prevalence rate reported by the Ministry of Public Health was 20.6%. The result showed that the prevalence of *O. viverrini*/*H. taichui* in the 2 areas were 27.6% and 47.1% respectively. All 88 cases with small-sized eggs in Chaloem Phra Kiat District harbored *H. taichui*, while 16/84 cases in Ban Luang were mixed infection of *O. viverrini* and *Haplochis* sp.

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PARAGONIMIASIS IN NAN PROVINCE, NORTHERN THAILAND

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TWO cases of paragonimiasis were identified within the hill-tribe population living on the Thai-Laotian border of Nan province, northern Thailand, where information on *Paragonimus* was then

still limited. The patients were in the habit of eating improperly cooked crabs and freshwater prawns. A survey for natural intermediate hosts to complete the life cycle was in progress at that time, and the detection of paragonimiasis cases indicated that there was persistence of paragonimiasis in the endemic area of Nan Province.

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CHAETOTAXY OF NEWLY EXCYSTED METACERCARIAE AMONG FIVE SPECIES OF THAI *PARAGONIMUS*

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SCANNING electron microscopy was used to study the papillae distribution (chaetotaxy) among five species of newly excysted *Paragonimus* metacercariae (*P. bangkokensis*, *P. harinasutai*, *P. heterotremus*, *P. siamensis*, and *P. westermani*). Comparative data on the distribution of papillae in these species indicate considerable differences in the arrangement of papillae on the surfaces of the oral and ventral suckers. The numbers of papillae in the mouth of the oral sucker should be used to differentiate these species. Key to the species of Thai *Paragonimus* excysted metacercariae are given.

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ISOZYME DISCRIMINATION BETWEEN *PARAGONIMUS HETEROTREMUS* AND *P. MIYAZAKII*

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THE lung flukes, Thai *Paragonimus heterotremus* and Japanese *P. miyazakii* were assayed using polyacrylamide gel electrophoresis to distinguish between the isolates. Twelve loci were obtained from ten enzymes recovered from two species of *Paragonimus* populations. Nine enzymes tested showed only a single band, whereas one enzyme, malic dehydrogenase (Mdh), showed three banding patterns. Three of twelve loci in *P. heterotremus* and one locus in *P. miyazakii* were polymorphic, whereas nine loci were a single monomorphic band, which was seen in both species. Isozyme patterns for acid phosphatase (AcpH),

adenylate kinase (Ak), hexokinase (Hk) and malic dehydrogenase (Mdh) were identical in all *Paragonimus*. Esterase (Est), phosphoglucosmutase (Pgm) and 6-phosphoglucuronate dehydrogenase (6PgD) showed slightly different patterns, while glucose phosphate isomerase (Gpi), glucose-6-phosphate dehydrogenase (G6pdh) and malic enzyme (Me) showed remarkable differentiations, indicating a specie-specific marker between the two different populations.

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CHROMOSOMES AND CHROMOSOME BREAKAGE IN THE LUNG FLUKE, *PARAGONIMUS HETEROTREMUS*

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THE chromosomes of the lung fluke, *Paragonimus heterotremus*, were studied by air-drying technique. The results showed the chromosome numbers were $2n = 22$ and $n = 11$, which consisted of one pair of large metacentric, four pairs of medium subtelocentric, three small metacentric or submetacentric, and three small submetacentric or subtelocentric, whereas the relative lengths of the chromosomes were 20.5 ± 0.4 , 12.6 ± 0.2 , 11.2 ± 0.2 , 9.3 ± 0.2 , 8.9 ± 0.2 , 7.8 ± 0.2 , 7.4 ± 0.1 , 6.0 ± 0.1 , 6.0 ± 0.1 , 6.0 ± 0.1 and 4.2 ± 0.0 %, respectively. The results also revealed chromosome breakage on the small chromosome (No. 8).

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LARVICIDAE EFFECT OF *PIPER RETROFRACTUM* VAHL (PIPERACEAE) EXTRACT AGAINST *Aedes Aegypti* AND *Culex quinquefasciatus*

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FRESH *Piper retrofractum* was chopped and macerated with distilled water and 95% ethanol for 1 day, 3 days and 10 days. Each filtration was tested against fourth instar larvae of *Aedes aegypti* and *Culex quinquefasciatus*. Larval mortality were recorded after 24 hours and 48 hours exposure. The result revealed that the extract solution of 1-, 3-days maceration with water and 95% ethanol showed similar larvicide activity against *Ae. aegypti* at LC_{50} of 0.015%, 0.016%, 0.016% and 0.014% wet w/v respectively.

Three-days water extract has larvicide effect against *Cx. quinquefasciatus* ($LC_{50} = 0.008\%$ wet w/v) more than 1-day and 10-days extract, while the alcoholic extract of different maceration days gave similar larvicide effect ($LC_{50} = 0.006\%$, 0.005% and 0.005% wet w/v). However, longer exposure to every extracts will increase the percent of larval mortality. *Cx. quinquefasciatus* revealed more susceptible to alcoholic extract of *Piper retrofractum* than *Ae. aegypti* (for 1-day extract at 24 hours exposure $LC_{50} = 0.006\%$, $LC_{95} = 0.012\%$ and $LC_{50} = 0.016\%$, $LC_{95} = 0.042\%$ respectively). The high efficiency and ease preparation of the *Piper retrofractum* extract made it a method of choice for people to use as the household phytoinsecticide to control mosquito larvae.

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A NOTE ON DNA IDENTIFICATION OF MOSQUITO SPECIMENS FOR LONG-TERM PRESERVATION

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THE cytochrome oxidase subunit I (COI) region of mitochondrial DNA (mtDNA) and internal transcriber spacer 2 (ITS2) ribonuclear DNA were used to amplify specific regions from total genomic DNA of preserved *Anopheles minimus* Theobald collected from Ratchaburi Province, Thailand. The universal primers were used to compare the techniques for long-term preservation. The experiments were conducted using the offspring of each individual mosquito. Mosquitoes were reared for F1 generation which then preserved as frozen and dried specimens. Frozen mosquitoes yielded amplified PCR product for both COI and ITS2 regions, whereas dried preserved mosquitoes yielded PCR product for only ITS2 region.

The comparison of DNA recovery by PCR amplification of preserved techniques for dried mosquitoes, stored for up to 22 years, showed that pin steel specimens were more efficient than paper-point specimens in the way that paper-point technique needed the nail polisher for attachment. This polisher might cause damage of DNA molecule. The ability to amplify mtDNA and ribonuclear DNA from different specimen preservations should be considerable in order to select the method of preservations for specific purposes and advance uses of these specimens in the future.

Poster presentation in: *Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005.*

PRELIMINARY ISOENZYME STUDY IN ANOPHELES SUNDAICUS FROM PHANG NGA, A TSUNAMI-AFFECTED AREA IN THAILAND

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ANOPHELES SUNDAICUS has been known as a potential vector of human malaria parasites and is a primarily anthropophilic species along coastal Thailand. This species is attracting more attention from the Ministry of Public Health owing to its role as a malaria vector and its extensive post-tsunami breeding in coastline areas of Phang Nga Province. A comparative study was conducted to determine the dispersal and origin characteristics of the *An. sondaicus* population inhabiting both affected and unaffected areas, by electrophoresis technique. The screening of 16 enzyme systems--HK, ADK, °-GPDH, FUM, XDH, EST, LDH, MDH, PGM, PGI, AOX, ME, MPI, AMY, ADH, and TO--comprising 20 loci, revealed allelic variation and genetic polymorphism among the *An. sondaicus* population. Sixteen--HK, °-Gpdh, Xdh, Ldh, Pgm, Gpi, Aox, ME, Mpi, Amy, To, Est-1, Est-2, Est-3, Est-5 and Adh--presented a monomorphic locus, and 4 loci--Mdh, Adk, Fum and Est-4--showed multiple electromorphic locus in all of the studied populations. These results suggest that the characteristics of both mosquito populations were likely similar and possibly of the same origin.

Poster presentation in: *Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005.*

EFFICACY OF WATER DISPERSIBLE GRANULE FORMULATION OF BACILLUS THURINGIENSIS ISRAELENIS (VECTOBAC®WDG) AND BACILLUS SPHAERICUS (VECTOLEX®WDG) TO CONTROL CULEX SITIENS IN BRACKISH WATER PONDS IN TSUNAMI-AFFECTED AREAS OF PHANG-NGA PROVINCE, SOUTHERN THAILAND

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CULEX SITIENS is the predominant mosquito species in brackish water pools in Tsunami-affected areas in Phang-Nga province, Southern Thailand. Microbial control agents, *Bacillus thuringiensis israelensis* (VectoBac®) and *B. shaericus* (VectoLex®) in the form of water dispersible granule (WDG) formulations, were evaluated for their efficacy to control this mosquito species. The efficacy of VectoBac®WDG (500 g/ha), VectoLex®WDG (750g/ha) and a mixture of VectoBac®WDG (500g/ha) and VectoLex®WDG (750g/ha) was evaluated 24, 48 and 72 hours post-treatment. All 3 treatments gave satisfactory control of 99-100% reduction within 72 hours post-treatment in the 3rd – 4th larval instar and pupae population. This pilot study, is first of such report, indicating that VectoBac®WDG and VectoLex®WDG were highly effective to control mosquito species in brackish-water habitats under field conditions in Thailand. In addition, these agents were observed to be safe to non-target organisms found in brackish-water environment.

Oral presentation in: *Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005.*

REPELLENT ACTIVITY OF PRODUCTS CONTAINING DEET, HIPC, PMD AND PLANT ESSENTIAL OILS AGAINST COASTAL SPECIES OF MOSQUITO IN PHANG-NGA NAVAL BASE, TSUNAMI AFFECTED AREA

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THE efficacy of 5 commercial repellents (2 products contained synthetic chemical compound as active ingredient, and the other 3 products contained botanical extracts as active ingredient) and 4 laboratory prepared products which had plant essential oils as active ingredient were evaluated against coastal species of mosquito in the Phang-Nga naval base after tsunami. A 10x10x10 Latin square design was used to randomize the test subjects for possible individual difference for mosquito attraction. One gram of each product was applied to each volunteer's leg (from knee to ankle). Mosquitoes attracted to treated areas of human baits were observed and collected from 1800 to 2200 hours. All 5 commercial products, which each contained active ingredient as deet (di-methyl benzamide),

HIPC (hydroxyethyl isobutyl piperidine carboxylate), PMD (*p*-menthane diol), citronella oil, or tumeric oil and eucalyptus oil combination provided complete repellency throughout the observation periods of 4 hours. For the laboratory prepared products, each kind of plant essential oils (makaen oil, galangal oil and oil combination of qinghaosu, may chang and kaffir lime) was individually prepared as active ingredient in cream formulation. The preparation with oil combination was also formulated into ointment. All of the prepared repellents gave complete protection for 2-3 hours. The results indicate that the repellent activity of the commercial products was better than the laboratory formulated products; however, 2-3 hours of repellency would be sufficient to protect against evening mosquitoes if people use them before retiring to sleep under a bednet. Locally formulated repellents with these natural essential oils could be useful in where low cost alternatives are needed and in places where native aromatic plants are grown.

Poster presentation in: *Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005.*

IMPACT OF TSUNAMI ON OCCURRENCE OF MOSQUITO VECTORS IN THE AFFECTED AREAS OF PHANG NGA PROVINCE

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AN earthquake in the Indian Ocean caused the Dec 26 tsunami, which killed more than 200,000 people and caused immense property damage. In Thailand, tsunami hit Andaman Coast (954 kilometres in length including six provinces, namely: Ranong, Phang Nga, Phuket, Krabi, Trang and Satun) and caused great loss of life and destruction to buildings and infrastructure with an estimation of 7.8 million dollars. 70% of the damages occurred in Phang Nga Province and 53,203 people of 12,293 families became its victims. The tsunami flooded the coastal areas up to two to three kilometers inland and contaminated surface waters in the inundated areas with seawater. The Department of Mineral Resources of MONRE carried out an assessment of the impact of sea water intrusion into surface water bodies and reported 96.7% of the sampled water bodies as of 1 February, 2005 were contaminated by seawater. It was estimated that 20,300 hectares of land on the mainland were inundated and about 1,505 hectares of agricultural land have been

severely affected by salt water intrusion. The present study was conducted to determine an impact of tsunami on mosquito occurrence, abundance, distribution, and breeding places in the affected areas of Phang Nga Province, southern Thailand. We conducted mosquito surveys in tsunami-affected areas during February-April, 2005. The mosquitoes proliferated extensively in the available water sources contaminated with seawater within a month after tsunami occurrence. It was shown that the water logging with full sunlight provided excellent breeding places for *Anopheles sundaicus* and *Culex sitiens*. The former is considered as a potential vector of malaria along the coastal areas of Thailand and the latter is a biting nuisance mosquito species. It revealed that almost all sites along the coastline were positive for the presence of those mosquito larvae with maximum larval density of more than 150 larvae per dip. Their breeding places varied in size from small pits (1x2 m²) to large water reservoirs such as pit lakes and water collections of abandoned tin mines (220x730 m²) having a broad salinity ranging from 100 to 11,300 ppm, dissolved oxygen 1.3 to 24.8 mg/l, pH 6.4 to 8.6 and water temperature 29.5 to 34.0 °C. Stagnant water under full sunlit infested with filamentous green algae, *Spirogyra* sp. or floated pieces of dried leaves, particular grasses was most favourable breeding place of *An. sundaicus* where as *Cx. sitiens* preferred to breed in more putrefied water. A total of 4,948 mosquitoes belonging to six species was collected by human landing catches. The most abundant species was *Cx. sitiens* (81.6%). Only 430 (8.7%) *An. sundaicus*, 374 (7.6%) *Cx. quinquefasciatus* and 7 (0.1%) *Ma. uniformis* were caught. Regarding their biting cycles, *An. sundaicus* and *Cx. sitiens* showed nocturnal activity, with a single peak during 2000-2100 hours and 1900-2000 hours, respectively. The maximum biting rate of *An. sundaicus* was 35 mosquitoes per person-hour and 135 mosquitoes per person-hour for *Cx. sitiens*. Regarding malaria transmission, *Anopheles sundaicus* is of particular interest and its presence in this environment cannot be overlooked, irrespective of the tsunami event.

Oral presentation in: Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005.

INSECTICIDE SUSCEPTIBILITY OF THE INVADED MOSQUITOES IN TSUNAMI AFFECTED AREA IN THAILAND

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THE giant wave tsunami attacked six coastal provinces along the Andaman coast line of Thailand in the morning of December 26th, 2004. It caused remarkable damage, loss of life and change in large scale of the environmental areas. Several inland water sites became brackish water due to the filling of the seawater and became the suitable breeding site of *Anopheles sundaicus* and *Culex sitiens*. In order to control the mosquitoes, the insecticide susceptibility status of the field larvae and mosquitoes was performed under laboratory conditions. Larvae bioassay tests were conducted using WHO standard method. Three larvicides, the temephos, malathion, and plant extract (ethanolic extract of *Piper retrofractum* Vahl,) were used in the experiment. The results revealed that *Culex sitiens* was more susceptible to temephos than malathion and the plant extract, LC₅₀ range from 0.0008-0.0014 ppm., 0.0046-0.0078 ppm., and 5.3180-10.1030 ppm., respectively. *Culex quinquefasciatus* showed more tolerate to every tested larvicides than *Culex sitiens*. Adults bioassay test using WHO test kit and diagnostic dose of 5% malathion, 0.75% permethrin and 0.05% deltamethrin and 4% DDT were conducted. The results revealed that *Culex sitiens* and *Anopheles sundaicus* were susceptible to all tested insecticides. The LT₅₀ of 5% malathion were range from 25.7 – 26.0 min in *Culex sitiens*, and 44.7 min in *Anopheles sundaicus*. In addition *Culex quinquefasciatus* also showed susceptible to malathion with the LT₅₀ of 19.7 min. However, it had high tolerate to both pyrethroid insecticides with LT₅₀ of 33.1 min. for 0.75% permethrin and 19.6 min. for 0.05% deltamethrin and showed low percentage mortality after 24 hr pose-exposure, 48% and 32% respectively. In conclusion every tested larvicides could be used for control *Culex sitiens* larvae even in the brackish water, and malathion and pyrethroid insecticides for adult control of *Culex sitiens* and *Anopheles sundaicus*.

Oral presentation in: Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005.

SUSCEPTIBILITY OF CULEX SITIENS TO SUBPERIODIC BRUGIA MALAYI

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THE present study was carried out to determine the susceptibility of the most predominant species of mosquitoes, *Culex sitiens*, in Tsunami-affected areas of Phang Nga Province to subperiodic

Brugia malayi. Female mosquitoes were raised under laboratory conditions from larvae collected from breeding places in the affected-areas. A laboratory stock colony of *Aedes togoi* was the susceptible control. Mosquitoes were allowed to feed when 3 to 5 days old on a microfilaremic cat with a microfilarial density of 100-500 per 20 µl blood obtained from an endemic area in Surat Thani Province. Development of the microfilariae in the mosquitoes was detected by dissection 14 days after feeding. *Cx. sitiens* proved refractory. This is conclusive evidence that *Cx. sitiens* cannot naturally support the complete development of subperiodic *Brugia malayi*.

Poster presentation in: Joint International Tropical Medicine Meeting 2005, The Grand Hotel, Bangkok, Thailand, 30 November – 2 December 2005.

DISTRIBUTION OF MEDICALLY IMPORTANT MOSQUITOES IN NAVA NAKORN INDUSTRIAL ESTATE, PATHUM THANI PROVINCE, THAILAND

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A SURVEY of the distribution of medically important mosquitoes was conducted in Nava Nakorn Industrial Estate, Pathum Thani Province from May to July, 2003. Mosquitoes were sampled bi-monthly by dipping, CO₂ light trap and human landing catch. Five species of mosquito larvae were found in breeding sites with *Culex* species potentially breeding in this area. *Cx. quinquefasciatus* was found to be breeding at a higher rate than other species in both sites of study, followed by *Cx. gelidus*. An estimated 47 larvae/dip were found at breeding site A and 36 larvae at breeding site B. By light trap method, *Cx. tritaeniorhynchus* was the main species found (53.1%) at site A, and *Cx. vishnui* (54.8%) at site B. An average of 25 mosquitoes/trap/night was recorded at site A, which was double that of site B. The mosquitoes attracted to humans were mainly *Cx. gelidus* (site A: 35.9%; site B: 52.3%) followed by *Cx. quinquefasciatus* and *Cx. vishnui*. The highest mosquito landing activity was found at 19.00-21.00 hr and 23.00-24.00 hr, and the highest mosquito landing density was 21 mosquitoes/hour.

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COMPARATIVE REPELLENCY OF 38 ESSENTIAL OILS AGAINST MOSQUITO BITES

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THE mosquito repellent activity of 38 essential oils from plants at three concentrations was screened against the mosquito *Aedes aegypti* under laboratory conditions using human subjects. On a volunteer's forearm, 0.1 ml of oil was applied per 30 cm² of exposed skin. When the tested oils were applied at a 10% or 50% concentration, none of them prevented mosquito bites for as long as 2 h, but the undiluted oils of *Cymbopogon nardus* (citronella), *Pogostemon cablin* (patchuli), *Syzygium aromaticum* (clove) and *Zanthoxylum limonella* (Thai name : makaen) were the most effective and provided 2 h of complete repellency.

From these initial results, three concentrations (10%, 50% and undiluted) of citronella, patchouli, clove and makaen were selected for repellency tests against *Culex quinquefasciatus* and *Anopheles dirus*. As expected, the undiluted oil showed the highest protection in each case. Clove oil gave the longest duration of 100% repellency (2-4 h) against all three species of mosquito. Copyright - 2005 John Wiley & Sons., Ltd.

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DETERMINATION OF LEAD TOXICITY IN CULEX QUINQUEFASCIATUS MOSQUITOES IN THE LABORATORY

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LABORATORY investigations were carried out to study the effects of lead toxicity and lead uptake on *Culex quinquefasciatus* mosquitoes. Three different concentrations of lead nitrate were used in laboratory tests (0.05, 0.1, and 0.2 mg/l). An atomic absorption spectrometer (AAS) was used to determine lead concentrations. The results showed that lead significantly reduced hatching, egg-production, and emergence rates, compared with the unexposed groups (p<0.05). The ratio of female to male offspring was 3.64:1, which was observed in the second generation, after the parents were exposed to 0.2 mg/l lead. No effects were observed on oviposition.

preference, larval weight, or larval deformation. The LC50 of lead against *Cx. quinquefasciatus* larvae within 24 hours was 0.18 mg/l. There was a significant increase in lead uptake related to increased lead exposure in mosquito larvae ($p < 0.05$). The bioconcentration factor (BCF) showed that the lead concentration in the larvae was 62 times greater than in the water. The lead concentration from parents to offspring reduced in the first and second generations ($p < 0.05$). There was no significant difference between female and male mosquitoes in lead concentration ($p > 0.05$).

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ARE EXTENSIVE T CELL EPITOPE POLYMORPHISMS IN THE *PLASMODIUM FALCIPARUM* CIRCUMSPOROZOITE ANTIGEN, A LEADING SPOROZOITE VACCINE CANDIDATE, SELECTED BY IMMUNE PRESSURE?

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PROTECTIVE cellular immune responses depend on MHC presentation of pathogen-derived Ag fragments. MHC diversity renders this process sensitive to point mutations coding for altered amino acid sequence of the short target Ag-derived peptides epitopes. Thus, in a given host, a pathogen with an altered epitope sequence will be more likely to escape detection and elimination by the immune system. At a population level, selection by immune pressure will increase the likelihood of polymorphism in important pathogen antigenic epitopes. This mechanism of immune evasion is found in viruses and other pathogens. The detection of polymorphic hot spots in an Ag is often taken as a strong indication of its role in protective immunity. We provide evidence that polymorphisms in the T cell epitopes of a malaria vaccine candidate are unlikely to have been selected by immune pressure in the human host.

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ANTI-*P. FALCIPARUM* IgG2, IgE AND IL-4 POLYMORPHISM RELATED TO SEVERE MALARIA IN THAILAND

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ANTI-*Plasmodium falciparum* specific antibodies play a critical role in immune protection against the asexual blood stages of *P. falciparum*, whereas the IgG2 and IgG4 do not and even are suggested to block protective mechanisms. In addition, anti-*P. falciparum* specific IgE could have a pathogenic role during malaria infection. Interleukin 4 is a Th2 type cytokine that induces Ig-class switching from IgM/IgG to IgE. Earlier data have shown that IL-4 producing T-cell subsets have been associated with the production of anti-Pf-RESA-specific IgG antibodies. The IL-4 -590 C/T transition in the IL-4 promoter has been reported to influence the promoter activity and to be associated with levels of total IgE. In addition, the T allele was found to be associated with elevated anti-*P. falciparum* IgG antibodies in the Fulani of west Africa. This suggests that anti-*P. falciparum* specific IgG subclasses might be influenced by host genetic factors. The aims of the study were to investigate whether the IL-4 -590 C/T polymorphism influences the production of anti-*P. falciparum* specific IgG, IgG subclasses, or IgE and whether this polymorphism and the antibodies were related to susceptible or resistance to severe malaria in people living in a malaria endemic area of Thailand.

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ANTI-BLOOD STAGE ANTIBODIES INDUCED BY NATURAL *P. VIVAX* INFECTION

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NATURALLY acquired immunity to *P. vivax* blood stage antigens have been described in 211 vivax individuals living in malaria endemic area in Thailand. The specific IgG and IgG antibody response to *P. vivax* blood stage antigens was observed in 110 cases (52.13%) and 102 cases (48.34%), respectively. The majority of IgG responders had specific IgG1, IgG2, and IgG3 subclasses. In contrast, the specific IgG4 subclass

was rarely detected. The IgG1 coexpressed with IgG2 showed the highest responders. The levels of either anti-*P. vivax* IgG or IgM antibodies seem not to be related with age of each individual ($r = 0.038$, $p = 0.474$ for IgG2, $r = 0.193$, $p = 0.052$ for IgM). The levels of anti-*P. vivax* IgG subclasses were age independent since there were no significant correlation between the levels of each specific IgG subclass and age of each individual ($r = 0.100$, $p = 0.301$ for IgG1, $r = 0.069$, $p = 0.474$ for IgG2, $r = 0.004$, $p = 0.967$ for IgG3, and $r = 0.079$, $p = 0.414$ for IgG4). There was no significant correlation between the number of malaria exposures and the levels of anti-*P. vivax* specific IgG, or IgM ($r = 0.044$, $p = 0.654$ for IgG, $r = 0.062$, $p = 0.537$ for IgM). The levels of specific IgG1, IgG2 and IgG3 were higher in responders who had only IgG antibody and had more than one malaria attack. No significant correlation between the level of anti-*P. vivax* IgG, or IgM antibody and parasitemia was found ($r = 0.024$, $p = 0.728$ for IgG, $r = 0.016$, $p = 0.815$ for IgM). Our results showed that individuals with naturally exposure to *P. vivax* malaria infection in endemic area in Thailand did develop the specific antibodies either IgG, IgM or both against blood stage antigens and the specific IgG1, IgG2, or IgG3 were the predominant subclasses.

Manuscript is preparing for publication

ANTIBODY RESPONSE PROFILE TO *P. VIVAX* MEROZOITE SURFACE PROTEIN1 (MSP1) IN NATURALLY EXPOSED MALARIA INDIVIDUALS IN THAILAND

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NATURALLY acquired antibody-mediated immunity to blood stage antigen, PvMSP1 (C-terminal) antigen has been investigated in 200 vivax individuals living in some endemic areas in Thailand. The antibody responses to PvMSP1 (C-terminal) antigen were detected in 169 individuals (84.50%). Among these, the specific IgG and IgM antibodies to PvMSP1 (C-terminals) antigen were observed in 139 individuals (69.50%) and 30 individuals (15.00%), respectively. The majority of IgG responders had specific IgG1 and IgG3 subclasses. The specific IgG2 and IgG4 were rarely detected. In addition, IgG1 coexpressed with IgG3 were the highest response. The levels of either anti-PvMSP1 (C-terminal) IgG or IgM antibody seem not to be related with age ($r = 0.036$, $p = 0.677$ for IgG; $r = 0.001$, $p = 0.499$ for IgM). However, the levels of anti-PvMSP1 (C-terminal) IgG antibody increased with age groups while

the levels of anti-PvMSP1 (C-terminal) IgM antibody did not. The levels of each specific IgG subclass antibody to PvMSP1 (C-terminal) antigen were not correlated with age ($r = 0.035$, $p = 0.711$ for IgG1; $r = -0.600$, $p = 0.285$ for IgG2; $r = 0.077$, $p = 0.454$ for IgG3; and $r = 0.664$, $p = 0.051$ for IgG4). There was no correlation between the number of malaria exposures and the levels of anti- PvMSP1 (C-terminal) IgM antibody ($r = -0.143$, $p = 0.225$). While the levels of anti- PvMSP1 (C-terminal) IgG antibody were significantly correlated with the number of malaria exposures ($r = -0.208$, $p = 0.014$). No correlation between the levels of either anti-PvMSP1 (C-terminal) IgG or IgM antibody and parasitemia was found ($r = -0.040$, $p = 0.639$ for IgG; $r = -0.060$, $p = 0.376$ for IgM). Our finding indicated that individuals with naturally exposure to vivax malaria infection in some endemic areas in Thailand did develop the specific IgG and IgM antibodies to PvMSP1 (C-terminal) and the specific IgG1 and IgG3 were the predominant subclasses.

Manuscript is preparing for publication

EVALUATION OF A MONOCLONAL ANTIBODY-BASED DOT-BLOT ELISA FOR DETECTION OF *LEPTOSPIRA* SPP IN BOVINE URINE SAMPLES

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OBJECTIVE: To evaluate the efficacy of a novel monoclonal antibody (MAb)-based dot-blot ELISA for detection of *Leptospira* antigens in urine samples of cattle.

Sample Population: Blood and urine samples of 45 test cattle from 5 farms in Chonburi province and 20 control cattle from 2 farms in Khon Kaen province in Thailand.

Procedure: Blood and urine samples were assayed (microscopic agglutination test and urine antigen test) for *Leptospira* infection by use of an MAb-based dot-blot ELISA, and results for the ELISA were compared with those for dark-field microscopy (DFM), microbial culture, and a polymerase chain reaction (PCR) assay.

Results: All urine samples with positive results for DFM, microbial culture, PCR assay, or > 1 of these tests also had positive results when tested by use of the MAb-based dot-blot ELISA, except for 1 sample that had positive results only for the PCR assay. Detection

limits of the dot-blot ELISA were 103 leptospire/mL of urine and 9.3 ng of *Leptospira* homogenate. Comparison revealed that the diagnostic sensitivity, specificity, efficacy (accuracy), positive predictive value, and negative predictive value for the ELISA were in agreement with results for DFM (100%, 72.72%, 80%, 57.14%, and 100%, respectively), microbial culture (100%, 61.54%, 66.62%, 28.57%, and 100%, respectively), and PCR assay (95.45%, 100%, 91.77%, 100%, and 95.83%, respectively).

Conclusions and Clinical Relevance: The MAb-based dot-blot ELISA is suitable as a tool for detecting leptospire in urine samples of cattle. (*Am J Vet Res* 2005;66:762-766)

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COMPARISON BETWEEN SALMO-DOT, PCR, AND BACTERIAL CULTURE FOR DETECTION OF SALMONELLA SPP. IN FOOD SAMPLES

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SALMONELLOSIS continues to be a major foodborne infection of humans worldwide. Contamination of *Salmonella* spp. in foods can cause problems in food industries especially the export of chicken meat and other food products because processed foods are expected to be *Salmonella*-free. Standard culture method is reliable and has been widely accepted as a gold standard procedure for determination of *Salmonella* spp. in food. Nevertheless, bacterial culture takes 4-5 days before the results are known. It is laborious and expensive. Besides, it produces large amount of contaminated waste. At present, several alternative and rapid methods for detection of *Salmonella* spp. in food have been developed. In this study, an immunological test using a test kit namely "Salmo-Dot" which is an MAb-based antigen detection test (MAb specific to lipopolysaccharide of *Salmonella* spp.) and polymerase chain reaction (PCR) to detect *stn* and *invA* genes were compared with the standard culture method for detection of *Salmonella* in food samples. Among the 50 chicken meat samples tested, 15 samples (30%) were positive by all methods, i.e. Salmo-Dot, PCR amplification of *stn* gene, PCR amplification of *invA* gene and the culture method. One strain of *Salmonella* was isolated from each of the positive sample, and 15 *Salmonella* isolates have been established. Although, the results of Salmo-Dot and PCR were conformed, with 100%

sensitivity and 100% specificity, to the standard culture method, the Salmo-Dot is the better alternative of the conventional culture method than PCR for detection of *Salmonella* in naturally contaminated food samples because it requires shorter time for completing the process, less expensive and more simple.

Presented at: *Joint International Tropical Medicine Meeting, 30 November - 2 December 2005, The Grand Hotel, Bangkok, Thailand.*

CLINICAL DIFFERENCES AMONG PCR-PROVEN DENGUE SEROTYPE INFECTIONS

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THE objective of this study was to compare the clinical spectra of dengue serotypes proven by PCR technique. The retrospective study reviewed the clinical information of dengue-infected patients who were admitted to northeastern provincial hospitals in Thailand from June to September 2002. Dengue infection and viral serotype were confirmed by polymerase chain reaction (PCR). Pair anti-dengue immunoglobulin G (IgG) and Ig M from paired sera were analyzed by enzyme-linked immunosorbent assay (ELISA). Ninety-nine PCR-proven dengue-infected Thai patients were studied. Their ages ranged from 3- 30 years. They were infected with DEN1, DEN2, DEN3, and DEN4 in 21, 55, 12 and 12%, respectively. Twenty-two percent had primary, and 78% had secondary infections. Dengue fever was the most common presentation for both primary (77.2%) and secondary infections (46.7%). The ratio of dengue fever:dengue hemorrhagic fever (DF:DHF) and non-dengue shock syndrome:dengue shock syndrome (non-DSS:DSS) for DEN2 was the lowest of the dengue serotypes. There was no difference in the duration of fever, percentage of hepatomegaly and bleeding among the serotypes in both DF and DHF. The trend of white blood cell, lymphocyte and atypical lymphocyte counts of DEN3 were the highest, while those of DEN1 were the lowest among the dengue serotypes.

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IDENTIFICATION OF RECEPTOR MOLECULE FOR DENGUE VIRUS FROM MOSQUITO CELL LINE

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DENGUE viruses (DENV) infect cells by attaching to a surface receptor, probably through the envelope (E) glycoprotein, located on the surface of the viral membrane. However, the host cell receptors remain unknown. This study sought to identify dengue virus binding receptors on the surface of AP-61 and LLC-MK2 cells, from mosquito and mammalian cells, respectively. These cells were extracted by chloroform/methanol system, then separated into neutral and acidic glycolipids by Q-sepharose column. Next, neutral lipid fractions were purified by Iatrobead and HPLC column. In order to identify the putative receptor molecules, TLC/virus binding assay, TLC/immunostaining, cell surface staining, enzyme β -N-acetyl-hexosaminidase treatment and MALDI-TOF/MS structure analysis were performed. In the neutral lipid fractions, L-3 (GlcNAc β 1-3Man β 1-4Glc β 1-1Cer) and L-4 (GalNAc β 1-4GlcNAc β 1-3Man β 1-4Glc β 1-1Cer) were found in AP-61 cells, while GA2 (GalNAc β 1-4Gal β 1-4Glc β 1-1Cer) and PG (Gal β 1-4GlcNAc β 1-3Gal β 1-4Glc β 1-1Cer) were found on the LLC-MK2 cell. All of these glycosphingolipids can react with DENV-2. Interestingly, in the acidic fractions of both cells contained the sulfatide, similarly to the heparan sulfate (HS) that have the sulfate group and also strongly reacted with DENV. This study strongly suggests that L-3, L-4, GA2, PG and sulfatide are the putative receptor of DENV-2. Moreover, L-3, L-4, GA2, PG contain β -HexNAc in the reducing end, which may play an important role in DENV binding.

Present at: 2nd Asian Regional Dengue Research Network Meeting. September 28-30, 2005, Singapore.

DEVELOPMENT AND EVALUATION OF A LATEX AGGLUTINATION TEST FOR THE RAPID DIAGNOSIS OF SCRUB TYPHUS

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THE purpose of this research was to develop a simple and rapid diagnostic test for scrub typhus using a latex agglutination test (LAT) to detect antibodies against *Orientia tsutsugamushi*. Five strains of *O. tsutsugamushi* were propagated in L929 cells. The rickettsiae were purified and concentrated with percoll density gradient centrifugation. A suitable concentration of *O. tsutsugamushi* soluble antigen was used to sensitize latex to prepare the latex antigen. The specificity, sensitivity, and accuracy of the latex antigen were assessed. The LAT, indirect immunofluorescent antibody test (IFA), and Weil-Felix agglutination test (WF) were compared by testing 109 acute febrile illness cases and 100 confirmed non-scrub typhus cases (50 other febrile disease cases and 50 healthy controls). By using the IFA as the standard reference method, the overall sensitivity, specificity, and accuracy of the LAT were 89.1, 98.2, and 93.6%, respectively. By contrast, the sensitivity of the WF, compared with the IFA, was only 47.3%, while the specificity and accuracy were 92.6 and 69.7% respectively. Thus, The LAT described here is another important alternative test for the diagnosis of scrub typhus.

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DEVELOPMENT OF MULTIPLEX PCR FOR THE DETECTION OF TOTAL COLIFORM BACTERIA FOR ESCHERICHIA COLI AND CLOSTRIDIUM PERFRINGENS IN DRINKING WATER

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MULTIPLEX PCR amplification of *lacZ*, *uidA* and *plc* genes was developed for the simultaneous detection of total coliform bacteria for *Escherichia coli* and *Clostridium perfringens*, in drinking water. Detection by agarose gel electrophoresis yielded a band of 876 bp for the *lacZ* gene of all coliform bacteria; a band of 147 bp for the *uidA* gene and a band of 876 bp for the *lacZ* gene of all strains of *E. coli*; a band of 280 bp for the *plc* gene for all strains of *C. perfringens*; and a negative result for all three genes when tested with other bacteria. The detection limit was 100 pg for *E. coli* and *C. perfringens*, and 1 ng for coliform bacteria when measured with purified DNA. This assay was applied to the detection of these bacteria in spiked water samples. Spiked water samples with 0-1,000 CFU/ml of coliform bacteria and/or *E. coli* and/or *C. perfringens* were detected by this multiplex PCR after a pre-enrichment step to increase the sensitivity

and to ensure that the detection was based on the presence of cultivable bacteria. The result of bacterial detection from the multiplex PCR was comparable with that of a standard plate count on selective medium ($p=0.62$). When using standard plate counts as a gold standard, the sensitivity for this test was 99.1% (95% CI 95.33, 99.98) and the specificity was 90.9% (95% CI 75.67, 98.08). Multiplex PCR amplification with a pre-enrichment step was shown to be an effective, sensitive and rapid method for the simultaneous detection of these three microbiological parameters in drinking water.

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INDIRECT IMMUNOPEROXIDASE TEST FOR THE DIAGNOSIS OF LEPTOSPIROSIS

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LEPTOSPIROSIS is a widespread zoonotic disease that affects all mammals, including humans, in different parts of the world. Clinical recognition of leptospirosis is challenging, and the definitive serologic diagnosis assay, the microscopic agglutination test (MAT), is time-consuming and difficult to conduct. In this study, an indirect immunoperoxidase (IIP) test to detect *Leptospira*-specific antibodies in human serum samples was developed. The efficacy of the IIP was compared with the indirect immunofluorescent assay (IFA) and MAT. A total of 368 human serum samples were analyzed by MAT, IFA, and IIP. Using a MAT titer of > 1:100 as the gold standard, the sensitivities for the detection of Leptospiral antibodies at a titer of 1:200 were 94.7% by IFA and 93.6% by IIP; specificities were 95.3% by IFA and 94.9% by IIP; and accuracies were 95.1% by IFA and 94.6% by IIP. With a titer of 1:400, the sensitivity, specificity and accuracy were 86.2%, 98.9%, and 95.7% by IFA, respectively; whereas, for the IIP, the sensitivity was 85.1%, specificity 98.5%, and accuracy 95.1%. A further evaluation of this test with 80 unknown-febrile-disease sera was also included. We found that the sensitivity and specificity of this test were 100% and 76.8%, respectively. Therefore, the IIP test is a potentially valuable tool for the diagnosis of leptospirosis.

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SHORT REPORT : DETECTION OF *ORIENTIA TSUTSUGAMUSHI* IN CLINICAL SAMPLES BY QUANTITATIVE REAL-TIME POLYMERASE CHAIN REACTION

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O*RIENTIA TSUTSUGAMUSHI* infection causes scrub typhus, a common zoonosis of rural Asia. *Orientia tsutsugamushi* was recently detected by a real-time quantitative polymerase chain reaction (qPCR) assay in animal specimens. We evaluated the same qPCR assay in specimens obtained from patients with serologically proven scrub typhus infections. The 47-kDa qPCR assay was more sensitive than was mouse inoculation; it was reactive in whole blood specimens from all 10 isolate-positive patients and in 7 of 17 isolate-negative individuals ($P=0.003$, Fisher's two-tailed exact test). As few as 1,076 *O. tsutsugamushi* copies/uL were detected in whole blood. Four of 7 sera from isolate-proven scrub typhus infections were also reactive by qPCR. The assay was unreactive in all 12 individuals without scrub typhus infection. This is the first demonstration of a sensitive and specific real-time qPCR assay for human scrub typhus infection.

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ANALYSIS OF NATURAL KILLER T CELL SUBSETS IN PATIENTS WITH SEVERE AND UNCOMPLICATED FALCIPARUM MALARIA IN THAILAND

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THERE is limited evidence about the roles of natural killer T (NKT) cells coexpressing NK marker and T cell receptors in the immunological status of malaria patients. The analysis of NKT cell subsets may disclose the roles of innate immune responses during falciparum malaria infection and provide insights in

vaccine development or therapeutic approaches to severe malaria. We aimed to examine the relationships between NKT cell subsets and the severity in falciparum malaria patients. The case definition of severe falciparum malaria was based on that recommended by WHO. The peripheral blood lymphocytes from 11 severe malaria patients (SMP), 22 uncomplicated malaria patients (UMP) and 30 healthy controls (HC) were used to analyze the proportion of NKT cell subsets (CD16+, CD56+, CD57+, and CD161+T cells) during the course of malaria illness by flow cytometry. A dynamic alteration in NKT cell subsets during malaria infection was observed. On admission day, CD16+T cells expanded in the peripheral blood of the UMP when compared with the HC while the level of CD57+T cells in the SMP was lower than in the HC. In addition, there were higher levels of CD56+ and CD161+T cells in the SMP than the UMP on day 7 after treatment. These results indicated that each NKT cell subset might have functional properties relating to severity of falciparum malaria or immunoregulatory function.

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A CHOICE BETWEEN BLOOD CLOT AND EDTA BLOOD FOR NESTED POLYMERASE CHAIN REACTION IN DETECTING SCRUB TYPHUS DNA

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TO determine whether blood clot or EDTA blood is more accurate for nested polymerase chain reaction (PCR) in detecting scrub typhus DNA, thirty pairs (acute and convalescent) unknown specimens from pyrexia of unknown origin (PUO) patients, 30 healthy controls and 15 other diseases patients were used to detect scrub typhus DNA by nested PCR, and then were compared with the indirect immunofluorescent antibody (IFA) test as the gold standard. At the acute stage, there were no significant differences between the results of the nested PCR from blood clot, EDTA blood and the IFA test ($p=0.157$). However, there were significant differences between the results of the nested PCR from blood clot and the IFA test ($p=0.021$) at the convalescent stage. At the acute stage, the sensitivity, specificity and accuracy of the nested PCR for blood clot were 26.3, 85.7, 70.7% and for the EDTA blood 52.6, 87.5, 78.7%, respectively. In addition, at the convalescent stage, the sensitivity,

specificity and accuracy of blood clot and EDTA blood specimens increased to 52.6, 94.6, 84%, and 73.7, 96.4, 90.7%, respectively. These results suggest that an EDTA blood specimen is better than a blood clot specimen for diagnosing scrub typhus by nested PCR, especially in the convalescent stage.

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A SINGLE DOSE OF *PLASMODIUM YOELII* MSP1¹⁹ IMMUNIZATION FORMULATED WITH MONTANIDE ISA51 AND CPG OLIGODEOXYNUCLEOTIDE IS ENOUGH TO INDUCE PROTECTION AGAINST *P. YOELII* INFECTION

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THE carboxy-terminal 19kDa-fragment of merozoite surface protein 1 (MSP1₁₉), is highly conserved and effective in induction of protective immune response against malaria infection. Our previous studies in mice based on using complete/incomplete Freund's adjuvant demonstrated that a four-dose immunization was able to induce complete protection. However, the kinetics of MSP1₁₉-specific antibody response induced by a single dose-immunization has not been investigated. In this study, we then singly immunized BALB/c mice subcutaneously with MSP1₁₉ in the mixture of Montanide ISA51 and CpG oligonucleotide (ODN) and monitored the antibody level. The MSP1₁₉-specific antibody reached maximum level by 28 days post immunization. At that day, the IgG or its isotype (IgG1 and IgG2a) levels were comparable to those of mice with four-dose immunization. However, the longevity of the IgG antibody response is shorter, or which the higher IgG1 level decreased rapidly which the lower IgG2a level still persisted over 22 weeks of study period. All immunized mice survived. *P. yoelii* infection post challenge with little patent parasitemia occurring during the first 2 weeks and then being cleared. These findings suggest that one-dose immunization is enough to induce MSP1₁₉-specific immunity against parasite infection, and that leaving time longer than three weeks post the first immunization may be helpful in generating more complete memory response.

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LONG-TERM, PROTECTIVE IMMUNE RESPONSE OF MICE FOLLOWING IMMUNIZATION WITH THE CARBOXY-TERMINAL 19KDA-FRAGMENT OF *P. YOELII* (MSP1₁₉) FORMULATED WITH MONTANIDE ISA51 AND CPG OLIGODEOXYNUCLEOTIDE

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MSP1 is the major protein on the surface of plasmodial merozoite and its carboxy-terminus, the 19kDa-fragment (MSP1₁₉), is highly conserved and effective in induction of protective immune response against malaria parasite infection as demonstrated in mice and monkeys but its longevity has not been elucidated. We then investigated this in BALB/c mice by immunization with recombinant *P. yoelii* MSP1₁₉ formulated with Montanide ISA51 and CpG oligodeoxynucleotide. The MSP1₁₉-specific IgG antibody reached maximum level by 14 days after a four-dose immunization and persisted for at least 12 months without significant waning. This is in contrast to MSP1₁₉ immunization using complete/incomplete Freund's adjuvants (CFA/IFA), by which the antibody level gradually declined to significantly lower level at 12 months after immunization. The change of IgG1 and IgG2a antibody levels was different. Only the IgG1 antibody level decreased significantly 6 months after immunization but the IgG2a level still persisted over the 12 months. Boosting effect was seen in the IgG1 but not in IgG2a antibody response. All of the immunized mice survived *P. yoelii* infection post challenge with negligibly patent parasitemia. These findings suggest that the protective immune response to MSP1₁₉ following immunization using oil-based Montanide ISA51 and CpG ODN as adjuvant last very long and encourage clinical trials for malaria vaccine development.

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GENETIC CHARACTERIZATION *ORIENTIA TSUTSUGAMUSHI* ISOLATED IN THAILAND DURING 2003- 2005

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O*RIENTIA TSUTSUGAMUSHI* is the causative agent of scrub typhus infection is a major cause of human disease in rural areas of South East Asia. This study describes the isolation of *O. tsutsugamushi* from scrub typhus patients at two sites in Thailand and their genetic characterization.

Patients were recruited from two clinical investigation sites located in Udon Thani in North eastern Thailand and Mae Sot on the Thai-Burma border. Samples were collected between November 2003 to February 2005 from patients with those of suspected scrub typhus infection using the framework of two ongoing acute febrile illness studies. Isolation of *O. tsutsugamushi* in mammalian cell culture was performed and isolates were characterized by PCR amplification and nucleotide sequencing of the entire 56 kDa gene ORF (~1.6 Kb). DNA sequence of the 56 kDa gene were compared with reference and prototype strain of *O. tsutsugamushi*. A dendrogram that demonstrated phylogenetic relationships was constructed using Kimura 2-parameter and Neighbor-Joining algorithms.

Seventeen *O. tsutsugamushi* isolates were propagated from the patient samples with 14 (82%) and 3 (18%) originating from Udon Thani and Tak provinces, respectively. The majority of the isolates (11/17) grouped with the Karp reference strain and formed distinct clusters. The Tak isolate, FPW2031, belonged to the Karp group and demonstrated relatedness to a group of Udon Thani isolates. Four isolates grouped with the Gilliam strain. Isolate FPW1038 grouped with Kato strain and was very similar to the historical Thai isolate TA716 (100% homology). Isolate UT302 was distinct from the Karp, Kato and Gilliam genogroups and demonstrated relatedness to the historical Thai isolate TA763 (96% homology).

This study demonstrates the diversity of contemporary isolates of *O. tsutsugamushi* collected in Thailand and relationships with prototype strains. It also demonstrates the need for ongoing surveillance and isolation of *O. tsutsugamushi* from scrub typhus

patients in order to understand the natural history and ecology of contemporary strains of *O. tsutsugamushi* in a locality, understand the diagnostic implications of genetic and antigenic variation in contemporary isolates. These can be used to produce or design new diagnostic tools, characterise antibiotic susceptibility of *O. tsutsugamushi* isolates.

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STRONG LINKAGE DISEQUILIBRIUM OF A HbE VARIANT THE (AT)⁹(T)⁵ REPEAT IN THE BP1 BINDING SITE UPSTREAM OF THE BETA-GLOBIN GENE IN THE THAI POPULATION

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A BINDING site for the repressor protein BP1, which contains a tandem (AT)^x(T)^y repeat, is located approximately 530 bp 5' to the human beta-globin gene (HBB). There is accumulating evidence that BP1 binds to the (AT)⁹(T)⁵ allele more strongly than to other alleles, thereby reducing the expression of HBB. In this study, we investigated polymorphisms in the (AT)^x(T)^y repeat in 57 individuals living in Thailand, including three homozygotes for the hemoglobin E variant (HbE; beta26Glu →Lys), 22 heterozygotes, and 32 normal homozygotes. We found

that (AT)⁹(T)⁵ and (AT)⁷(T)⁷ alleles were predominant in the studied population and that the HbE variant is in strong linkage disequilibrium with the (AT)⁹(T)⁵ allele, which can explain why the betaE chain is inefficiently synthesized compared to the normal betaA chain. Moreover, the mildness of the HbE disease compared to other hemoglobinopathies in Thai may be due, in part to the presence of the (AT)⁹(T)⁵ repeat on the HbE chromosome. In addition, a novel (AC)ⁿ polymorphism adjacent to the (AT)^x(T)^y repeat (i.e., (AC)³(AT)⁷(T)⁵) was found through the variation screening in this study.

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POLYMORPHISM OF THE HLA-B AND HLA-DRB1 GENES IN THAI MALARIA PATIENTS

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THE high degree of polymorphism of human leukocyte antigen (HLA) genes has been suggested to result from natural selection against susceptibility to a variety of infectious pathogens, including malaria. HLA molecules are considered to play a crucial role in the defense of the host against malarial infection, and different HLA class I and class II alleles have been reported to be associated with reduced susceptibility to malaria or the severity of malaria in different populations. To test for associations between HLA alleles and the severity of malaria in a Thai population, polymorphisms of HLA-B and HLA-DRB1 genes were investigated in 472 adult patients in northwest Thailand with *Plasmodium falciparum* malaria. In this study, malaria patients were classified into three groups: mild malaria, non-cerebral severe malaria, and cerebral malaria. Our results revealed that the allele frequencies of HLA-B46, -B56, and -DRB1*1001 were statistically different between non-cerebral severe malaria and cerebral malaria (P = 0.005), between mild malaria and cerebral malaria (P = 0.032), and between mild malaria and non-cerebral malaria (P = 0.007). However, our results may be showing false positives due to multiple testing. This, further study with a larger sample size must be conducted to obtain conclusive evidence of the association of these HLA-B and DRB1 alleles with the severity of malaria in Thailand.

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A FUNCTIONAL POLYMORPHISM IN THE IL1B GENE PROMOTER, IL1B-31C>T, IS NOT ASSOCIATED WITH CEREBRAL MALARIA IN THAILAND

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BACKGROUND: IL-1beta and IL-1RA levels are higher in the serum of cerebral malaria patients than in patients with mild malaria. Recently, the level of IL1B expression was reported to be influenced by a polymorphism in the promoter of IL-1, IL1B-31C>T. METHODS : To examine whether polymorphisms in IL1B and IL1RA influence the susceptibility to cerebral

malaria, IL1B-31C>T, IL1B 3953C>T, and IL1RA variable number of tandem repeat (VNTR) were analysed in 312 Thai patients with malaria (109 cerebral malaria and 203 mild malaria patients). RESULTS : In this population, IL1B -31C>T and IL1RA VNTR were detected, while IL1B 3953C>T (i.e., IL1B 3953T) was not observed in the polymorphism screening for 32 patients. Further analyses for IL1B-31C>T and IL1RA VNTR in 110 cerebral malaria and 206 mild malaria patients showed no significant association of these polymorphisms with cerebral malaria. CONCLUSION : The present results suggest that IL1B-31C>T and IL1RA VNTR polymorphisms do not play a crucial role in susceptibility or resistance to cerebral malaria.

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THE ROLE OF THE TAT GENE IN THE PATHOGENESIS OF HIV INFECTION

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THE human immunodeficiency virus Tat regulatory protein is essential for virus replication and for the efficient transcription of HIV-1 provirus, and in the pathogenesis of AIDS. The role of the tat gene was investigated in 300 samples. It was found that 71.7% were subtype CRF_01AE, 9.3% were subtype B, while 11.7 and 7.3% of them were cross-reactive and non-typeable, respectively. Moreover the results from peptide ELISA also showed that a low CD4 cell count was related to low anti-Tat antibody ($p < 0.05$), which may be due to the progression of HIV-1, which can be found predominantly in AIDS patients. The results of nested PCR showed that the second Tat exon might also play a role in T-cell activation. Reverse transcription polymerase chain reaction (RT-PCR) was used to measure HIV-1 mRNA expression in PBMC. RT-PCR negative results were found mostly in the asymptomatic HIV-seropositive group (88%). HIV-1 mRNA expression was found to correlate with current immunologic status. The differences in Tat protein sequences from DNA sequencing between the patients who had anti-Tat antibody positive and anti-Tat antibody negative, were not significant ($p > 0.05$). These results suggested that the Tat amino acid sequences were conserved among each group of samples and did not change significantly compared with the consensus sequence in previous studies. Several factors make Tat an attractive target for vaccine design.

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AN EXOTIC SINUSITIS

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WE report a case of sinusitis caused by mixed free-living amoebae, *Acanthamoeba* and *Naegleria*, in an immunocompetent host; this has not been documented before. Free-living amoebae should be considered in the differential diagnosis of pathogens that cause sinusitis with or without central nervous system involvement, especially when bacteria or fungi are not found by smear, biopsy or culture.

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SPA, SPRINGS AND SAFETY

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NATURAL mineral water has long been used worldwide for bathing and health purposes. At present, Thailand is famous for health spas and natural hot springs among local people and tourists. Due to possible risks of exposure to harmful agents, we studied hazardous pollutants at 57 natural hot springs from 11 provinces in northern, central, eastern and southern Thailand. Pathogenic, free-living amoebae of the genera *Naegleria* and *Acanthamoeba*, which can cause central nervous system infection, were found in 26.3% (15/57) and 15.8% (9/57), respectively. Dissolved radon, a soil gas with carcinogenic properties, was present in nearly all hot springs sites, with concentration ranging from 0.87-76,527 Becquerels/m³. There were 5 water samples in which radon concentration exceeded the safety limit for drinking. *Legionella pneumophila* (serogroups 1, 3, 5, 6, 7 10 and 13) were found in samples from 71.9% (41/57) of studied sites. Because spas and natural springs are popular tourist attractions, health authorities should be aware of possible hazards and provide tactful measures and guidelines to ensure safety without causing undue alarm to foreign and Thai tourists.

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PROTOZOAL CONTAMINATION OF WATER USED IN THAI FROZEN FOOD INDUSTRY.

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THIS study evaluated the prevalence of contamination of water that was used for food preparation. Since protozoal cysts can be found in small numbers in water, 1,000 liters of either untreated or treated water were filtered through activated carbon block filters (1 microm nominal porosity). Identification of protozoa was performed using specific monoclonal antibodies against *Giardia* and *Cryptosporidium* parasites followed by fluorescence microscopy. Twelve of 20 untreated water samples (60%) were found to be contaminated by *Giardia* cysts, with an average of 53.33 cysts/1,000 liters (geometric mean 39.43), whilst 7 samples (35%) were contaminated by *Cryptosporidium* oocysts, with an average of 28.57 oocysts/1,000 liters (geometric mean 26.92). Three samples of untreated water (15%) were positive for both organisms. In contrast, none of the treated water samples were contaminated.

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SENSITIVITY AND SPECIFICITY OF POLYMERASE CHAIN REACTION FOR THE DETECTION OF *TOXOPLASMA GONDII* DNA ADDED TO LABORATORY SAMPLES

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WE studied the sensitivity and specificity of PCR to detect *T.gondii* DNA by aliquoting various concentration of tachyzoites into laboratory specimens from 60 positive and 10 negative buffy-coat samples. We were able to detect the specific gene from purified DNA samples containing as few as 0.25 parasites per 100,000 human leukocytes. These results had an impressive initial 100% specificity but later it decreased because of false-negative data.

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FREE-LIVING AMEBA CONTAMINATION IN NATURAL HOT SPRINGS IN THAILAND

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THERMO tolerant free-living ameba, *Naegleria* spp and *Acanthamoeba* spp contamination in natural hot springs in Thailand were carried out from 13 provinces. The temperature of hot springs water varied from 28 degrees-65 degrees C and pH from 6-8. We found that 38.2 % (26/68) of water samples were positive, *Acanthamoeba* was 13.2% (9/68) whilst *Naegleria* was 35.3% (24/68). Contamination by free-living ameba in natural hot springs may pose a significant health risk to people who use such water for recreation activities.

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IMPACT OF HEALTH EDUCATIONAL PROGRAMMES ON THE PREVALENCE OF ENTEROBIASIS IN SCHOOLCHILDREN IN THAILAND

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ENTEROBIASIS is a worldwide prevalent disease particularly in low income areas. The budget needed for the prevention, treatment and eradication of the disease has thus far frustrated the limited budgets of global public health systems. A study was undertaken to determine if education in addition to medical treatment of enterobiasis could make a difference to the rates of infection. A total of 777 children (399 male and 378 female) from 11 elementary schools in five districts of Samut Prakan Province, Thailand were examined between December 2000 and

March 2002. In five of the 11 schools studied, medical treatments were applied, followed by a programme of educating the children in the prevention of infection. Children in the remaining six schools received medical treatment only. The study showed a decrease in infections among children who received supplementary education. This decrease was significant in comparison to the decrease shown among children who received medical treatment only. The study therefore showed that educating high risk individuals played a key role in the prevention of enterobiasis.

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AMPHIZOIC AMOEBAE: PATHOGENIC FREE-LIVING PROTOZOA; REVIEW OF THE LITERATURE AND REVIEW OF CASES IN THAILAND

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ALARGE variety of species of free-living amoebae (FLA) caused an indefinite form of these protozoa. Non-fixed form, as indicated by amoeboid movement and possessed the bacteria to survive in nature. Two species of pathogenic FLA: *Naegleria fowleri* and *Acanthamoeba* spp. were identified as the causative agents of Primary Amoebic Meningoencephalitis (PAM) and Granulomatous Amoebic Encephalitis (GAE) respectively. They were suggested to be amphizoic protozoa, capable of living as parasites or as free-living and they were also considered to be distributed worldwide. These amoebae were detected in lakes, rivers and ponds. The first case of meningoencephalitis was observed in 1961 by Fowler. Many cases were reported later on and the pathogenicity was tested by nasal inoculation of mice. In fact, quite a number of FLA were isolated but only a few species were pathogenic to humans. The three typical features which allow recognition of *Naegleria* spp. flagellate stage, round cyst and promitotic trophozoite. This promitosis distinguishes the *Naegleria* genus from *Acanthamoeba* spp. The disease caused by PAM usually occurs with acute onset, whereas chronic for GAE. The GAE cases mentioned are mostly in debilitated patients, chronic alcoholics or patients under treatment with immunosuppressive methods. About 6 cases of PAM were reported in Thailand during 1982-1997. Four cases of GAE were reported in 1994 and two isolated cases of *Acanthamoeba* from keratitis patients were reported in 2000. Finally one case of PAM and one case of GAE were reported in 2001. The surveys of FLA were set up to study the distribution of these pathogenic amoebae and determine the prevalence of amoebae

in aquatic habitats of human environments. About 40% were identified as *Acanthamoeba* spp., 30% were *Naegleria* spp., 20% were *Hartmannella* and 10% were *Vahlkampfia*. Only 10% of *Naegleria* spp. belonged to *Naegleria fowleri*.

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EARLY DETECTION AND IDENTIFICATION OF AMPHIZOIC AMOEBAE FROM NASAL EXUDATES OF A SYMPTOMATIC CASE

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AMAN visited the Out Patient Department of the hospital for Tropical Diseases in February 2004 with low grade fever and severe headache for a week. He had the history of diving in a natural pond 2-3 days before the onset of the disease. A thick bloody mucous was observed from the nasal discharge. Fresh microscopic observation of the exudates in 0.85% sodium chloride revealed numerous active amoeba trophozoites. Two groups of the trophozoites were observed. The first group was 10 μ sized amoeba with active directional movement by lobopodia and the second group was 15-30 μ sized amoeba with active multiprogressive movement by filopodia. Few flagellate forms were observed after exflagellation in distilled water and some polygonal cysts were also found. Giemsa' stain was used to differentiate the amoeba trophozoites from the leukocytes. It was concluded that this patient was infected by both *Naegleria* spp. and *Acanthamoeba* spp. This is the first report of double infection of free-living amoeba in a symptomatic and non-fatal patient.

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THE *IN VITRO* ANTI-GIARDIAL ACTIVITY OF EXTRACTS FROM PLANTS THAT ARE USED FOR SELF-MEDICATION BY AIDS PATIENTS IN SOUTHERN THAILAND

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THIS study evaluated the anti-giardial activity of chloroform, methanol and water extracts of 12 medicinal plants (39 extracts), commonly used as self medication by AIDS patients in southern Thailand. The plant extracts and a standard drug, metronidazole, were incubated with 2×10^5 trophozoites of *Giardia intestinalis* per millilitre of growth medium in 96-well tissue culture plates under anaerobic conditions for 24 h. The cultures were examined with an inverted microscope and the minimum inhibitory concentration and the IC_{50} value for each extract was determined. The chloroform extracts from *Alpinia galanga*, *Boesenbergia pandurata*, *Eclipta prostrata*, *Piper betle*, *Piper chaba*, *Zingiber zerumbet*, and the methanol extracts from *B. pandurata* and *E. prostrata* were classified as "active", i.e. with an IC_{50} of < 100 μ g/ml, whereas the chloroform extract from *Murraya paniculata* was classified as being "moderately active". This study shows that extracts from some medicinal plants have potential for use as therapeutic agents against *G. intestinalis* infections. © Springer-Verlag 2004.

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COMPARISON OF FIVE DNA EXTRACTION METHODS AND OPTIMIZATION OF A B1 GENE NESTED PCR (N-PCR) FOR DETECTION OF TOXOPLASMA GONDII TISSUE CYSTS IN MOUSE BRAINS

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TOXOPLASMOSIS, caused by *Toxoplasma gondii*, is an important parasitic disease worldwide. Different techniques have been developed for *T. gondii* detection. At present, Polymerase chain reaction (PCR) has been widely used. However, the PCR for identifying *T. gondii* remains unsatisfactory in many laboratories because of lack of standardization and variations in efficiency. In the present study, we optimized a nested PCR protocol (n-PCR) in order to compare the amplification of *T. gondii* DNA, after being extracted from mouse brains by five different DNA extraction methods including phenol chloroform, QIAamp DNA minikit, Genomic DNA purification kit and Chelex with or without proteinase K. All DNA extraction methods used in our experiment were able to extract DNA from a single tissue cyst from mouse brains. However, among our five DNA extraction methods, the Chelex without proteinase K appeared to be the most rapid and easiest one.

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IMMUNOHISTOCHEMICAL STUDY OF ACUTE TOXOPLASMOSIS IN THE LIVER, SPLEEN AND BRAIN INEXPERIMENTALLY INFECTED MICE

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IN this study, immunohistochemical technique was used to enhance visualization of the pathological lesion in the liver, spleen and brain in experimentally infected mice. ICR mice were infected with RH strain *Toxoplasma gondii*. By histology, the structure of the liver was affected and showed several areas of necrosis, which increased with the period post-inoculation. They were observed at the surface of the liver and then invaded deep into the tissue. Similar results were observed for the spleen. In contrast, only a few organisms were seen in the brain, however, it was only immunohistochemistry that the number and distribution of *Toxoplasma gondii* organisms could be identified.

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COST-EFFECTIVENESS OF PERINATAL SCREENING OF TOXOPLASMA GONDII ANTIBODY IN PREGNANT THAI WOMEN

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TOXOPLASMOSIS is usually asymptomatic in the normal host, but primary infection during pregnancy can be transmitted to the fetus. Congenital toxoplasmosis, though rare, is nevertheless a health and economic burden. Early correct diagnosis is thus important for intervention and proper management. Laboratory diagnosis for congenital toxoplasmosis relies mainly on demonstrating serum specific antibodies and isolation of *T. gondii* DNA from amniotic fluid.

Toxoplasma sero-conversion rate was studied in 4,000 pregnant Thai women and IgM antibody was also determined in 8,000 neonates. We found no IgM antibody in any neonate and the sero-conversion rate was found to be 2 per 1,000 pregnancies. With such low prevalence, it is perhaps not cost effective to carry out nationwide perinatal screening of *Toxoplasma* antibody in pregnant women in Thailand. Care should be confined to individual case detection in both pregnant woman and the newborn who are suspected of acquiring the disease.

(This study was financially supported by Mahidol University Fund)

Oral presentation in: *Joint International Tropical Medicine Meeting, 30 November –2 December 2005, Bangkok, Thailand).*

CYCLOSPORA INFECTION IN HEALTHY BOY AT THAI – MYANMAR BORDER

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WE report a case of healthy boy, from Thai-Myanmar border, who infected with *Cyclospora*. Stool concentration and modified Acid-Fast stain were performed. Round organisms size 7–8 µm, pink colour compatible with unpopulated *Cyclospora* oocysts were found. *Cyclospora* infection can be found in both competent and immunocompromised hosts, which less severe symptom in former group. Good personal hygiene and sanitation are important for preventing transmission of this infection.

Presentation in: *Joint International Tropical Medicine Meeting, 30 November –2 December 2005, Bangkok, Thailand.*

MULTIPLEX RT-PCR ASSAY FOR THE DETECTION OF STAGE CONVERSION PROCESSES IN *TOXOPLASMA GONDII*: A PUTATIVE FUTURE TOOL FOR THE DETECTION OF TOXOPLASMIC ENCEPHALITIS

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WE have developed a multiplex reverse transcription-polymerase chain reaction (RT-PCR) assay that facilitates the analysis of large numbers of samples for differences in *sag-1* and *sag-4* mRNA abundance, genes which are selectively expressed by either tachyzoites or bradyzoites. In our assay, we further co-amplified *alpha-tubulin* cDNA as an internal control. The results obtained from our RT-PCR assay show that the multiplex RT-PCR, consisting of the parallel amplification of *sag-1*, *sag-4* and *tubulin* cDNA offers a simple, rapid and sensitive technique for the detection of *T. gondii* tachyzoite/bradyzoite stage conversion. In the future, the established RT-PCR technique may serve as a feasible alternative tool to diagnose TE in severely immunocompromised patients.

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IN VITRO CULTIVATION OF *TOXOPLASMA GONDII* FOR DYE TEST IN CAPTIVE WILD FELIDS

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TOXOPLASMA *GONDII* is an obligate intracellular coccidia parasite that infects virtually all species of warm-blooded animals, including people and causes serious diseases in immunocompromised hosts. Live tachyzoites derived from serial passage in Hela culture was used in the Sabin-Feldman dye test for detection of *T. gondii* antibody. Serum samples of 21 captive wild felids including one fishing cat (*Prionailurus*), one leopard (*Panthera pardus*), two flat-headed cat (*Prionailurus planiceps*), six tigers (*Panthera tigris*), two leopard cats

ABSTRACTS

(*Felis bengalensis*), two clouded leopards (*Felis nebulosa*), three pumas (*Puma concolor*) and four jungle cats (*Felis chaus*) were collected. Antibodies to *T. gondii* were found in nine of 21 felids (42%). This study revealed that cell culture-derived tachyzoites could be used successfully as a source of live organisms in a gold standard Sabin-Feldman dye test which provides more simple, cheaper and less ethically sensitive than *in vivo* inoculation.

Poster presentation in: Joint International Tropical Medicine Meeting, 30 November –2 December 2005, Bangkok, Thailand.

CULTIVATION OF *GIARDIA LAMBLIA* IN MONGOLIAN GERBILS

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MONGOLIAN gerbils (*Meriones unguiculatus*) were susceptible to infection with *Giardia lamblia* trophozoites. The trophozoites were obtained *in vitro* in Diamond's TYIS-33 culture medium. The animals were infected orally with 0.5 ml culture medium containing 10⁶ trophozoites. Cysts were then collected and concentrated by sucrose gradient centrifugation technique. *G. lamblia* cysts were first observed in feces on day 5 post infection. The characteristic of *G. lamblia* infection on gerbils was intermittent cyst release.

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IN VIVO CULTURE OF *CRYPTOSPORIDIUM* OOCYSTS FOR LABORATORY USE

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CRYPTOSPORIDIUM oocysts are needed for laboratory and research works such as drug trials, viability studies and irradiation methods. Adequately oocysts can be obtained by *in vitro* and *in vivo* techniques. We used an *in vivo* technique in the laboratory. Seven-day-old mice were infected

with 100,000-200,000 *Cryptosporidium* oocysts. At 8 days post infection, the small and large intestine were collected. A simple extraction procedure was used and purification was by Ficoll gradient centrifugation. After purification, the oocysts were preserved in phosphate buffered saline with antibiotic at 4 °C.

Poster presentation in: Joint International Tropical Medicine Meeting, 30 November –2 December 2005, Bangkok, Thailand.

TRANSMISSION OF *ENTEROCYTOZOON BIENEUSI* GENOTYPE A IN THAI ORPHANAGE

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ACROSS-SECTIONAL study of *Enterocytozoon bieneusi* infection in children who lived in an orphanage in Bangkok, Thailand was conducted in April 2003. Two hundred ninety stool specimens were collected and examined under light microscopy after staining with gram-chromotrope. Confirmation of *E. bieneusi* was done using transmission electron microscopy. Of 290 samples, 12 (4.1%) were positive for *E. bieneusi*. Genotypic characterization of 10 *E. bieneusi* showed that all were genotype A, which might indicate the same source of infection. Multivariate analysis showed that orphans who were 12-23 months old, girls and living in one particular house were independently associated with *E. bieneusi* infection. Our study suggests that *E. bieneusi* infection in this orphanage might be transmitted person to person.

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EVALUATION OF A REAL-TIME PCR ASSAY FOR THE DIAGNOSIS OF MALARIA IN PATIENTS FROM THAILAND

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WE compared the diagnosis of malaria in 297 patients from Thailand by a real-time PCR assay using the LightCycler (Roche Applied Science) with conventional microscopy using Giemsa-stained thick and thin blood films. The PCR assay can be completed in an hour and allowed detection and identification of four species of *Plasmodium* in a single reaction by use of melting temperature curve analysis. Blood was collected, stored, and transported on IsoCode STIX (Schleicher & Schuell), which provide a stable matrix for the archiving and rapid simple extraction of DNA. A genus specific primer set corresponding to the 18S rRNA was used to amplify the target sequence. FRET Hybridization probes were designed for *Plasmodium falciparum* over a region containing base pair mismatches allowing for differentiation of the other *Plasmodium* species. The PCR results correlated with the microscopic results in 282 of the total 297 (95%) patient specimens. The majority of these were single species infections caused by *P. vivax* (150) and *P. falciparum* (120) along with 5 *P. malariae*, 2 mixed infections (*P. falciparum/P. vivax*) and 5 negative specimens. No negative microscopy specimens were positive by PCR (100% specificity for detection of any *Plasmodium*). The 15 discrepant results could not be resolved but given the subjective nature of microscopy and the analytical objectivity of PCR, it is possible that the PCR results are correct. The ability of the PCR method to detect mixed infections or to detect *P. ovale* could not be determined by this study. Within the limitations of initial equipment costs, this real-time PCR assay is a rapid, accurate and efficient method for the specific diagnosis of malaria which may have application in clinical laboratories as well as in epidemiologic studies and antimalarial efficacy trials.

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PURIFICATION AND CHARACTERIZATION OF 3'-5' DNA HELICASE FROM *PLASMODIUM FALCIPARUM*

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DNA helicases can catalyze the unwinding of double stranded DNA to provide single stranded templates for DNA replication, repair and recombination. Therefore, DNA helicases may serve as candidate enzymes to combat malarial parasites.

In this study, DNA helicase of *Plasmodium falciparum* was isolated and purified from crude extract by 80% ammonium sulfate precipitation and FPLC. The protein was loaded onto Resource Q column and two peaks of DNA helicase activity were found. Peak II enzyme was further purified by using Hitrap heparin, Mono S and ssDNA columns respectively. DNA helicase activity was detected by measuring the unwinding of 32P-labeled partial duplex DNA. The directionality of unwinding reaction was 3' to 5' with respect to the single-stranded DNA to which the enzyme was bound. The apparent molecular weight of *P. falciparum* DNA helicase is 90 kDa. It cannot unwind blunt-ended duplex DNA. Unwinding activity requires Mg²⁺ as a divalent cation. Only ATP or dATP supports the unwinding activity of parasite enzyme. The helicase activity is inhibited by 200 mM KCl or NaCl. Anthracycline antibiotics including aclarubicin, daunorubicin, doxorubicin, and nogalamycin inhibits unwinding activity of *P. falciparum* 3'-5' DNA helicase with IC₅₀ values of 9, 2, 8 and 5 μM whereas IC₅₀ values of these drugs against parasite growth are 1.8, 2.5, 1.5 and 0.1 μM, respectively.

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PREPARATION AND EVALUATION OF DIHYDROARTEMISIN IN NANOSUSPENSION

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DIHYDROARTEMISININ (DHA) is an effective antimalarial drug especially against tolerant species *Plasmodium falciparum*. However, poor solubility in water makes it difficult to formulate in an effective dosage form. Particle size reduction to micro- or nanometer range is a promising technology to overcome solubility and bioavailability problems of poorly water soluble drugs by increasing of solution velocity and saturation solubility. Co-grinding technique using hydrophobic drugs with hydrophilic polymer(s) and/or combination with co-polymer(s) was interesting method that can produce fine particles with narrow particle size distribution. This technique is attractive due to organic solvent free and simple step operation. In this research, DHA particles were prepared by co-grinding method, the formation of DHA particles as nanosuspension from ternary ground

mixtures of DHA, polyvinylpyrrolidone and sodium deoxycholate was studied. Physical characterization of the co-ground mixtures and suspension and *in vitro* antimalarial activity against *P. falciparum* of the obtained suspension was determined. In conclusion, the nanosuspensions with high percentage of DHA nanoparticles were obtained by reconstitution of the coground mixture in distilled water with particle size of 80-200 nm. The nanosuspension was effective antimalarial activity against *P. falciparum* K1 strain. The PXRD patterns indicating that the co-grinding technique decreased crystallinity of DHA in the coground mixtures to amorphous state whereas DHA existed as crystalline solid in physical mixtures.

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DNA REPLICATING AND DNA REPAIRING ENZYMES OF PLASMODIUM FALCIPARUM

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MALARIA caused by *Plasmodium falciparum* remains a major global health problem especially the development of parasite drug resistance. New chemotherapeutic targets are urgently needed to achieve effective malaria treatment and control. The potential targets that should be explored and studied at the biological and molecular level are enzymes in DNA replication and DNA repair. DNA polymerase plays an important and crucial role not only in DNA replication, translation, DNA synthesis, DNA recombination but also in DNA repair of all prokaryotic and eukaryotic cells in order to maintain the integrity of the cell's genomes. In *P. falciparum*, there are at least three types of DNA polymerases that have been identified and characterized. *P. falciparum* DNA polymerase α and δ were fully cloned and sequenced. The third enzyme, DNA polymerase γ playing an important role in replication of mitochondrial DNA was also isolated from parasite mitochondria and characterized by using various specific inhibitors. Parasite DNA polymerases show some different properties from human enzymes.

Another enzyme with a great potential as a chemotherapeutic target and which is known to act as a repairing enzyme in cells, is the DNA polymerase β . DNA polymerase β is known to be the major enzyme that operates during the repair synthesis of base excision repair in higher organisms. The mechanism apparently involves the short patch repair pathway by the removal and replacement of a single nucleotide and the long

patch repair pathway by removal and replacement of a few nucleotides. It is possible that the *P. falciparum* parasite has a greater need for these repair pathways because genome analysis indicates that 80% of the genetic material is adenine and thymine (A+T).

In our recent study, a new type of DNA polymerase from *P. falciparum* is isolated and characterized. Partially purified DNA polymerase was highly resistant to aphidicolin and NEM, as seen in the other eukaryotic enzymes. Interestingly, partially purified DNA polymerase β of *P. falciparum* was strongly resistant to ddTTP whereas the other eukaryotic enzymes are sensitive to ddTTP. The partially purified enzyme was also resistant to the nucleoside analogs. Its low processivity was demonstrated by having 10 nucleotides product. The role of partially purified DNA polymerase β on base excision repair was investigated using UG mismatch of the 28-mer substrate. The results showed a patch size of 3 nucleotides. This is the first evidence demonstrating a role for DNA polymerase β in *P. falciparum* base excision repair.

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DETECTION OF PFCRT T76 MUTATION IN FALCIPARUM MALARIA PATIENTS FROM THAILAND BY REAL-TIME PCR ASSAY

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CHLOROQUINE resistance of *Plasmodium falciparum* is associated with the mutation in a transporter gene found on food vacuole membrane (chloroquine resistance transporter, CRT). Pfcrt T76 mutation is strongly correlated with *in vitro* chloroquine resistance. In this study, Pfcrt T76 mutation was investigated from 130 blood samples from falciparum malaria patients admitted at the Hospital for Tropical Diseases, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand by real-time PCR assay using Light Cycler. Parasite DNA of each blood sample was extracted and purified by High Pure PCR Template Preparation Kit (Roche Applied Science). Pfcrt T76 mutation was detected by using Pfcrt specific primers labeled with LCRed 640 and fluorescent-labeled hybridization probes. T76 Pfcrt mutation was detected by melting temperature curve analysis and an assay

can be completed in an hour. In our study, Pfcrt T76 mutation was found in all specimens. The result shows an existence of the high prevalence of chloroquine resistance in this area. Moreover, a real-time PCR can demonstrate mixed infections of wild-type and mutant *P. falciparum* strains. Based on the results, a real-time PCR LightCycler-based technique is rapid, informative and useful for molecular surveillance of chloroquine resistance of *P. falciparum*.

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REDUCTION OF LOW BACK MUSCULAR DISCOMFORT THROUGH AN APPLIED ERGONOMICS INTERVENTION PROGRAM

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AN applied ergonomics intervention program (AEIP) was conducted with male employees who work in the pressing and storage sections of a metal auto parts factory in eastern Thailand. The objective of this study was to reduce worker muscular discomfort at the low back. The study design was a participatory research approach, with quasi-experimental pretest-posttest, and with a non-equivalent control group. Thirty-five persons participated in the AEIP (AEIP group) and 17 persons did not (non-AEIP group). The AEIP was composed of three major categories: (1) top management support; (2) equipment designed for workstations and manual material handling; and (3) administrative intervention, training, and health education. Muscle activity was measured by surface electromyography of the left and right erector spinae, and multifidus muscles; and evaluated by multivariate test for dependent samples (paired observation) and for independent samples. After the AEIP, the low back muscular loads of the AEIP group was significantly reduced, while those of the non-AEIP group were not. Comparison of the means of percentage maximum voluntary contractions (% MVC) of low back muscular activity between the AEIP group and non-AEIP group indicated that the AEIP group had significantly reduced low back muscular load, with a 95% confidence level (p -value < 0.05).

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HEALTH PROMOTION PROGRAM FOR THE SAFE USE OF PESTICIDES IN THAI FARMERS

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THE purpose of this study was to determine the knowledge, attitudes and practices (KAP) concerning the safe use of pesticides of Thai farmers in Don Kha subdistrict, Bang Phae district, Ratchaburi Province. Thirty-three voluntary Thai farmers of thirty-three farming families, recruited by convenience sampling, participated in a training program for six months. Data were collected by questionnaire interviews, and KAP on the safe use of pesticides were compared by paired t-test. Research findings showed that the mean scores of KAP in the posttest were significantly higher than the pretest. The results of this study provided health professionals with information to develop more effective prevention and intervention programs. To prevent illness, the most important role of health officers should be focus on education and information for individuals, families, and communities.

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EPITOPE MAPPING OF MONOCLONAL ANTIBODIES SPECIFIC TO SEROVAR OF *LEPTOSPIRA*, USING PHAGE DISPLAY TECHNIQUE

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RANDOM heptapeptide library displayed by bacteriophage T7 was used to characterize epitopes of five monoclonal antibodies that were specific to *L. australis*, *L. bangkok*, and *L. bratislava*. Phages selected by biopanning were cloned by plaque isolation, and the binding specificity of individual clones was confirmed by enzyme-linked immunosorbent assay, before being further amplified and checked for phage peptide sequence using PCR and DNA sequencing. Almost all of the peptide epitopes were continuous or linear. Interestingly, in phages reacting with the monoclonal antibody (MAb) clones F11, F20, 2C3D4, and 8C6C4A12, the deduced amino acid sequence of the displayed peptides corresponded to a segment

of hypothetical protein of the *Leptospira* genome (*L. interrogans* serovar *Lai* and *Copenhageni*). Considering the deduced amino acid sequences of phages reacting with the MAb clones F11, F20, 2C3D4, and 8C6C4A12, the consensus motif -SKSSRC-, -TLINIF-, -SSKSYR- and -CTPKKSGRC- appeared respectively. No similarity was observed among phage reacting with the MAb clone F21. The results demonstrate that T7 phage display technique has potential for epitope mapping of leptospiral MAbs, and for rapid analysis of the interactions between phage display peptides with the MAb. The finding of a phage peptide that binds to MAb with protective activity can be further tested as a candidate for leptospirosis vaccine in the future.

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EMERGENCE OF *OPISTHORCHIS VIVERRINI* CERCARIAE FROM NATURALLY INFECTED *BITHYNIA (DIGONIOSTOMA) SIAMENSIS GONIOMPHALOS*

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UNDER natural conditions, the emergence of *Opisthorchis viverrini* cercariae from naturally infected *Bithynia (Digoniostoma) siamensis goniomphalos* showed diurnal periodicity, peaking between 8:00-10:00 AM. The cercariae did not emerge during darkness, but low-intensity light could induce a release. Cercariae shedded from each field infected *B.(D.) s. goniomphalos* was recorded daily. The maximum output from one snail was 1,728 cercariae in a day. The total cercarial output from all five infected snails was 56,555 and the maximum of total cercariae shed from one snail was 27,692. The field-infected *B. (D.) s. goniomphalos* could survive for 70 days after the snails were collected.

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THE ASSOCIATION BETWEEN ENVIRONMENTAL FACTORS AND TUBERCULOSIS INFECTION AMONG HOUSEHOLD CONTACTS

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ACROSS-SECTIONAL study was conducted to determine the association between environmental factors and tuberculosis

infection among household contacts aged less than 15 years in Bangkok, Thailand, between May and December 2003. During the study period, 480 household contacts aged under 15 years were identified. The prevalence of tuberculosis infection among household contacts was 47.08% (95% CI = 42.60-51.56). A generalized estimating equation (GEE) indicated that the risk of positive tuberculin skin testing in household contact was found to increase with household crowding. Children living in a crowded household were five times more likely to have tuberculosis infection (OR = 5.19, 95% CI = 2.65-8.69). The association between environmental factors and tuberculosis infection assists community tuberculosis staff in understanding the risks for tuberculosis infection in the community and planning appropriate preventive actions based on this risk.

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COMPARATIVE STUDIES ON THE PATHOLOGICAL FINDINGS AND MORTALITY IN *SCHISTOSOMA MANSONI* INFECTED MICE AFTER TREATMENT WITH ARTESUNATE AND THE CURRENT ANTISCHISTOSOMAL DRUGS

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THE effect of artesunate (ART) on the pathology and mortality rate of in *Schistosoma mansoni* infected mice was comparatively studied with the current drugs of choice for the treatment of schistosomiasis mansoni: praziquantel (PZQ) and oxamniquine (OX). *S. mansoni* experimentally infected mice were treated at 9th week of infection with ART, PZQ or OX at an oral dosage of 300 mg kg(-1), 600 mg kg(-1) and 100 mg kg(-1), respectively. Untreated, infected mice and non-infected mice were added as controls. Samples of mice were sacrificed and examined for the pathological findings at 1 week, 1 month, and 3 months after treatment. At 1 week after treatment, both gross and microscopic lesions were observed. No significant differences were noted among the infected groups. Differences were observed at 1 month after treatment. The lesions decreased more rapidly in groups treated with PZQ and OX. At 3 months after treatment, there were significant differences in the pathological findings among groups. In the groups treated with PZQ and OX, the lesions were markedly reduced and rarely found,

but they were clearly observed in the group treated with ART and in the untreated, infected group. High mortality was also recorded in the group treated with ART and in the untreated, infected group. Therefore, the treatment of *S. mansoni* infected mice at 9 weeks of infection with ART did not reduce the pathological findings or the mortality rate compared to treatment with the current recommended schistosomicides, PZQ and OX.

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MUTATIONS IN THE *GYRA* AND *GYRB* GENES OF FLUOROQUINOLONE-RESISTANT *MYCOBACTERIUM TUBERCULOSIS* FROM TB PATIENTS IN THAILAND

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AMONG fluoroquinolone-resistant *Mycobacterium tuberculosis* (FQ'-MTB) isolates. mutation at positions 90, 91, and 94 in *gyrA* gene and at positions 495, 516, and 533 in *gyrB* gene have been frequently reported. In this study, 35 isolates of FQ'-MTB were collected from Siriraj Hospital and Chest Disease Institute. The quinolone-resistance-determining regions (QRDR) of *gyrA* and *gyrB* genes in all 35 FQ'-MTB isolates and from the H37Ra reference strain were amplified using polymerase chain reaction (PCR). Direct DNA-sequencing and single-strand conformation polymorphism (SSCP) were further utilized for characterization of the mutations in the QRDR of *gyrA* and *gyrB* genes and mutation screening, respectively. From DNA-sequencing, 21 of 35 (60%) exhibited single-point mutations in different positions. at Ala90Val, Ser91Pro, and Asp94(Gly/Ala/His/Asn); and one novel mutation position at Gly88Cys in the *gyrA* gene and Asp495Asn in the *gyrB* gene. These positions were previously frequently reported to be responsible for FQ'-MTB. The other 14 FQ'-MTB isolates (40%) had no mutation. This study is the first report of mutation occurring only in the QRDR of the *gyrB* gene, without prior mutation in the *gyrA* QRDR among FQ'-MTB isolates. By SSCP analysis for screening of the mutant FQ'-MTB, the SSCP patterns of mutated FQ'-MTB isolates were clearly differentiated from the SSCP patterns of FQ'-MTB.

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BRACKISH-WATER MOLLUSKS OF SURAT THANI PROVINCE, SOUTHERN THAILAND

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BRACKISH-WATER mollusks inhabiting the mangrove areas along the Gulf of Thailand of Surat Thani Province were investigated for distribution, abundance and natural infections. Nine families and thirty-two species of brackish-water snails were recovered from 14 sampling stations. *Cerithidea* (*Cerithideopsis*) *cingylata*, *C. (C.) djadjariensis*, and *C. (Cerithidea) charbonnieri*, of the family Potamididae, were naturally infected with 2 types of cercariae, and one which was undetermined. *C. (C.) cingylata* had the highest infection rate (38.5%). Viewing two snail communities, the first community on the mainland and the second on Samui Island in Surat Thani Province, 28 brackish-water mollusk species were present on the mainland, 15 species were evident on Samui Island, and 11 snail species were common to both the mainland and Samui Island. Measurement of community similarity based on species presence revealed an index of similarity of 0.51. Concerning land use by the local people in the station areas investigated, brackish-water snails in Surat Thani Province are facing habitat degradation by human use.

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SPECTROPHOTOMETRIC DETERMINATION OF PLASMA AND RED BLOOD CELL CHOLINESTERASE ACTIVITY OF 53 FRUIT FARM WORKERS PRE- AND POST-EXPOSED CHLORPYRIFOS FOR ONE FRUIT CROP

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WE sought to investigate the early biological effects of chlorpyrifos among 53 Thai fruit farm workers by measuring the plasma cholinesterase (PChE) and red blood cell cholinesterase (AChE) activities, a biomarker of organophosphate (OPs) pesticide during one fruit crop. The ChE activity (V(m)/K(m)) was spectrophotometrically analyzed before and after exposing to chlorpyrifos. The V(m)/K(m) values of both non-spraying and spraying seasons are found as normal distribution pattern. The median PChE and AChE activities among farm workers in the

non-spraying season were 2.3×10^{-3} s(-1) and 7.26×10^{-5} s(-1), respectively. The median PChE and AChE activities of the farm workers in the spraying season were 2.02×10^{-3} s(-1) and 5.95×10^{-5} s(-1), respectively. The mean V(m)/K(m) values of PChE shifted left (t-test, $p=0.013$), indicating a decrease in PChE activity in the farm workers exposed to chlorpyrifos. However, the V(m)/K(m) values of AChE in nonspraying season and in the spraying season were not different (t-test, $p=0.246$). We propose that PChE activity can be used as a biomarker for monitoring early toxicity induced by chlorpyrifos insecticide.

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AN ERGONOMICS INTERVENTION PROGRAM TO PREVENT WORKER INJURIES IN A METAL AUTOPARTS FACTORY

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An ergonomics intervention program (EIP) was conducted with male employees working in the pressing and storage sections of a metal autoparts factory in Samut Prakan Province, Thailand. The objectives of this study were to assess the causes of injuries in the pressing and storage sections of that factory, and to improve working conditions by reducing worker injuries from accidents and low back muscular discomfort, using an EIR. The study design used a participatory research approach which was quasi-experimental with pretest-posttest evaluations, with a non-equivalent control group. A total of 172 male participants working in Building A were the target group for assessing causes of injury. A retrospective study of official accident information, and questionnaires for general information, health and muscular discomfort, injury frequency rate (IFR), injury severity rate (ISR), medical expenses, and EIP design. Two groups of employees volunteered for the study on muscular back discomfort. The first group of 35 persons volunteered to participate in the EIP (EIP group), and the second 17 persons from Building B did not (non-EIP group). The EIP was composed of 4 major categories: (1) engineering improvement, (2) change in personal protective equipment, (3) environmental improvement, (4) administrative intervention, training, and health education. Low back muscular discomfort was measured through questionnaires on subjective feelings of muscular discomfort, and by surface electromyography (sEMG). Muscle activities were measured by sEMG of the

left and right erector spinae and multifidus muscles, and evaluated by multivariate test for dependent samples (paired observation), and multivariate test for two independent samples. After EIP, IFR decreased 65.46%, ISR decreased 41.02%, and medical expenses decreased 42.79%. The low back muscular loads of the EIP group were significantly reduced, with a 95% confidence level ($p < 0.05$) while those of the non-EIP group were not. Subjective feelings of muscular discomfort, determined by Wilcoxon Signed Ranks test, showed that after applying the EIP to the EIP group, the mean scores for general bodily discomfort and low back muscular discomfort in the EIP group had significantly reduced, while those of the non-EIP group increased, ($p < 0.05$).

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FACTORS ASSOCIATED WITH THE HOUSEHOLD CONTACT SCREENING ADHERENCE OF TUBERCULOSIS PATIENTS

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ACROSS-SECTIONAL study was conducted to explore factors associated with the adherence of tuberculosis patients in bringing their household contacts to a TB clinic in Bangkok, Thailand. During the study period, May to December 2003, 325 sputum-smear-positive tuberculosis patients were recruited into the study. Of the 325 eligible tuberculosis patients, 169 (52.00%, 95% CI = 47.00-57.00) brought their household contacts to the TB clinic. Psychosocial and cues to action factors were examined as indicators of the household contact screening adherence of tuberculosis patients. The results reveal that the household contact screening adherence of tuberculosis patients was significantly associated with a higher perceived susceptibility (Adjusted OR = 2.90, 95% CI = 1.18-7.16), lower perceived barriers (Adjusted OR = 4.60, 95% CI = 1.99-10.60), a higher intention to bring the contacts to the TB clinic (Adjusted OR = 3.35, 95% CI = 1.44-7.76), and a short distance from home to the TB clinic (Adjusted OR = 11.47, 95% CI = 4.57-28.79). The results from this study provide information for TB clinic staff for developing an appropriate intervention program. Through effective intervention and active policy enforcement, a higher percentage of household contact screening adherences can be achieved.

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EFFECT OF ANTISENSE-SGTPS ON THE GLUCOSE UPTAKE OF THE BLOOD FLUKE *SCHISTOSOMA MANSONI*: OBSERVATIONS IN ADULT WORMS AND SCHISTOSOMULA

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AS-ODNS, complementary to *Schistosoma mansoni* glucose transporter proteins (SGTP1 and SGTP4), were chosen as potential therapeutic agents for schistosomiasis. AS-SGTP1 oligos lowered the glucose uptake of adult worms both in vitro and ex vivo. The most effective AS-ODN was that of 21 nucleotides complementary to the SGTP1 nucleotide sequence, including the initiation region of mRNA translation. This oligo was found to decrease glucose uptake in vitro by as much as 50% and at a concentration of 4.0 mg/ml, it killed all male worms within 24 hours. A significant decrease, up to 34%, in glucose uptake was also noted when 100 mg/kg x2 (with a 2 hours interval) of AS-ODN was administered ex vivo. Two out of six anti-SGTP4 oligos also decreased the glucose uptake of adult worms in vitro by 25-44%. Added to the culture of schistosomula, two AS-SGTP4 oligos were found to decrease glucose uptake by 20-43%.

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DEVELOPMENT OF MULTIPLEX PCR FOR THE DETECTION OF TOTAL COLIFORM BACTERIA FOR *ESCHERICHIA COLI* AND *CLOSTRIDIUM PERFRINGENS* IN DRINKING WATER

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MULTIPLEX PCR amplification of lacZ, uidA and plc genes was developed for the simultaneous detection of total coliform bacteria for *Escherichia coli* and *Clostridium perfringens*, in drinking water. Detection by agarose gel electrophoresis yielded a band of 876 bp for the lacZ gene of all coliform bacteria; a band of 147 bp for the uidA gene and a band of 876 bp for the lacZ gene of all strains of *E. coli*; a band of 280 bp for the plc gene for all strains of *C. perfringens*; and a negative result for all three genes when tested with other bacteria. The detection limit was 100 pg for *E. coli* and *C. perfringens*, and 1 ng for coliform bacteria when measured with purified DNA. This assay was applied to the detection of these bacteria

in spiked water samples. Spiked water samples with 0-1,000 CFU/ml of coliform bacteria and/or *E. coli* and/or *C. perfringens* were detected by this multiplex PCR after a pre-enrichment step to increase the sensitivity and to ensure that the detection was based on the presence of cultivable bacteria. The result of bacterial detection from the multiplex PCR was comparable with that of a standard plate count on selective medium ($p=0.62$). When using standard plate counts as a gold standard, the sensitivity for this test was 99.1% (95% CI 95.33, 99.98) and the specificity was 90.9% (95% CI 75.67, 98.08). Multiplex PCR amplification with a pre-enrichment step was shown to be an effective, sensitive and rapid method for the simultaneous detection of these three microbiological parameters in drinking water.

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FRESHWATER MOLLUSKS OF MEDICAL IMPORTANCE IN KALASIN PROVINCE, NORTHEAST THAILAND

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ASNAIL survey was performed in six districts around irrigation areas of Lampao Dam, in Kalasin Province. The survey caught a total of 5,479 live snails and classed them into five families, 12 genera and 15 species, of which 7 species are suspected of transmitting human parasitic diseases. The seven species were *Pila polita*, *Pomacea canaliculata*, *Filopaludina* (*S.*) *m. martensi*, *Bithynia* (*Digoniostoma*) *siamensis goniomphalos*, *Melanooides tuberculata*, *Radix rubiginosa*, and *Indoplanorbis exustus*. Of these, *B. (D.) s. goniomphalos* and *I. exustus* were found to harbor emergent cercariae. Only *B. (D.) s. goniomphalos* hosted several types of cercariae--*Opisthorchis viverrini*, unidentified species of intestinal flukes, echinostomes, xyphidio and furcocercous cercariae. *Indoplanorbis exustus* shed only echinostome cercariae. *B. (D.) s. goniomphalos* showed a rather high natural infection rate with *O. viverrini*, 1.3% in Yang Talat district, and 0.61% in Kamalasai district, in Kalasin Province.

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WILLINGNESS TO BE VACCINATED AGAINST SHIGELLA AND OTHER FORMS OF DYSENTERY: A COMPARISON OF THREE REGIONS IN ASIA

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WE conducted a cross sectional survey of 3163 women and men in six Asian countries to examine willingness for children and adults to be vaccinated against shigellosis and other forms of dysentery. The six sites were clustered into three regions for ease of comparison. The regions are: Northeast Asia (China), Southeast Asia (Thailand, Vietnam, and Indonesia) and South Asia (Bangladesh and Pakistan). We used multiple logistic regression to identify region-specific models for vaccination willingness for both adults and children. A vaccine to protect against dysentery, if available would be very much in demand throughout the three Asian regions for children. For adults, the responses indicate that vaccine uptake by adults will vary. A large proportion of respondents in all regions, specifically in China, do not perceive themselves at risk yet still consider a shigellosis vaccine desirable.

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THE HEALTH OF WORKERS IN A METAL AUTOPARTS FACTORY IN EASTERN THAILAND

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ONE hundred and seventy-two male employees working in the pressing and store sections of a metal autoparts factory in eastern Thailand participated in the study. The aim of this study was to survey the health and well-being condition of Thai workers prior to corporation initiatives in applied ergonomics with the workers of the company. A retrospective study of official accident information, and questionnaires regarding general information, health, muscular discomfort, accidents, posture disorders, and subjective feelings of fatigue or discomfort were filled out for the survey. The results of the study provided 48 categories of important information on the health and wellness of the employees in their workplace. Regression analysis revealed that, based on the working history of the employees, the small and large pressing sections of the workplace had a greater impact on the muscular discomfort of the employees (0.322) ($p = 0.001$). Based on the health information, the independent factors influencing the employee's

muscular discomfort were frequency of muscular discomfort (0.240) ($p = 0.004$), no disease of muscle and bone (0.165) ($p = 0.025$), and finally, regularly taking medicine for muscular pain (0.163) ($p = 0.024$). The factors influencing accidents in the employees were working where they could be cut by sharp material or metal (0.257) ($p = 0.008$), muscular discomfort (0.169) ($p = 0.059$), and not using protective equipment (0.146) ($p = 0.076$). Thus the applied ergonomics intervention program for preventing worker injuries in the sections studied should be implemented, in order to promote the health and well-being of the employees.

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THERAPEUTIC EFFECT OF SUBCURATIVE DOSE PRAZIQUANTEL ON SCHISTOSOMA MANSONI INFECTED MICE AND RESISTANCE TO CHALLENGE INFECTION AFTER TREATMENT

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THE therapeutic effect of a subcurative dosage of praziquantel (PZQ) on *Schistosoma mansoni* infected mice and resistance to challenged worm infection after treatment were assessed and compared with conventional treatment using a curative dosage of PZQ. *S. mansoni* infected mice were treated with PZQ at a curative dosage (600 mg kg⁻¹) or a subcurative dosage (300 mg kg⁻¹) at 9 weeks after infection. Untreated mice and non-infected mice were added as controls. The therapeutic affect of the drug was evaluated in terms of the mortality of mice after treatment, and the parasitological and pathological finding in micesacrificed at 1 week, 1 month, or 3 months after treatment. Another sample of mice was not killed but challenged with *S. mansoni* cercariae at 1 week, 1 month, or 3 months after treatment. Resistance to re-infection was evaluated by the extent of challenged worm reduction. In conclusion, there was no significant difference in mortality, or parasitological and pathological findings between mice treated with PZQ at the two dosages. However, resistance to challenged worm infection was more sustained in the group treated with subcurative dose PZQ, especially at 3 months after treatment.

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COMMUNITY-BASED APPROACH FOR PREVENTION AND CONTROL OF DENGUE HEMORRHAGIC FEVER IN KANCHANABURI PROVINCE, THAILAND

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An action research design was conducted in two villages of Mueang District, Kanchanaburi Province to assess the effectiveness of a community-based approach program. Knowledge, perceived susceptibility, self-efficacy, and regular larval survey behavior were measured for program outputs. Container Index (CI), House Index (HI), and Breteau Index (BI) were used to confirm program outcomes. Key community stakeholders in the experimental village were identified and empowered through active learning in the village. Monthly meetings with the key stakeholders were used to share experiences learned, to reflect on the program outputs and outcomes as well as to plan for the next cycle of program activities. The program was quite successful. Knowledge, perception, self-efficacy, and larval survey practices in the experimental group were significantly higher than before the experiment, and higher than the comparison group. CI, HI, and BI were decreased sharply to better than the national target. Community status as community leaders was the best predictor for larval survey behavior at the first survey. Participating in the study program activities was the best predictor at the end of the program. The results from this study suggest that the dengue hemorrhagic fever (DHF) prevention and control program at the sub-district health level should be more proactive and emphasized at the village level. Monitoring the disease control program outputs and outcomes should be performed regularly during monthly meetings. Finally, local health officers need to be empowered for these matters.

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CAUSAL RELATIONSHIP BETWEEN HEALTH PROMOTING BEHAVIOR AND QUALITY OF LIFE IN CERVICAL CANCER PATIENTS UNDERGOING RADIOTHERAPY

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THE purpose of this cross-sectional study was to examine the causal relationships among age, education, family income, and stage of carcinoma, perceived benefits, perceived barriers, perceived self-efficacy, health promoting behavior and quality of life in patients with cervical cancer. Pender's Health Promotion Model (1996) provided a guide for the conceptual framework of this study. Purposive sampling was employed to recruit 488 cervical cancer patients who were undergoing radiotherapy at seven public hospitals in five areas of Thailand. The instruments used in this study included a Personal Data Form, Cognitive perception Form, Health promoting behavior scale, the social support questionnaire and The Functional Assessment of Cancer Therapy General (FACT-G) form. The proposed model was tested and modified by the LISREL Program. The modified model adequately fitted with the data. The results demonstrate that health promoting behavior had a significant direct positive effect on quality of life (beta = 0.71, $p < 0.01$). Cognitive perceptual factors had a significant direct effect on health promoting behaviors ($P = 0.69$, $p < 0.01$). Social support had a significant direct effect on the cognitive perceptual factors ($P = 0.64$, $p < 0.01$), health promoting behavior (beta = 0.70, $p < 0.01$), and the quality of life (beta = 0.48, $p < 0.01$). Age and education did not have a significant total effect on the quality of life. Family income had a significant direct effect on cognitive perceptual factors (beta = 0.10, $p < 0.05$). The stage of cancer had a significant direct negative effect on cognitive perceptual factors (beta = -0.11, $p < 0.05$) and the quality of life (beta = -0.12, $p < 0.01$). The direct effect of the predictors on the quality of life indicated that cervical cancer patients with higher practice of health promoting behavior tended to have a higher quality of life. The findings indicate that Pender's Health Promotion Model is a useful guide for explaining and predicting the health promoting behavior and the quality of life of Thai cervical cancer patients who were undergoing radiotherapy. The significance of cognitive perceptual factors and social support confirm health promoting behavior as a goal directed towards the level of well being. This has implications for health care systems in planning interventions to promote health promoting behavior in a health promotion setting in cervical cancer patients for a better quality of life and healthy. A longitudinal study and experimental study are recommended for further study.

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EPITOPE MAPPING OF MONOCLONAL ANTIBODIES SPECIFIC TO SEROVARS OF *LEPTOSPIRA*, USING PHAGE DISPLAY TECHNIQUE

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RANDOM heptapeptide library displayed by bacteriophage T7 was used to characterized epitopes of the monoclonal antibodies (mAb) clone F11, F20, F21, 2C3D4, and 8C6C4A12, which specific to serovar *L. australis*, *L. bratislava*, and *L. bangkok*, respectively. Phage selected by biopanning was cloned by plaque isolation, and the binding specificity of individual clones was confirmed by enzyme-linked immunosorbent assay, before further amplified and checked for phage peptide sequence using PCR and DNA sequencing. Interestingly, in phage reacting with the mAb clone F11, F20, 2C3D4, and 8C6C4A12, the deduced amino acid sequence of the displayed peptides was corresponded to a segment of hypothetical protein of *Leptospira* genome (*L. interrogans* serovar Lai and Copenhageni). Considering the deduced amino acid sequences of phage reacting with the mAb clone F11, F20, 2C3D4, and 8C6C4A12, the consensus motif -SKSSRC-, -TLINIF-, -SSKSYR- and -CTPKKSGRC- appeared respectively. No similarity was observed among phage reacting with the mAb clone F21. The results demonstrate that T7 phage display technique has potential for display of peptides and for rapid analysis of the interactions between these peptides with the mAb antibodies.

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ECOLOGICAL SURVEY OF BRACKISH-WATER SNAILS AND THEIR PARASITIC TREMATODES IN TIDAL FLATS IN JAPAN AND THAILAND

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MANY kinds of snails inhabit tidal flats in the temperate and tropical zones. In Japan, however, tidal flats were decreased rapidly in this half century, moreover polluted by various wastes.

So the decrease of abundance and number of species of snails leads to serious damage to their parasitic trematodes. In Thailand shrimp farms have been developed immensely during the past decades. These developments have had adverse impacts on water resources and mangrove forests, and hence some species in them have also been disturbed and may be extinct, including brackish-water snails. In order to clarify the situations of snails and trematodes in west Pacific Ocean we have conducted this survey in Japan and Thailand. Forty-one tidal flats were surveyed in western Japan and 13 types of cercaria of parasitic trematodes were found from 12 species of snails. The diversity of snails in tidal flat was highest on Iriomote Island (south end of Japan) and that of cercaria was also highest on the same island. The sites of high infection rates of snails to cercariae were scattered in Japan, i.e., the Urauchi River on Iriomote Is. (76.9% in *Cerithidea cingulata*), the Doki River (69.1 % in *Cerithidea rhizophorarum*) and Bishamon (45 % in *Batillaria cumingii*). In Thailand snails were collected at 21 places in tidal flats and mangrove forests along the eastern coast. Twenty-two snail species were examined and 7 types of cercariae were found from only 7 snail species. The sites with high infection rates of snails were Ban Klong Klaeng (TH 17) (100 % in *Cerithidea cingulata*), Ban Tanon Sung (TH 20) (90.5 % in *Cerithidea djadjariensis*), and Khuk Khi Kai (TH 22) (57.5 % in *Cerithidea djadjariensis*). The common snails in Japan and Thailand were only two, however, 4 types of cercaria out of 13 in Japan and 7 in Thailand were common. We also present some ecologically interesting results such as host selection of trematodes.

From these results the habitats with the high diversity both in snails and trematodes were extremely restricted in Japan and Thailand. Although the environmental conditions of the tidal flats are growing worse in Japan, they are thought to be deteriorating more than expected in Thailand. The improvement of environmental conditions in the tidal flats and mangrove forests are required in order to protect the snail-parasite community in west Pacific Ocean.

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MUTATIONS IN THE *RPOB* GENE OF THE RIFAMPICIN-RESISTANT *MYCOBACTERIA* STRAINS FROM THAILAND

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RIFAMPICIN (RIF) is the main drug for the treatment of tuberculosis and leprosy, and the Rifampicin derivative namely Rifabutin, is the main drug for the treatment of *M. avium* Complex (MAC). Here we reported forms of mutation never before described in the *rpoB* gene for samples of 70 rifampicin-resistant (RIF^r) *M. tuberculosis* (MTB), 20 (MAC) and 9 *M. leprae* strains from Thailand. Sequence analysis of these strains revealed mutations in a 435 bp region of the *rpoB* gene (MTB), 542 bp (*M. avium*) and 289 bp (*M. leprae*). Among 70 MTB, twenty-eight strains (40.0%) had single mutations, and 26 of those strains had mutations at positions never before reported. Of those 26, just one had a substitution at Val-432 (Asp), and the remaining 25, a silent mutation at Gln-517. All other strains had multiple mutations. Twenty-four (34.3%) had mutations at two positions; nine (12.8%), at three positions; two (2.8%), at five positions; and one (1.4%), at six positions. Five strains (7.1%), reported to have the RIF^r phenotype, contained no mutation in the examined region of the *rpoB* gene. Surprisingly, one RIF^r strain had silent mutations at twenty-nine positions. By far the dominant mutation was the silent mutations at Gln-517 (85.7% of strains). Among 20 MAC, 1 strain (5%) has missense mutation at Lys-626 (Thr), 5 strains (25%) had silent mutations at only one position, 7 (35%) at two, 7 (35%) at three, and 1 (5%) at seven positions. The dominant mutation was silent mutations at Ala-630 (15, 75% of strains), followed by Val-581 in 8 strains (40%), Tyr-578 and Thr-600 in 4 strains (20%), and Gly-597 in 3 strains (15%). Among 9 *M. leprae*, two of the nine had mutations at 2 positions (codons); three, at 3 positions; one, at 6 positions; one, at 7 positions; one, at 8 positions, and one, at 9 positions. point mutations at the Glu-546 (Lys) and His-554 (Asn) positions predominated. Mutations at both of these positions occurred 3 times (8.3%). For two other positions, Val-550 (Met) and Gly-556 (Arg), mutations occurred two times (5.5%); and for the remaining codon positions, only once. This investigation demonstrates that mutation in the *rpoB* gene of *Mycobacteria* strains from Thailand are more varied than previously reported for RIF^r of *Mycobacteria* strains. Screening by means of PCR-SSCP clearly separated RIF^r strains from rifampicin-susceptible (RIF^s) strains.

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SEROEPIDEMIOLOGICAL INVESTIGATIONS OF HUMAN AND ANIMAL LEPTOSPIROSIS IN A RURAL COMMUNITY, NAKHON RATCHASIMA, NORTHEASTERN THAILAND

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BACKGROUND: According to hospital-based data, reported cases of leptospirosis in Thailand increased dramatically during the years 1998-2002. Community-based information of human and animal leptospiral infections in the same area has never been investigated in Thailand. The objective of this study was to determine the seroprevalance and incidence of human leptospiral infections and the prevalence of animal leptospirosis in an endemic area of Nakhon Ratchasima, northeastern Thailand.

Methods: A follow-up study was conducted in Prathai and Chum Phuang districts, Nakhon Ratchasima, with 2,207 villagers aged 18-70 years. The majority of the respondents were involved in agricultural occupations. In 2004, venipuncture was performed among the participants every three months, during March, June, September, and December for microscopic agglutination test (MAT) with 24 serovars of *Leptospira interrogans*, to determine *Leptospira* infection; a MAT titre of 1:100 or over was considered seropositive. Serological surveys using a MAT titre cut-off point of 1:50, and urine cultures for leptospires, were performed in buffaloes, cattle, pigs, and dogs, with 100 animals in each group. Leptospiral infections in rodents were detected by cultivations of leptospires from the kidneys of 1,126 trapped rodents with serological testing by MAT, simultaneously with human surveys in the study area.

Results: The prevalence rates of human leptospiral infections from the four surveys were 31.7, 28.3, 38.5, and 48.9/1,000 population, respectively, and the cumulative incidences were 10.8, 11.5, and 16.3/1,000 population for the second to fourth surveys. The incidence rate was 35.5 cases per 100,000 person-years. Among 280 seropositive persons, 62.9% were males and 37.1% were females, with ages ranging between 18-68 years and an average of 46.6 years. The predominant (97.1%) leptospiral infection in seropositive humans was *Leptospira interrogans* serovar Bratislava, which was also found in dogs and pigs, at rates of 5.7 and 3.0%, respectively. The serovars found in buffaloes and cattle

were pomona, ranarum, sarmin, sejroe, shermani, and tarassovi. *Leptospira interrogans* was found in 10/1,126 (0.9%) rodent samples. The predominant serogroup isolated from rodents was Autumnalis, and only one isolated sample was Pyrogenes.

Conclusions: The results revealed that in this endemic area, transmission of subclinical leptospirosis in the general population occurred throughout the year. The main serovar found in humans was Bratislava, which was also found in dogs and pigs in the same community. Urine cultures, for isolating serovars from dogs, pigs and other animals, are being processed to identify and confirm the maintenance hosts of leptospires in this endemic community. These results will be useful for preventing and controlling leptospirosis.

Presented at: 4th International Leptospirosis Society (ILS) Scientific Meeting 2005, Chiang Mai, Thailand. 14-16 Nov 2005.

MIMOTOPE IDENTIFICATION FROM MONOCLONAL ANTIBODIES SPECIFIC TO SEROVAR OF LEPTOSPIRA, USING PHAGE-DISPLAYED RANDOM PEPTIDE LIBRARY

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METHODS: Random heptapeptide library displayed by bacteriophage T7 was used to identify mimotopes from phages bound to fifteen monoclonal antibodies (mAbs) that specific to different serovar of *Leptospira spp.*, and four leptospirosis patient sera respectively. Phage selected by biopanning was cloned by plaque isolation, and the binding specificity of individual clones was confirmed by enzyme-linked immunosorbent assay, before further amplified and checked for phage peptide sequence using PCR and DNA sequencing. The obtained sequences were compared with the protein sequences database of Gene Bank using BLASTP software.

Results: Considering the peptide sequences of phages bound to fifteen mAbs and four leptospirosis patient sera, the consensus motif -LTPCD was predominantly found in 38 out of 132 phage clones (29%), followed by -TPCSK- found in 17/132 phage clones (13%), -KSKKSS- 6/132 (4.5%), -SSKSYR- 5/132 (3.8%), -KSGRC- 4/132 (3%), and -TUN/F3/132 (2.3%), appeared respectively. Interestingly, these finding displayed peptides sequence (mimotope) were corresponded to a segment of hypothetical protein LA0620 of *Leptospira interrogans* serovar Lai, or hypothetical protein UC10450

of *Leptospira interrogans* serovar Copenhageni stt. Fiocruz. No similarity was observed among phage reacting with the mAb clone LF9.

Conclusion: The results demonstrate that most of our finding mimotopes were linear or continuous, and corresponded to a segment of hypothetical protein of *Leptospira interrogans*. Phage display technique has potential for rapid identification of phages mimotope that interact with the leptospiral mAbs and patients sera. The finding consensus mimotopes -LTPCD-, -TPCSK-, and -RSKRIR- from phages that bound to protective mAbs, can be further tested to use as immunogen against leptospirosis in the future.

Presented at: 4th International Leptospirosis Society (ILS) Scientific Meeting 2005, Chiang Mai, Thailand. 14-16 Nov 2005.

PRODUCTION AND CHARACTERIZATION OF MONOCLONAL ANTIBODY SPECIFIC TO LEPTOSPIRAL FLAGELLIN

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BACKGROUND: Leptospiral flagellin (FlaB) has been reported as a highly conserved protein among pathogenic *Leptospira spp.* Sequence alignment revealed sequence homology in the central region. FlaB was included in a group of protein antigens that were targeted to humoral immune response during natural infection. Substantial production of anti-FlaB antibodies was observed among the positive cases of MAT test. In this study, leptospiral FlaB specific MAb has been produced and characterized. The MAb will be further investigated for its role in protective immunity against leptospiral infection.

Methods: FlaB specific MAb was produced from immunizing BALB/c mice with the whole cell antigen prepared from *L. interrogans* serovar Cynopteri. The specificity of the MAb was tested by and indirect enzyme link immunosorbent assay (ELISA) and microscope agglutination test (MAT) using panel of antigens prepared from 20 pathogenic, a saprophytic leptospires and 9 other bacterial genera. The isotype identification and the MW of the specific antigen were determined by the ELISA method and immunoblotting respectively. The biochemical nature of the specific antigen was analyzed by immunoblotting using the antigen prepared from serovar Cynopteri which had been

Results: Leptospiral FlaB specific monoclonal antibody, 7A5F12; IgG2b, was produced. Indirect ELISA

and MAT using the panel antigens showed that MAb 7A5F12 reacted with 15 serovars of pathogenic *L. illterrogalls* which were Bangkok, Bratislava, Louisiana, Ballum, Bataviae, Canicola, Cdlidoni, Cynopteri, Djasiman, Grippytyphosa, Hebdomadis, Sarmin, Javanica, Sejroe, and Tarassovi, but reacted with neither nonpathogenic *Leptospira* nor other bacterial genera. Western blot staining of whole cell antigens prepared from serovar Cynopteri or the partial purified recombinant-leptospiroflaB revealed recognition of MAb to the antigen at MW 37 kDa. The band of specific reactivity was disappeared when using the same antigen treated with protease K but still remained for the same antigen treated with sodium meraperiodate. Identification of the specific epitope of MAb and the corresponding region on the FlaB sequence will be further discussed.

Conclusion: The MAb specific to leptospiral FlaB was produced. This MAb showed cross reactivity with 15 serovars of *L. illterrogalls* but not nonpathogenic *Leptospira* or other bacterial genera. Specific reactivity with recombinant leptospiral FlaB confirmed the identity of the specific target antigen of this MAb. According to its broad specificity across FlaB of many leptospiral serovars, this MAb may have a broadly protective role against leptospiral infection, and this suspected capability will be further investigated.

Presented at: 4th International Leptospirosis Society (ILS) Scientific Meeting 2005, Chiang Mai, Thailand. 14-16 Nov 2005.

RAPID QUANTIFICATION OF AN AEROSOL *LEGIONELLA* SPP. USING THE COMBINATION OF AIR SAMPLING AND REAL TIME POLYMERASE CHAIN REACTION TECHNIQUES

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OBJECTIVES: To develop and optimize the combined method of air sampling and real time polymerase chain reaction (Real-time PCR) for quantification detection of an aerosol *Legionella* spp.

Methods: Based on the 5S rRNA gene primers, and TaqMan hydrolysis probe were constructed for a real time PCR assay using the detection system (Rotor Gene 2000 detector) and dual labeled fluorescent probe. The specificity of primers and probe were evaluated by nine non *Legionella* airborne bacteria to avoid the false positive results. The impinger air sampler plus T-100 sampling pump (rotary vane) was used to collect air sample with flow rate 25 liters per min for 20 min. The developed method will be validated and applied for

detection aerosols *Legionella* from the exhausted air of positive result cooling tower water using the culture as the gold standard method.

Result: The detection limit of quantification detection of aerosol *Legionella* using the combination of air sampling and real time PCR was at least 10 fg of *Legionella* DNA which corresponding to 10 *Legionella* cells (1 *Legionella* genome = 4.3 fg). The developed method was enabled detection of aerosols *Legionella* in less than 4 hours compare with 4-7 days using culture base method.

Conclusion: The developed method was quantitative, sensitive, specific and rapid for the detection of an aerosol *Legionella* spp. within 4 hours, in contrast to the traditional culture method, which required a minimum of 5 days. This approach could be further apply to study the expulsion of infectious particle and may permit assessment studies of airborne environmental control.

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MUTATIONS IN THE *RPOB* GENE OF THE RIFAMPICIN-RESISTANT *MYCOBACTERIA* STRAINS FROM THAILAND

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RIFAMPICIN (RIF) is the main drug for the treatment of tuberculosis and leprosy, and the Rifampicin derivative namely Rifabutin, is the main drug for the treatment of *M. avium* Complex (MAC). Here we reported forms of mutation never before described in the *rpoB* gene for samples of 70 rifampicin-resistant (RIF^r) *M. tuberculosis* (MTB), 20 (MAC) and 9 *M. leprae* strains from Thailand. Sequence analysis of these strains revealed mutations in a 435 bp region of the *rpoB* gene (MTB), 542 bp (*M. avium*) and 289 bp (*M. leprae*). Among 70 MTB, twenty-eight strains (40.0%) had single mutations, and 26 of those strains had mutations at positions never before reported. Of those 26, just one had a substitution at Val-432 (Asp), and the remaining 25, a silent mutation at Gln-517. All other strains had multiple mutations. Twenty-four (34.3%) had mutations at two positions; nine (12.8%), at three positions; two (2.8%), at five positions; and one (1.4%), at six positions. Five strains (7.1%), reported to have the RIF^r phenotype, contained no mutation in the examined region of the *rpoB* gene. Surprisingly, one RIF^r strain had silent mutations at twenty-nine positions. By far the dominant mutation was the silent

mutations at Gln-517 (85.7% of strains). Among 20 MAC, 1 strain (5%) has missense mutation at Lys-626 (Thr), 5 strains (25%) had silent mutations at only one position, 7 (35%) at two, 7 (35%) at three, and 1 (5%) at seven positions. The dominant mutation was silent mutations at Ala630 (15, 75% of strains), followed by Val-581 in 8 strains (40%), Tyr-578 and Thr-600 in 4 strains (20%), and Gly-597 in 3 strains (15%). Among 9 *M. leprae*, two of the nine had mutations at 2 positions (codons); three, at 3 positions; one, at 6 positions; one, at 7 positions; one, at 8 positions, and one, at 9 positions. Point mutations at the Glu-546 (Lys) and His-554 (Asn) positions predominated. Mutations at both of these positions occurred 3 times (8.3%). For two other positions, Val-550 (Met) and Gly-556 (Arg), mutations occurred two times (5.5%); and for the remaining codon positions, only once. This investigation demonstrates that mutation in the *rpoB* gene of *Mycobacteria* strains from Thailand are more varied than previously reported for RIF^r of *Mycobacteria* strains. Screening by means of PCR-SSCP clearly separated RIF^r strains from rifampicin-susceptible (RIF^s) strains.

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GENES MUTATIONS OF DRUG-RESISTANT, (ISONIAZIDR AND FLUOROQUINOLONER), MYCOBACTERIUM TUBERCULOSIS FROM TB PATIENTS IN THAILAND

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THE main mechanism of drug resistant *Mycobacterium tuberculosis* that falling in to mutations in specific genes, altering in drug target enzyme, have been frequently reported. By this mechanism, several molecular techniques have been used to verify these mutations. For the rapidity and simplest of molecular techniques, in present study, the mutations in *gyrA*, *gyrB*, (drug target of FQ^r-MTB) *katG*, and *inhA* genes (drug target for INH^r-MTB) of MDR-TB isolates have been studied by PCR-DNA sequencing. For FQ^r, 92 isolates of FQ^r-MTB were studied and the result shown that 70 of 92 (76.08%) exhibited single-point mutations in different positions, at Asp94 (Gly/Ala/His/Asn) (42.39%), Ala90Val (20.65%), Ser91Pro (9.78%), Gly88 (Cys/Ala) (2.17%), in *gyrA* QRDR and one isolates (1.09%) with Asp495Asn mutation in the *gyrB* QRDR. The other 22 FQ^r-MTB isolates (23.91%) had no mutation. For INH^r, 29 isolates of INH^r-MTB were studied. Single point mutations at one or two

positions of *katG* gene were found (both Ser315Thr and Arg463Leu, 58.6%, only Arg463Leu, 34.5%, only Ser315Thr, 3.4%, Thr308Pro, 3.4%). Accordingly, 9 of 29 isolates were identified as mutants in *inhA* promoter and *inhA*-ORF, of which 5 isolates found Cytosine → Thymine mutation at position -15 (17.2%), 1 isolate found Thymine → Cytosine mutation at upstream position -8 (3.4%), 1 isolate found Cytosine → Thymine mutation at position -15 plus mutation at Ile21Thr (3.4%), 1 isolate found Cytosine → Thymine mutation at position -15 plus Ser94Ala (3.4%), and 1 isolate with Ile21Val (3.4%), whereas 20 isolates (69%) had no mutation at any position. Furthermore, it was found that mutation position at Trp308Pro in *katG* gene and Thymine → Cytosine at position -8 of *inhA* gene is firstly reported here.

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THAILAND TSUNAMI HEALTH IMPACT STUDY

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TSUNAMIGENIC earthquakes shook 8.9 Richter-scale off the coast of Northern Sumatra on 26 December 2004 triggered one of the most human disaster in recent history. It was calculated that a total of 41,509 sq. km. of land were destructed in seven affected countries and found approximately 200,000 deaths. In Thailand, there were SLX provinces received impacts causing 5,313 deaths and 8,457 injured. Only in Phang-Nga Province, was estimated a major damage its infrastructure, land and human lives where there were 4,190 populations killed and 5,597 injured, and 1,865 have been missing. The scope of displaced people as a result of the tsunami was massive; approximately more than 25,000 and possibly many more people had to move as a result of the tsunami. Significant number of 2,474 cases was reported for communicable diseases such as diarrhea, respiratory, dengue, melioidosis after the tsunami attack. Ministry of Public Health reported a significant increased number of psychological problems, load of people suffering from anxiety and stress. In this regard the tsunami brought a range of problems including high levels of salinity in the surface and well water. The Faculty of Tropical Medicine, Mahidol University launched a field survey in Takuapa District, Phang-Nga province in February 2005 with teams of

vector-borne disease, water quality, health behavior and nutrition, dengue mosquito, helminthology, and snail intermediate host. Tsunami has highlighted the vulnerability of groups such as women, children and elderly, much more attention should be given to protecting and improving sanitation, maternal care, vector-borne disease transmission, health education, and food intakes.

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PRELIMINARY WATER QUALITY SURVEY AFTER TSUNAMI IN PHANG-NGA, THAILAND

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THIS preliminary water quality survey was performed at the eight weeks after the tsunami attack in Phang-Nga province on December 26, 2004. Water samples collected from the affected area where 10 km parallel along the seaside were compared with water samples from the control area where approximately four km from the seaside which tsunami waves could not reach. These samples included 18 surface water samples, 37 well water samples and 8 drinking water samples that were examined for microbiology and physical-chemical properties. Microbiological examination was focused on enteric bacteria which were isolated from culture method, while physical-chemical properties were on-site testing for pH, salinity, dissolved oxygen (DO), conductivity and total dissolved solids (TDS) by a portable electrochemical meter (Sens Ion 156). Results from microbiological examination showed that water samples in the affected area were contaminated with enteric bacteria more than that in the control area: 45.45% of surface water samples in the affected area and 40.00% in the control area, 19.05% of well water samples in the affected area and 7.69% in the control area. All eight drinking water samples were clear from enteric bacteria. Tests of physical-chemical properties showed that salinity, pH, conductivity, and TDS of surface water samples from the affected area were significantly higher than the control area. Salinity, conductivity, and TDS of well water samples from the affected area were also significantly greater than those from the control area. Surface water and well water in the Tsunami affected area have been greatly changed and need to be improved.

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MALACOLOGICAL SURVEY IN PHANG-NGA PROVINCE, SOUTHERN THAILAND, PRE- AND POST INDIAN OCEAN TSUNAMI

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THREE malacological surveys were conducted in the Takua Pa District of Phang-nga Province, southern Thailand, before and after the Indian Ocean tsunami disaster. Twenty nine species of fresh- and brackish-water snails were found, in which 10 species of freshwater snails were present, including live *Pila polita*; 8 species were of medical importance. Two brackish-water snails, *Nerita anieulata* and *Littorinopsis sea bra*, were absent after the tsunami disaster, while brackish-water *Cerithidea eingulata* and *C. djadjariensis* harbored 9 types of trematode cercariae.

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HEALTH BEHAVIOR OF TSUNAMI VICTIMS IN PHANG-NGA PROVINCE, THAILAND

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THE health behaviors of 250 tsunami victims in Phang-nga Province were surveyed three months after the disaster struck. Questionnaires and non-participant observation were used to study the effects of the disaster on their lifestyles and health behaviors, and the effects of environmental change, which included sanitation, personal hygiene, illness and prophylaxis, and local health care and promotion while residing in temporary shelters provided by government and private donors. Our findings indicated good management of drinking water in the temporary shelters. Toilet construction and water supply were sufficient, but wastewater and sewage systems were poorly managed. Most of the study group complained of back pain, stress, and sleep disturbance. A local hospital and health stations provided medical care. Health

Oral Presentation in: *Joint International Tropical Medicine Meeting 2005. 30 Nov – 2 Dec 2005.*

EPIDEMIOLOGICAL SURVEILLANCE OF NON-FATAL-UNINTENTIONAL INJURY AMONG CHILDREN UNDER FIVE YEARS OLD IN TAMBON AMPANG, AMPHOR BAN PAEW, SAMUT SAKHON PROVINCE, THAILAND

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BY the year 2015, all UN Member States including Thailand have pledged to meet the Millennium Development Goals in reducing by two thirds the mortality rate among children under five and ensuring safe environment for children. We want to assess if morbidity of childhood injury in a pilot province would reflect a cause of death in another parallel study. Epidemiological monthly surveillance of non-fatal unintentional injury among 248 children under five was conducted in seven villages of Ampang District, Samut Sakhon Province using questionnaires with face-to-face interview. Key informants were either parents or relatives or teachers who took care of the children. Data collection was conducted through a parent-teacher network of a local day care center and the village health volunteers. Preliminary study of injury during the six month follow up among the target population showed that 52% of the study samples were boys~ Major causes of injury accounted for was falls, mild to moderate degrees, during walking and running (74.7%) followed by injury relating to toys (00.5%), poisoning (9%) and others (6%: burn, traffic, drowning). Location of injury occurred mostly in the indoor setting (68%). Time at which injury happened the most was during noon-afternoon (62.8%) followed by in the evening (22.6%), morning (01.9%) and at night (2~7%). At the time of injury, most children were under the care of their grand parents (43.3%), followed by parents (09%) and relatives.

Preliminary data collected from this study on types, major causes, location and time of injury among children under five in Samut Sakhon province can be used as baseline information for planning towards prevention and control policy in reducing childhood injury rates and promoting a safer environment for children. It can also be used to validate if such injuries among children under five would be leading causes of death in this locality. Cause specific cumulative incidence rates by age and sex on major types of injury and effect association analysis on key risk factors are undertaken.

Oral Presentation in: *Joint International Tropical Medicine Meeting 2005. 30 Nov – 2 Dec 2005.*

CYCLOSPORA INFECTION IN HEALTHY BOY AT THAI-MYANMAR BORDER

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WE report a case of a healthy boy, from the Thai-Myanmar border, infected with *Cyclospora*. Stool concentration and modified acid-fast stain were performed. Round organisms, size 7-8 μm, pink color, compatible with unpopulated *Cyclospora* oocysts, were found. *Cyclospora* infection can be found in both competent and immunocompromised hosts, with less severe symptoms in the former group. Good personal hygiene and sanitation are important for preventing transmission of this infection.

Poster Presentation in: *Joint International Tropical Medicine Meeting 2005. 30 Nov – 2 Dec 2005.*

CAUSAL RELATIONSHIP BETWEEN HEALTH PROMOTING BEHAVIOR AND QUALITY OF LIFE IN CERVICAL CANCER PATIENTS UNDERGOING RADIOTHERAPY

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THE purpose of this cross-sectional study was to examine the causal relationships among age, education, family income, and stage of carcinoma, perceived benefits, perceived barriers, perceived self-efficacy, health promoting behavior and quality of life in patients with cervical cancer. Pender's Health Promotion Model (1996) provided a guide for the conceptual framework of this study. Purposive sampling was employed to recruit 488 cervical cancer patients who were undergoing radiotherapy at seven public hospitals in five areas of Thailand. The instruments used in this study included personal data form, cognitive perception form, health promoting behavior scale, the social support questionnaire and the Functional Assessment of Cancer Therapy General (FACT-G) form. The proposed model was tested and modified by the LISREL Program. The modified model adequately fitted with the data and accounted for 63%. The results demonstrate that health promoting

behavior had a significant direct positive effect on quality of life ($\beta=0.71$, $p<0.01$). Cognitive perceptual factors had a significant direct effect on health promoting behaviors ($\beta=0.69$, $p<0.01$). Social support had a significant direct effect on the cognitive perceptual factors ($\beta=0.64$, $p<0.01$), health promoting behavior ($\beta=0.70$, $p<0.01$), and the quality of life ($\beta=0.48$, $p<0.01$). Age and education did not have a significant total effect on the quality of life. Family income had a significant direct effect on cognitive perceptual factors ($\beta=0.10$, $p<0.05$). The stage of cancer had significant direct negative effect on cognitive perceptual factors ($\beta=-0.11$, $p<0.05$) and the quality of life ($\beta=-0.12$, $p<0.01$). The direct effect of the predictors on the quality of life indicated that cervical cancer patients with higher practice of health promoting behavior tended to have a higher quality of life.

The findings indicate that Pender's Health Promotion Model is a usual guide for explaining and predicting the health promoting behavior and the quality of life of Thai cervical cancer patients who were undergoing radiotherapy. The significance of cognitive perceptual factors and social support confirm health promoting behavior as a goal directs toward the level of well being. That have implications for health care systems in planning interventions to promote health promoting behavior, in a health promotion setting in cervical cancer patients for a better quality of life and healthy. A longitudinal study and experimental study are recommended for further study.

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Poster Presentation in: *Joint International Tropical Medicine Meeting 2005.30 Nov - 2 Dec 2005.*

A RANDOMIZED TRIAL OF ARTEMETHER-LUMEFANTRINE VERSUS MEFLOQUINE-ARTESUNATE FOR THE TREATMENT OF UNCOMPLICATED MULTI-DRUG RESISTANT *PLASMODIUM FALCIPARUM* ON THE WESTERN BORDER OF THAILAND

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BACKGROUND: The use of antimalarial drug combinations with artemisinin derivatives is recommended to overcome drug resistance in *Plasmodium falciparum*. The fixed combination of oral artemether-lumefantrine, an artemisinin combination therapy (ACT) is highly effective and well tolerated. It

is the only registered fixed combination containing an artemisinin. The trial presented here was conducted to monitor the efficacy of the six-dose regimen of artemether-lumefantrine (ALN) in an area of multi-drug resistance, along the Thai-Myanmar border.

Methods: The trial was an open-label, two-arm, randomized study comparing artemether-lumefantrine and mefloquine-artesunate for the treatment of uncomplicated falciparum malaria with 42 days of follow up. Parasite genotyping by polymerase chain reaction (PCR) was used to distinguish recrudescence from newly acquired *P. falciparum* infections. The PCR adjusted cure rates were evaluated by survival analysis.

Results: In 2001-2002 a total of 490 patients with slide confirmed uncomplicated *P. falciparum* malaria were randomly assigned to receive artemether-lumefantrine ($n=245$) or artesunate and mefloquine ($n=245$) and were followed for 42 days. All patients had rapid initial clinical and parasitological responses. In both groups, the PCR adjusted cure rates by day 42 were high: 98.8% (95% CI 96.4, 99.6%) for artemether-lumefantrine and 96.3% (95% CI 93.1, 98.0%) for artesunate-mefloquine. Both regimens were very well tolerated with no serious adverse events observed attributable to either combination.

Conclusion: Overall, this study confirms that these two artemisinin-based combinations remain highly effective and result in equivalent therapeutic responses in the treatment of highly drug-resistant *falciparum* malaria.

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BEYOND DEWORMING

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No abstract available

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CHRONICLE OF MALARIA EPIDEMICS IN THAILAND, 1980-2000

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THE occurrence of malaria epidemics in Thailand was reviewed from the malaria surveillance report of the National Malaria Control Program. The literature review revealed that the four epidemic periods recorded during 1980-2000 almost always occurred in the provinces and districts located along international borders. Malaria epidemics are caused by

various factors such as: extensive population movement, multi-drug resistance development, low immune status of the population, lack of knowledge and appropriate personal protection against mosquito biting, and the re-emergence of malaria transmission in low malarious areas. Such factors can lead to changes in the parasite ratio and appearance of malaria epidemics throughout the country. Evidence related to the burden of malaria epidemics was also reviewed to identify causal factors that will be helpful in future research.

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FACTORS ASSOCIATED WITH OBESITY AMONG WORKERS IN A METROPOLITAN WATERWORKS AUTHORITY

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TO examine the relationship of socio-demographic characteristics, psychological factors, knowledge, attitude and behavior towards obesity among Metropolitan Waterworks Authority (MWWA) officers, a cross-sectional study was conducted between July and September, 2004. Two hundred and eighty-eight obese [body mass index (BMI) > or = 25 kg/m²] and 106 non-obese persons, aged 20-60 years, were recruited as study subjects. Data were collected by a self-administered questionnaire, comprised of three parts: socio-demographic; psychological factors (depression and stress); and knowledge, attitude, behavior related to obesity. Univariate analyses and Logistic regression models were used to study the association between obesity and possible risk factors. The results demonstrate significant associations between older age and obesity. Volunteers in the age groups of 40-49 and 50-59 years had a significantly higher risk of being obese than the age group of less than 40 years (adjusted OR = 3.4, 95% CI = 1.1-11.1 and adjusted OR = 10.4, 95% CI = 3.3-32.7, respectively). Volunteers with unhealthy behaviors were at significantly higher risk than those with healthy behaviors (adjusted OR = 10.3, 95% CI = 2.0-52.4) while persons with moderately healthy behaviors also had increased risk, but to a lesser extent (adjusted OR = 4.5, 95% CI = 1.7-11.4). There were no associations between psychological factors and obesity in this group of volunteers. When we focused on whether they consumed more food when they were stressed, it was found that the obese consumed significantly more food during stress (p-value = 0.003). Watching television, videos, or playing computer continuously for more than 3 hours, were significantly associated

with obesity. We conclude that although the obese have a good knowledge and attitude towards obesity, they still practise unhealthy behavior, have a sedentary lifestyle, and over eat when they are stressed. Future research regarding behavioral modification should be implemented at both community and country levels.

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IKONOS-DERIVED MALARIA TRANSMISSION RISK IN NORTHWESTERN THAILAND

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WE mapped overall malaria cases and located each field observed major malaria vector breeding habitat using Global Positioning System (GPS) instruments from September 2000 to October 2003 around the three malaria-endemic villages of Ban Khun Huay, Ban Pa Dae, and Ban Tham Seau, Mae Sod district, Tak Province, Thailand. The land-use/land-cover classifications of the three villages and surrounding areas were performed on IKONOS satellite images acquired on 12 November 2001 with a spatial resolution of 1 x 1 m. Stream network was delineated and displayed. Proximity analysis was performed on the locations of the houses with and without malaria cases within a 1.5 km buffer from *An. minimus* immature mosquito breeding habitats, mainly stream margins. The 1.5 km used in our proximity analysis was arbitrarily estimated based on the *An. minimus* flight range. A statistical t-test at 5% significance level was performed to evaluate whether houses with malaria cases have higher proximities to streams than houses without malaria cases. The result shows no significant difference between proximity to streams between houses with malaria cases and houses without malaria cases. We suspect that the actual flight range of *An. minimus* may be greater than 1.5 km. The *An. minimus* larval habitat deserves more detailed investigation. Further studies on human behavior contrary to that required for adequate malaria control among these three villages are also recommended.

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WATER QUALITY AND BREEDING HABITATS OF ANOPHELINE MOSQUITO IN NORTHWESTERN THAILAND

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MALARIA transmission is dependent upon many hydrology-driven ecological factors that directly affect the vectorial competence, including the presence of suitable habitats for the development of anopheline larvae. Larval habitats were identified and characterized at three malaria endemic villages (Ban Khun Huay, Ban Pa Dae, and Ban Tham Seau) in Mae Sot district, Tak Province, in northwestern Thailand between July 2002 and June 2003. The Global Positioning System (GPS) was used to provide precise locational data for the spatial distribution of anopheline mosquito larvae and their habitats. Ten habitat categories were identified. Eighteen adult *Anopheles* species were identified from larvae in all the surveyed habitats. *An. minimus* was the most common species throughout the year. The relationship between eight abiotic variables (temperature, hardness, carbon dioxide, dissolved oxygen, nitrate, phosphate, silica and pH) and the abundance of four major species of malaria vectors (*An. (Cel.) dirus*, *An. (Cel.) minimus*, *An. (Cel.) maculatus*, and *An. (Cel.) sawadwongporni*), and six species of non-vectors (*An. (Cel.) kochi*, *An. (Cel.) jamesii*, *An. (Ano.) peditaeniatus*, *An. (Ano.) barbirostris*, *An. (Ano.) campestris*, and *An. (Cel.) vagus*) larvae was investigated. The results from the multiple regression models suggest that hardness, water temperature and carbon dioxide are the best predictor variables associated with the abundance of *An. minimus* larvae ($p < 0.001$); water pH for *An. dirus* larvae ($p < 0.001$); temperature and pH for *An. kochi* larvae ($p < 0.01$); temperature and silica concentration for *An. jamesii* larvae ($p < 0.001$); dissolved oxygen and silica concentration for *An. campestris* larvae ($p < 0.001$); and pH and silica concentration for *An. vagus* larvae ($p < 0.001$). We could not identify key environmental variables for *An. maculatus*, *An. sawadwongporni*, *An. peditaeniatus*, and *An. barbirostris*.

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EPIDEMIOLOGY OF INTESTINAL PARASITIC INFECTIONS AMONG KAREN SCHOOL CHILDREN ON THE WESTERN BORDER OF THAILAND

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WE studied the stool samples of 701 school children from three primary schools near the Thai-Myanmar border, in Suanphung District, Ratchaburi, Thailand, to determine the prevalence and intensity of intestinal parasitic infections in August and September, 2005. The samples, 49.4% male and 50.6% female were examined using the Kato-Katz technique to detect helminth ova, and simple smear method to detect protozoa. The intensity of infection was categorized as light, moderate or heavy according to the thresholds set by the World Health Organization. The results revealed a helminth infection rate of 40.8%, while protozoa infections accounted for 26.4%, mixed infections were common, resulting in a total prevalence of both parasites of 55.1%. The most common infection was hookworm (24.5%) followed by trichuriasis (22.4%) and ascariasis (7.9%). The protozoal infections were *Entamoeba coli* (14.1%), *Giardia intestinalis* (8.4%), *Endolimax nana* (4.9%), *Entamoeba histolytica* (2.6%) and *Cyclospora cayetanensis* (0.1%). The prevalence rates of trichuriasis and ascariasis infection were significantly different among the three schools. Males were more frequently infected with hookworm (30.4%) than females (18.9%), but no significant difference in prevalence rates for both sexes were observed for whipworm and roundworm infections. The prevalence rates of hookworm tended to increase among the age group of 12-16 years (41.4%). Roundworm infections were more common among those aged <12 years, with the highest prevalence rate among children in the age group of 8-11 years (10.0%). Hookworm and trichuriasis infections among Karen children were significantly higher than Thai, and children from other ethnic groups ($p < 0.05$). More than 80% of individuals with hookworm and trichuriasis had light infections. Among those with ascariasis, 10.9 and 49.1%, had moderate and heavy infections, respectively. Heavy infections with ascariasis were frequently observed in children aged 4-7 years.

MALARIA REATMENT 2005: 1. TREATMENT OF SEVERE MALARIA

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THE treatment for uncomplicated malaria is aimed at producing a radical cure using the combination of (1) artesunate (4 mg/kg/day) plus mefloquine (8 mg/kg/day) for 3 days (2) a fixed dose of artemether and lumefantrine (20/120 mg tablet) named Coartem (4 tablets twice a day for three days for adults weighing more than 35 kg) (3) quinine 10 mg/kg 8-hourly plus tetracycline 250 mg 6-hourly for 7 days (or doxycycline 200 mg once a day for 7 days as an alternative to tetracycline) in patients aged 8 years and over (4) a combination of atovaquone and proguanil called "Malarone" (in adult, 4 tablets given daily x 3 days). In treating severe malaria, early diagnosis and early treatment with a potent antimalarial drug is recommended to save the patient's life. The antimalarial drugs of choice are (1) intravenous quinine loading dose 20 mg/kg i.v. drip in 2-4 hours followed by maintenance dose 10 mg/kg i.v. drip in 2 hour every 8 hours or (2) a parenteral form of an artemisinin derivative (2.1) artesunate i.v. 24 mg/kg at 0, 12, 24 hours then daily with the total dose of 12, 15 mg/kg or (2.2) artesunate suppository (5 mg/kg) given rectally 12 hourly for 3 days). Oral artemisinin derivatives (artesunate, artemether, dihydroartemisinin with the dose 4 mg/kg/day should replace parenteral forms when patients can tolerate oral medication to complete the total dose (12-15 mg/kg). Oral mefloquine (25 mg/kg divided into two doses 8 hrs apart) should be given at the end of the artemisinin treatment course to reduce recrudescence if the course of treatment is shorter than 7 days. Treatment of vivax malaria is chloroquine (30 mg/kg given in 3 days) followed by primaquine (0.3-0.5 mg/kg/day) for 14 days.

Presented in: *Joint International Tropical Medicine Meeting 2005. The Grand Hotel, Bangkok, Thailand 30 Nov.-2 Dec. 2005, p. 138.*

AZITHROMYCIN COMBINATION THERAPY WITH ARTESUNATE OR QUININE FOR THE TREATMENT OF UNCOMPLICATED FALCIPARUM MALARIA IN ADULTS. PROMISING RESULTS: FROM A RANDOMIZED PHASE 2 CLINICAL TRIAL IN THAILAND

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AZITHROMYCIN may have an important role as an antimalarial due to its safety in children and experience with use in pregnancy. The study was designed as a phase II open label, randomized 28-day inpatient study of acute, uncomplicated falciparum malaria, comparing the safety and efficacy of 2 azithromycin (AZ)-artesunate (AS) combinations with 2 AZ - quinine (QN) regimens in 100 adult patients: 1. Three days of AZ 750 mg BID + AS 100 mg BID 2. Three d of AZ 1000 mg QD + AS 200 mg QD 3. Three d of AZ 750 mg BID + QN 10 mg/kg BID 4. Three d of AZ 500 mg TID daily + QN 10 mg/kg TID. After completion of the first 50 subjects failure rates, PCT, and FCT were compared in a preliminary efficacy analysis. The presentation at the IFTM meeting will be based on the final study results. The 28-day cure rates for the 4 groups were 100 (95%CI: 71.5- 100), 100 (73.5-100), 72.7 (39.0-94.0), and 91.7% (61.5-99.8), respectively. No failures were seen in either of the artesunate arms, two RILIs and one RI failure in the BID quinine arm, and one RI in the TID quinine arm. With a mean PCT and FCT of 34±12 and 26±18 hours the artesunate combinations led to a significantly (P<0.001) faster clinical and parasitological improvement than the quinine arms (80±34 and 60±39 hours). Clinical treatment response was closely correlated with in vitro drug sensitivity data. No drug-related SAEs were seen and the drug combinations were well tolerated and safe. In conclusion, these data suggest that azithromycin-artesunate, even when given only once daily for 3 days, as well as azithromycin-quinine TID may be safe and highly efficacious combination treatments for uncomplicated falciparum malaria.

Presented at: *the XVth. International Congress for Tropical Medicine and Malaria. Marseille, France 11-15 Sep 2005; Abstract no. P027, page 136.*

ARTEMIFONE, A NEW ANTI-MALARIAL ARTEMISININ DERIVATIVE: OPEN PILOT TRIAL TO INVESTIGATE THE ANTIPARASITIC ACTIVITY OF BAY 44-9585 IN PATIENTS WITH UNCOMPLICATED *P. FALCIPARUM* MALARIA

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TO investigate the safety and efficacy of Artemifone, treatments of 80 mg per day for 3 days (Cohort A1) and 2 mg/kg body weight per day for 3 days (Cohort A2) were administered to patients with uncomplicated *P.falciparum* malaria. In Cohort A1 25 patients were enrolled and 62 patients will be enrolled in Cohort A2. Mefloquine 25 mg/kg body weight was added on day 3 to prevent recrudescence. The first 15 patients per cohort were randomized in a 2:1 fashion to Artesunate 4 mg/kg body weight plus Mefloquine on day 3. Pharmacokinetic profiles were performed in 5 patients in each cohort. Clinical assessments including parasitic counts were performed up to day 28 after start of treatment. Preliminary information: Artemifone at a dose of 2 mg/kg body weight appears to be safe and efficacious. The trial is still ongoing. Final results will be presented at the Congress. The study was supported by MMV, Geneva, Switzerland.

Presented at: *the XVIth. International Congress for Tropical Medicine and Malaria. Marseille, France 11-15 Sep 2005; Abstract no. P054, page 142.*

SERUM LEVELS OF DEHYDROEPIANDROSTERONE SULFATE AND INCREASED HEMOGLOBIN CONCENTRATIONS IN UNCOMPLICATED PLASMODIUM FALCIPARUM MALARIA COMPARED WITH SEVERE CASES, 28 DAYS MONITORING

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IT has been proposed that severe malarial anemia, a major cause of morbidity and mortality in endemic areas, is multifactor. Dehydroepiandrosterone (DHEA) and DHEA-sulfate (DHEAS), which are the most abundant hormones secreted by the adrenal cortex may be one of those factors. We examined the relationship between *Plasmodium falciparum* parasitemia,

hemoglobin (Hb) concentrations and serum DHEAS in Thai patients living along the Thai-Myanmar border. During 28 days of treatment, serum DHEAS and Hb levels were analyzed on day 0, day 7, day 14, day 21 and day 28 for monitoring the association. We found that, DHEAS levels were significantly associated with decreased parasite density, and also significantly associated with increased hemoglobin levels through 4 weeks of follow up, even after adjustment for other determinants of hemoglobin level. These findings support the hypothesis that DHEAS, an adrenal androgen which is low in childhood and rises with the development of secondary sexual characteristics, is necessary for resistance to malarial infection. Moreover, the physiological hormone DHEAS is a potent inhibitor of G6PD activity, and G6PD deficiency is known to exert antimalarial protection via enhanced opsonization and phagocytosis of rings, the early forms of the parasite. This study suggests that DHEAS should be analyzed in malaria patients and also be used as adjuvant therapy to stimulate red blood cell production in severe falciparum malaria patients.

Presented at: *the XVIth. International Congress for Tropical Medicine and Malaria. Marseille, France 11-15 Sep 2005; Abstract no. P406, page 221.*

EPIDEMIOLOGY OF HIV INFECTIONS AMONG SCREENED VOLUNTEERS PARTICIPATED IN AN HIV VACCINE PHASE III TRIAL, THAILAND

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BACKGROUND: The trend of HIV infection has shown striking transmission among adolescents and young adults. The Prime-Boost HIV Vaccine phase III trial has thus selected screen healthy Thai adults aged 20-30 years in Chon Buri and Rayong since September 2003. We describe preliminary epidemiological data among those screened volunteers.

Methods: As of November 2004, we have screened 12,094 volunteers using the standard EIA and confirmation tests. Demographic data of volunteers were obtained using standardized interviewed questionnaires.

Results: We found 207 infected screened volunteers (1.7%). There was no difference of prevalence between gender ($p=0.23$) or among birthplaces ($p=0.07$). The married and ex-married volunteers were found higher of HIV infection prevalence than the single

($p=0.002$). The higher educated volunteers tended to have less infection rate (Chi-squared test for trend $p<0.001$). The prevalence among different occupations were observed: 9.8% male/female commercial sex workers, 4.7% fishery, 2.8% farm workers and 2.7% entertainment business, respectively.

Conclusions: the prevalence among healthy screened volunteer is higher when compared to the national serosentinel surveillance among the male conscripts in these provinces (0.6%, $p<0.001$). This information is very useful for the local officials planning of HIV-AIDS prevention.

Presented at: *Seventh International Congress on AIDS in Asia and the Pacific 2005, Kobe Convention Center, Japan, 1-5 July 2005. Abstract page 234.*

INTERNATIONAL COLLABORATION IN DATA MANAGEMENT FOR A LARGE SCALE PHASE III VACCINE TRIAL, THAILAND

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ISSUES: Data management and quality assurance play important roles in efficacy trial conclusions. The collaboration between different teams involving in data processing is essential. Can this process be performed and accepted in international standards in a developing country?

Project: A Prime-Boost HIV Vaccine Phase III Trial is currently conducted in Thailand. This trial will screen 25,000 and enroll 16,000 volunteers. There will be approximately 500,000 forms capturing trial data during 3-years follow-up period.

Results: The current community-based trial requires several data management teams. Thai teams include 323 clinic-data staff members (48 sites), 9 laboratory data staff, 10 QA coordinators and 16 DMU personnel. Data flow also involves US teams including 7 members in data analysis coordinating team, 2 independent statisticians and 2 adverse event coding staff. The DMU gained experiences in managing secondary database for VaxGen gp120 trial. As this is the first trial in Thailand to maintain primary database subject to be audited by the US FDA, technology transfer including infrastructure installation, system validation and training according to international standards are fully supported.

Lessons learned: This collaboration is an ideal

example for cooperation between sponsor and host countries. Data management with industry standard compliance can be done in developing countries.

Presented at: *Seventh International Congress on AIDS in Asia and the Pacific 2005, Kobe Convention Center, Japan, 1-5 July 2005. Abstract page 367.*

SOURCES OF VOLUNTEERS PERCEPTION OF THE PRIME-BOOST HIV VACCINE TRIAL AND THE DECISION TO PARTICIPATE

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BACKGROUND: The world's largest preventive HIV vaccine trial was launched in Thailand in September 2003. Sources where potential volunteers can receive information to understand the trial and enable them to voluntarily decide to participate in the project are crucial for accomplishing recruitment.

Methods: Using a standardized questionnaire volunteers provided responses about the source of information where they got information about the study and that influenced them to join the study. As of December 2004, the sources that influenced and inspired volunteers to voluntarily join the trial were analyzed. The proportions of sources identified at four time points were compared.

Results: Out of 12,862 volunteers screened; overall sources of perception were derived from "enrolled volunteers" (45.6%), "local health staff" (37.6%), and "recruitment team" (22.7%). Over time the proportion of "enrolled volunteers" had significantly increase from 21.3% to 56.7% ($p<0.001$). The highest proportion, as sources of decision making, were "Local health staff" (39.7%), Screening video (27.7%), and enrolled volunteers" (15.9%).

Conclusions: This data demonstrates that the "Word of Mouth" from "enrolled volunteers" might be an invisible power for recruitment.

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NOVEL DNA AMPLIFICATION ON CHROMOSOMES 2P25.3 AND 7Q11.23 IN CHOLANGIO-CARCINOMA IDENTIFIED BY ARBITRARILY PRIMED POLYMERASE CHAIN REACTION

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PURPOSE: To detect and characterize amplified DNA sequences in cholangiocarcinoma (CCA). **Patients and methods:** We extracted DNA from tumor and corresponding normal tissues of 30 patients with CCA and amplified with 30 random ten-mer arbitrary primers by the arbitrary primers polymerase chain reaction (AP-PCR) technique. **Results:** Our results showed gains of genomic sequences at high frequency. Using the AX-11 arbitrary primer, we determined an amplified DNA fragment occurred frequently in the tumors analyzed. The DNA fragment was isolated and identified as two sequences mapped to chromosomes 2p25.3 and 7q11.23. Specific primers were designed employing these sequences and used for detecting amplification by realtime quantitative PCR. The amplification of the DNA sequences on chromosomes 2p25.3 and 7q11.23 was detected in 10 (33%) and 6(20%) cases, respectively. Thirteen (43%) cases showed amplification on both or one of the chromosomes. In addition, amplification of the DNA on chromosome 2p25.3 was predominantly observed in poorly differentiated tumors. **Conclusions:** Our findings suggest that the novel amplified DNA on chromosomal regions at 2p25.3 and 7q11.23 might be involved in the development and progression of CCA.

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ADIPONECTIN/ACP30, A COLLAGEN-LIKE PLASMA PROTEIN, IN RELATION TO ANTHROPOMETRIC MEASUREMENT IN THAI OVER-WEIGHT AND OBESE SUBJECTS

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ADIPONECTIN, anthropometric parameters including weight, height, BMI, arm circumference, triceps skinfold, subscapular skinfold, waist, hip circumferences and waist/hip ratio in 48 male and 166 female overweight and obese Thai volunteers (BMI \geq 25.00 kg/m²), and 26 male and 81 female normal subjects (BMI = 18.5-24.9 kg/m²), were recorded. Thai volunteers were investigated. Statistically significantly lower adiponectin concentrations in overweight and obese subjects were found when compared to control subjects of both sexes. Anthropometric parameters, including weight, height, BMI, arm circumference, triceps skinfold, subscapular skinfold, waist, hip circumferences and waist/hip ratio, except arm span, were statistically significantly higher in overweight and obese subjects than in control subjects. The overweight and obese subjects had higher glucose concentrations than the control subjects. BMI and glucose concentrations were found to be significantly related, under these conditions, to adiponectin. The decrease in adiponectin concentration in the overweight and obese subjects, which was related to high glucose concentration, might be the reason that obese people frequently develop type 2 diabetes mellitus. Further research into the pathophysiology of adiponectin and obesity is needed to elucidate this relationship.

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HOMOCYSTEINE AND VITAMIN IN HEALTHY THAI SMOKERS

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BACKGROUND: Cigarette smoking is considered to increase morbidity and the mortality risk of cardiovascular diseases. B vitamins regulate the metabolism of homocysteine via remethylation and transsulfuration pathways.

Objective: The purpose of this study was to investigate homocysteine concentrations, vitamin status, anthropometric and haematological measurements of healthy smokers compared with healthy nonsmoking subjects.

Design: This cross-sectional study was carried

out among smokers and nonsmokers from suburban and urban residential areas in Bangkok, Thailand.

Subjects: 174 smokers and 97 nonsmokers (aged 19-62), who participated voluntarily in the study, were investigated. Total homocysteine, folate, vitamin B₂, B₆, B₁₂, and C concentrations were measured.

Results: Total homocysteine concentrations in plasma were significantly higher in smokers than nonsmokers. Vitamin B₂, folate, B₁₂ and C concentrations were significantly lower among smokers than nonsmokers but vitamin B₆ was not significantly different between these groups. Total homocysteine concentration was significantly positive correlation with waist/hip ratio and smoking characteristics such as the number of cigarettes per day and pack-years but significantly negative association with folate and vitamin B₁₂. There were significant positive associations among the number of cigarettes smoked per day WBC count and waist/hip ratio. Furthermore, the prevalence of hyper-homocysteinemia in smokers (62%) was more common than in nonsmokers (33%).

Conclusion: These findings suggest that increased plasma total homocysteine Concentrations in Healthy Thai smokers may be explained by low B vitamin status that are involved in homocysteine metabolism such as vitamin B₂, folate, and B₁₂. The elevation of the number of cigarettes smoked per day and pack-years, WBC count, and high percentage of hyperhomocysteinemia among smokers may contribute to increased risk of atherosclerosis or cardiovascular disease development.

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METHYLENETETRAHYDROFOLATE REDUCTASE (MTHFR) POLYMORPHISM (C677T) INRELATION TO HOMOCYSTEINE CONCENTRATION IN OVERWEIGHT AND OBESE THAI

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METHYLENETETRAHYDROFOLATE reductase (MTHFR) is one of the main enzymes of homocysteine metabolism. Several studies have examined the association of a common mutation C677T with plasma homocysteine and vitamin status involved in the metabolic pathway and related to many diseases. We analyzed the association between MTHFR

(C677T) gene polymorphism with serum concentration of homocysteine, folate and vitamin B₁₂ in 37 male and 112 female overweight/obese Thai volunteers (BMI ≥25.00 kg/m²) compared with 23 male and 90 female control subjects (BMI = 18.5-24.99 kg/m²). Statistically significantly higher levels of serum homocysteine concentration were found in the overweight/obese than the control subjects (p<0.05). Serum folic acid levels in the overweight/obese subjects were statistically significantly lower than the control subjects (p< 0.05). When the data were grouped according to homocysteine concentration and MTHFR gene polymorphism, there were statistically significantly higher homocysteine concentrations in the overweight/obese than the control subjects only in wide type gene polymorphism (CC) in the hyperhomocysteine group (homocysteine >10.0 μmol/L) (p<0.05), while in all genotype polymorphism (CC, CT, TT) there were lower folic acid and vitamin B₁₂ concentrations in the overweight/obese than in the control subjects. In hyperhomocysteine groups, there was no statistically significant difference in frequencies of MTHFR (C677T) gene polymorphism between the overweight/obese and control subjects. Folic acid and gene polymorphism were found to be significantly related to overweight/obese and control groups in logistic regression analysis (p<0.05). The results supported the supposition that folic acid is more important than vitamin B₁₂. It can be concluded that gene polymorphism C677T, which is also an important factor in elevated homocysteine, might be associated in the overweight/obese and control.

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RELATIONSHIP BETWEEN SOLUBLE LEPTIN RECEPTOR, LEPTIN, LIPID PROFILES AND ANTHROPOMETRIC PARAMETERS IN OVERWEIGHT AND OBESE THAI SUBJECTS

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MEDIAN, range and 95% confidence interval (CI) for median of age, anthropometric variables, soluble leptin receptor, serum leptin and lipid profile levels of 48 overweight (Body mass index (BMI) = 25.00-29.99 kg/m²) and obese (BMI ≥ 30.00 kg/m²)

Thai males and 166 overweight and obese Thai females, compared with 26 males and 81 females in a control group (BMI = 18.50-24.99 kg/m²), were determined. The study subjects were persons who turned up regularly for physical check-ups at the Out-patient Department, General Practice Section, Ratchawithi Hospital, Bangkok, aged between 18-60 years. Serum leptin, triglyceride and low density lipoprotein cholesterol/high density lipoprotein cholesterol ratios (LDL-C/HDL-C ratio) were significantly higher in the overweight and obese males and females. Soluble leptin receptor and HDL-C were significantly lower in the overweight and obese males and females. Cholesterol and LDL-C were significantly higher in the overweight and obese females, but there was no significant difference in the overweight and obese males when compared with the control males. Low soluble leptin receptor levels were found in 38.1% (8/21) of the overweight and obese males, while 31.5% (29/92) were found in the overweight and obese females. Elevated leptin levels were found in 66.7% (32/48) and 89.8% (149/166) of the overweight and obese males and females, respectively. Both low soluble leptin receptor levels and elevated leptin levels were found in 9.5% (2/21) and 29.4% (27/92) of the overweight and obese males and females, respectively. A significant positive correlation was found between soluble leptin receptor and cholesterol, and between weight, BMI, waist, hip and HDL-C, with leptin. Serum soluble leptin receptor levels were significantly negatively correlated with leptin and BMI. The results can elucidate the causes and consequences of obesity, and are expected to aid the provision of care for overweight and obese Thai people.

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LOW FOLATE STATUS AS A RISK FACTOR FOR CERVICAL DYSPLASIA IN THAI WOMEN

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THE relationship between folate status and the risk of cervical dysplasia was studied among Thai women. The subjects were composed of 44 women with low-grade cervical neoplasia (cervical intraepithelial neoplasm I), 70 women with high-grade cervical neoplasia (cervical intraepithelial neoplasm II, III, and carcinoma in situ), and 95 women who served as controls. The low folate status in these women showed a strong association with cervical dysplasia.

Serum folate was markedly lower in both low-grade and high-grade cervical neoplasia cases compared with the control women. Using logistic regression, the odds ratio for low-grade cervical neoplasia with low serum folate level (19.82 nmol/L) was 6.13, whereas that of the high-grade group with the same folate level was 5.57. The findings support the contention that folate deficiency of women in this study had an increased risk of cervical change.

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ANALYSIS OF SEQUENCE VARIATION IN *GNATHOSTOMA SPINIGERRUM* MITOCHONDRIAL DNA BY SINGLE-STRAND CONFORMATION POLY-MORPHISM ANALYSIS AND DNA SEQUENCE

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MORPHOLOGICAL variations were observed in the advance third stage larvae of *Gnathostoma spinigerum* collected from swamp eel (*Fluta alba*), the second intermediate host. Larvae with typical and three atypical types were chosen for partial cytochrome c oxidase subunit I (COI) gene sequence analysis. A 450 bp polymerase chain reaction product of the COI gene was amplified from mitochondrial DNA. The variations were analyzed by single-strand conformation polymorphism and DNA sequencing. The nucleotide variations of the COI gene in the four types of larvae indicated the presence of an intra-specific variation of mitochondrial DNA in the *G. spinigerum* population.

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POLYMORPHISM OF GLUTATHIONE-S-TRANSFERASE OMEGA GENE AND RISK OF CANCER AMONG THAI PATIENTS

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POLYMORPHIC glutathione-S-transferase (GST) genes causing variations in enzyme activity may influence individual susceptibility to cancer. The

omega class glutathione-S-transferases (*GSTO*) has been reported to exhibit novel glutathione dependent thiol transferase, dehydroascorbate reductase, mono-methylarsonate reductase activities and modulate Ca^{2+} release by ryanodine receptors as well as induce IL-1 β post translational processing of cytokine releasing inhibitory drugs. Though polymorphisms have been reported in *GSTO1* and *GSTO2*, their predisposition to cancer risk has not yet been explored. In this case control study, 58 liver cancer cases (28 cases of hepatocellular carcinoma and 30 cases of cholangiocarcinoma), 31 cases of colorectal cancer, 30 cases of breast cancer and 68 controls were compared for frequencies of *GSTO1* and *GSTO2* genotypes determined by polymerase chain reaction (PCR)/ restriction fragment length polymorphism (RFLP) based method. The statistical analysis provided the support for the difference in genotypic distribution between hepatocellular carcinoma and control for *GSTO1* polymorphisms (*GSTO1** A140D: chi squared 2 d.f. =19.79, $P<0.05$) as well as in cholangiocarcinoma (*GSTO1** A140D: chi squared 2 d.f =9.02, $P<0.05$). However, statistically no significant difference was found in genotype distribution for *GSTO1* polymorphism (*GSTO1** A140 D) in colorectal cancer (*GSTO1** A140D: chi squared 2 d.f =1.52, $P>0.05$), breast cancer (*GSTO1** A140 D: chi squared 2 d.f. =3.957 $P>0.05$) and control. Additionally, statistically no significant difference in genotypic distribution for *GSTO2* polymorphism (*GSTO2** N 140D) was found in all types of cancer cases. An exploratory data analysis also identified statistically significantly increased odds ratio for the combination of *GSTO1** A 140/D140 and D140/D140 for hepatocellular carcinoma ($P<0.05$, OR= 8.8, CI 95%:2.82-28.88), cholangiocarcinoma ($P<0.05$, OR= 3.14, CI 95%: 1.18-8.84) and breast cancer ($P<0.05$, OR=3.71, CI 95%: 1.09-13.02) but not for colorectal cancer. However, odds ratio for the combination of *GSTO2** N142/D142 and D142/D142 in neither of the cancer cases reached a level of significance. The study suggests that *GSTO1** A140D polymorphism could play an important role as a risk factor for the development of hepatocellular carcinoma cholangiocarcinoma and breast cancer.

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GENETIC POLYMORPHISM OF GLUTATHIONE-S-TRANSFERASE GENE CLASS OMEGA 2 IN ACUTE LYMPHOBLASTIC LEUKEMIA

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BACKGROUND: Acute Lymphoblastic Leukemia (ALL) is the most common leukemia in childhood. Glutathione-S-transferases (GST) are a family of enzymes that play an important role in detoxification by conjugation of electrophilic free radicals to glutathione. Glutathione-S-transferase class Omega 2 (*GSTO2*) is the novel class of GST. Though polymorphism has been reported at codon 142 in *GSTO2* gene, the predisposition to cancer risk are still controversial. This is the first study of genetic polymorphism of *GSTO2* in acute lymphoblastic leukemia.

Method: In this case-control study, 90 cases of ALL and 84 healthy controls were compared for frequencies of *GSTO2* genotypes determined by PCR-RFLP based method.

Results: The odds ratio for the combination of *GSTO2** N142/D142 and *GSTO2** D142/D142 polymorphism in neither of the cancer cases reached the level of statistical significance. (odds ratio = 1.071, 95% CI = 0.587 - 1.954). However, there is polymorphism in almost every cases of high risk group and in the cases of abnormal chromosomal study.

Conclusion: *GSTO2** N142/D142 and *GSTO2** D142/D142 genotype is not susceptible to ALL but may be a marker for prediction of the clinical outcome or chemotherapeutic response.

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IDENTIFICATION OF GENETIC ALTERATION IN CERVICAL CANCER BY ARBITRARILY PRIMED POLYMERASE CHAIN REACTION (AP-PCR) IN THAI PATIENTS

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CERVICAL cancer is the second most common malignancy in women worldwide, and it remains a leading cause of cancer-related death for women in developing countries. In Thailand, it is the most common gynecologic malignancy. The infection with human papillomavirus and cellular genetic alteration appear to be necessary etiological factors for cervical carcinoma. This study was designed to investigate the genetic instability in cervical carcinoma tissues and provide evidence for discovering new genes and screening diagnostic molecular marker of cervical carcinoma. Genetic alterations in 57 Thai cervical cancer patients were analyzed by Arbitrarily-primed, polymerase chain reaction (AP-PCR) using 57 arbitrary primers. One of the primers, exhibited high frequency of band intensity, 40 out of 57 cases (70.1%). However, other three primers resulted change of banding patterns with frequency 68.4%, 64.9%, and 52.6%, respectively. The results of the current study strongly suggested that AP-PCR is a useful technique for the detection of genetic alterations in cervical cancer.

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GENETIC AMPLIFICATION AT CHROMOSOME 4P 15.2 AND 6Q 23-24 IN BREAST CANCER

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GENE amplification is clearly demonstrated as a promising aspect of tumor growth and development and has prognostic importance in certain cancers. From our previous study, genetic alterations in Thai patients with breast cancer were analyzed by random amplified polymorphic DNA with sixty arbitrary primers, showing that primer D15 can be detected gene gains at the highest frequency (80%). The amplified DNA fragment was then isolated and identified as approximately 600 bp sequences mapped to chromosomes 4p15.2 and 6q23-24, respectively. The specific primers on chromosome 4p15.2 and 6q23-24 were further designed and used to detect gene amplification in paraffin-embedded tissues of patients with breast cancer by real time PCR. Our results found that the gene amplification were detected in 23 out of 34 cases (67.6%) at chromosome 4p15.2 and 14 out of 34 cases (41.1%) at chromosome 6q23-24. The gene amplification at both chromosomes was significantly correlated with advanced stage of cancer ($p=0.007$

and 0.004 respectively). Moreover, gene amplification at chromosome 4p 15.2 was associated with lymph node metastasis ($p=0.009$). Our present findings suggest that amplification of the genes located on chromosomes 4p15.2 and 6q 23-24 may be involved in the tumorigenesis of breast cancer in Thai patients.

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MICROSATELLITE INSTABILITY AND *hMSH2* ALTERATIONS IN THAI SPORADIC COLORECTAL CANCER

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COLORECTAL cancer can be divided into two types: hereditary and sporadic. Several gene mutations in DNA mismatch repair system (MMR) including *hMSH2*, *hMSH3*, *hMSH6*, *hMLH1*, *hPMS1* and *hPMS2* have been widely observed in hereditary and sporadic cancer. The MSH2 gene is a component of the MMR system that is predominantly mutated in tumors showing a mutator phenotype manifested as microsatellite instability thus, an important role in maintaining the stability of microsatellites has been associated to this gene. In this study, we designed to investigate the microsatellite instability by using microsatellite markers (BAT-26 and BAT-40), and genetic alteration (*hMSH2*) determined by means of PCR-SSCP and nucleotide sequencing technique in sporadic colorectal cancer, Six cases (20%) and five cases (16.6%) of sporadic colorectal cancer manifested microsatellite instability in BAT-26 and BAT-40. With PCR-SSCP, eight cases showed shifted band and were confirmed by DNA sequencing. Seven cases (23%) showed number of poly A alteration in intron 5, only one case revealed mutation in exon 5 of *hMSH2*. Still, increase knowledge of the properties of MMR system and its connection to other biologic pathway is essential to better understand colorectal cancer development and to identify target for prevention and therapeutics.

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MUTAGENICITY STUDY OF WEEDS AND COMMON PLANTS USED IN TRADITIONAL MEDICINE AND FOR ANIMAL FEED

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MUTAGENICITY and antimutagenicity potentials were tested using Ames' test in crude distilled water and absolute ethanol extracts from the stems and leaves of *Peperomia pellucida* (Linn.) Kunth, *Eichhornia crassipes* Solms, *Colocasia esculenta* Schott and *Brachiaria mutica* (Forssk.) Stapf, and the stems of *Musa sapientum* Linn. No mutagenic effect was found in any of the 10 mg/plate crude extracts of these plants for either TA98 or TA100 of *Salmonella typhimurium*, in a direct test and a mutagenic induced test by S-9 mix. Both distilled water and absolute ethanol extract of 0.5–10 mg/plate *B. mutica* showed strong antimutagenicity to AFB₁, B(a)P and 4NQO in two tester strains. Ethanol extract of 0.1–0.5 mg/plate *C. esculenta* also showed antimutagenicity to AFB₁, B(a)P and 4NQO in two tester strains, but the 0.5–10 mg/plate water extract had an antimutagenic effect for 4NQO in TA98. The ethanol extracts of 5 mg/plate *B. mutica* and 0.5 mg/plate *C. esculenta* are cytotoxic, as indicated by their partial killing effect.

Poster presentation in: *Joint International Tropical Medicine Meeting, 30 Nov – 2 Dec 2005, Bangkok, Thailand.*

HEALTH BEHAVIOR OF TSUNAMI VICTIMS IN PHANG-NGA PROVINCE, THAILAND

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THE health behaviors of 250 tsunami victims in Phang-nga Province were surveyed three months after the disaster struck. Questionnaires and non-participant observation were used to study the effects of the disaster on their lifestyles and health behaviors, and the effects of environmental change, which included sanitation, personal hygiene, illness and prophylaxis, and local health care and promotion while residing in temporary shelters provided by government and private donors. Our findings indicated good management of drinking water in the temporary shelters. Toilet construction and water supply were sufficient, but wastewater and sewage systems were poorly managed. Most of the study group complained of

back pain, stress, and sleep disturbance. A local hospital and health stations provided medical care. Health awareness according to their perception included food safety, sleeping in mosquito nets, taking medication, and exercise. Most of them regularly slept in mosquito nets and defecated in toilets. They obtained food from donors and occasional purchases. Safe drinking water was free of charge. Some of them smoked tobacco and drank alcohol.

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VITAMIN B₁₂ STATUS OF THAI WOMEN WITH NEOPLASIA OF THE CERVIX UTERI

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THE vitamin B₁₂ statuses of Thai women with high- and low-grade cervical dysplasia were studied and compared with women with normal cytological smears. Serum vitamin B₁₂ and vitamin B₁₂ intakes were assessed, as well as demographic characteristics, sexual behavior, reproductive and menstrual history, exogenous hormone used, personal and familial medical history, smoking habit, and other risk factors. The presence or absence of genital HPV DNA was determined by polymerase chain reaction (PCR). Serum vitamin B₁₂ levels and vitamin B₁₂ intakes in women with normal cytological smears were significantly higher than those with both high- and low-grade cervical dysplasia (p<0.001). Increased vitamin B₁₂ serum levels were statistically significantly associated with increased low-grade (OR = 4.08; 95% CI = 1.41-11.79; p< 0.05) and increased high-grade cervical dysplasia risk (OR = 3.53; 95% CI = 1.24-10.04; p< 0.05) for the highest vs. lowest quartiles of serum vitamin B₁₂. This study indicated a relationship between increased vitamin B₁₂ status and the risk of cervical cancer.

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IDENTIFICATION OF DNA AMPLIFICATION ON CHROMOSOME 1P22 IN CERVICAL CANCER

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BACKGROUND: In Thailand, cervical cancer is the most common gynecologic malignancy. The infection with human papillomavirus and cellular genetic alteration appear to be necessary etiological factors for cervical carcinoma. This study was designed to investigate the genetic instability in cervical carcinoma tissue and provide evidence for discovering new genes and screening diagnostic molecular marker of cervical carcinoma.

Methods: Genetic alterations in 57 Thai cervical cancer patients were analyzed by Arbitrarily-primed polymerase chain reaction (AP-PCR) with 54 arbitrary primers. The nucleotide sequence of the amplified fragment was performed by DNA sequencing and identified by comparison with the known gene in genome database using Blastn programme.

Results: One of the primers exhibited the highest frequency of a band intensity in 40 of 57 cervical cancer cases (70.1%). The nucleotide sequence of this amplified fragment was homology with the DNA fragment located on chromosome 1p22. Results indicated that the DNA amplification on chromosome 1p22 may be associated with cervical cancer development.

Conclusions: This findings demonstrated that gene amplification in chromosome 1p22 may be associated to cervical cancer and it may be used as a genetic marker of cervical carcinoma.

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POLYMORPHISM OF GLUTATHIONE S-TRANSFERASE OMEGA GENE AND RISK OF CANCER

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POLYMORPHIC glutathione S-transferase (GST) genes causing variations in enzyme activity may influence individual susceptibility to cancer.

Though polymorphisms have been reported in *GSTO1* and *GSTO2*, their predisposition to cancer risk has not yet been explored. In this case control study, 28 cases of hepatocellular carcinoma, 30 cases of cholangiocarcinoma, 31 cases of colorectal cancer, 30 cases of breast cancer and 98 controls were compared for frequencies of *GSTO1* and *GSTO2* genotypes. The statistical analysis provided the support for the difference in genotypic distribution for *GSTO1* A140D* between hepatocellular carcinoma (OR 23.83, CI 95%: 5.07-127), cholangiocarcinoma (OR 8.5, CI 95% : 2.07-37.85), breast cancer (OR 3.71, CI 95% : 1.09-13.02) and control. With regards to *GSTO2* N140D* polymorphism, there was no difference in genotypic distribution between all the types of cancer and control. The study suggests that *GSTO1* A140D* polymorphism could play an important role as a risk factor for the development of hepatocellular carcinoma, cholangiocarcinoma and breast cancer.

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RIBOFLAVIN-DEFICIENT AND *TRICHINELLA SPIRALIS*-INDUCED STRESSES ON PLASMA CORTICOSTERONE ASSOCIATED WITH SPERMATOGENESIS IN MALE WISTAR RAT

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THE objective of this study is to investigate effects of riboflavin-deficient and *Trichinella spiralis*-induced stresses on corticosterone associated with spermatogenesis in male Wistar rats. Rats were allocated into 4 groups: Group 1: control ; group 2: riboflavin-deficient diet; group 3: *T. spiralis* infection; group 4: riboflavin deficiency diet with *T. spiralis* infection. This experiment lasted for 12 weeks. Plasma corticosterone was significantly enhanced when exposed to acute stress of riboflavin deficiency and/or *T. spiralis* infection. When rats was chronically subjected to such stresses, *T. spiralis per se* had prolonged effect on a marked increase of corticosterone. *T. spiralis per se* tended to be impacted on such sperm characteristics as sperm motility, sperm count and daily sperm production even the defected seminiferous tubules. It was proposed that the *Trichinella spiralis*-induced stress probably had adverse effect on the level of adrenocortical-testicular axis whenever their habitats on muscle fibers were evident. However the riboflavin-deficient-induced stress was not much implicated on adrenocortical-testicular axis.

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ASSESSMENT OF DIETARY PATTERNS OF THAIS IN GERMANY AND THAILAND

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THIS study was conducted to investigate the dietary patterns of Thais living in a different culture. Ninety-eight healthy Thai men and women aged 18-55 years were recruited from many regions of Germany, and compared with 100 healthy Thai men and women aged 17-56 years living in Thailand. A food frequency questionnaire (FFQ) with 85 food items and 24-h recall were used to assess amount and frequent of energy and nutrients intake especially fat, and body weight and height were measured to find out weight change for Thais in Germany. Socio-economic and health status information were gathered by interview. "Nutrisurvey" dietary analysis software was used to analyze the nutrient intakes of the studied group. Statistical analysis was done using Strata version 5.0. The results showed higher intakes of energy, protein and fat in the participants in Germany than those in Thailand. Rice was the staple food of the studied group in Germany. Average age-adjusted BMI for both study groups was above normal. A high consumption of fat is associated with weight increase. Thus, the dietary changes in these Thais may provide a possible explanation associated with the risk of obesity, which is a major health problem and the main risk factor for many fatal diseases.

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SERUM LEPTIN CONCENTRATIONS IN CHRONIC HEPATITIS

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THE objectives of this research were to investigate leptin levels among Thai chronic hepatitis B virus (HBV), chronic hepatitis C virus (HCV) and non-alcoholic steatosis hepatitis (NASH) diseases of Thai

patients compared with controls. Twenty of each HBV, HCV, and NASH patients compared with sixty people as the control group from the Outpatient Department at the Hospital for Tropical Diseases, Bangkok, Thailand were investigated. Fasting blood samples were collected for investigation of leptin concentration of liver patients was significantly higher than that of control subjects. It might be due to the accumulations of fat cells in liver disease patients. However, there is no relationship between leptin level and other parameters such as BMI, ALT, AST, ALP and hematological variables. Liver enzyme functions levels are much higher in patients groups. White blood cells counts, platelets and hematocrit values are slightly lower in liver disease patients. Therefore, it is concluded that physiological regulation of leptin maintain in relation to body fat, even chronic viral liver diseases. This finding and the apparent stage depending suggest the possibility that in the course of chronic viral diseases, serum leptin levels may reflect the extent of liver dysfunction.

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FATAL PLASMODIUM FALCIPARUM MALARIA CAUSES SPECIFIC PATTERNS OF SPLENIC ARCHITECTURAL DISORGANIZATION

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THE spleen is critical for host defense against pathogens, including *Plasmodium falciparum*. It has a dual role, not only removing aged or antigenically altered erythrocytes from the blood but also as the major lymphoid organ for blood-borne or systemic infections. The human malaria parasite *P. falciparum* replicates within erythrocytes during asexual blood stages and causes repeated infections that can be associated with severe disease. In spite of the crucial role of the spleen in the innate and acquired immune response to malaria, there is little information on the pathology of the spleen in human malaria. We performed a histological and quantitative immunohistochemical study of spleen sections from Vietnamese adults dying from severe falciparum malaria and compared the findings with the findings for spleen sections from control patients and patients dying from systemic bacterial sepsis. Here we report that the white pulp in the spleens of patients dying from malaria showed a marked architectural disorganization. We

observed a marked dissolution of the marginal zones with relative loss of B cells. Furthermore, we found strong HLA-DR expression on sinusoidal lining cells but downregulation on cordal macrophages. *P. falciparum* infection results in alterations in splenic leukocytes, many of which are not seen in sepsis.

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IMPROVEMENT OF FUNCTION AND MORPHOLOGY OF TUMOR NECROSIS FACTOR-ALPHA TREATED ENDOTHELIAL CELLS WITH 17-BETA ESTRADIOL: A PRELIMINARY STUDY FOR A FEASIBLE SIMPLE MODEL FOR ATHEROSCLEROSIS

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DYSFUNCTION of endothelial cells (EC) to produce endothelial nitric oxide synthase (eNOS) by tumor necrosis factor- α (TNF- α) causes critical features of vascular inflammation associated with several disease states e.g. atherosclerosis including increased platelet aggregation and adhesion on EC, elevated adhesion molecules and enhanced inflammatory cells binding to EC. 17- β estradiol (E_2) can stimulate eNOS production and improve the criteria features of atherosclerosis. Using TNF- α and E_2 , we attempted to develop in vitro vascular model for studying atherosclerosis.

Human umbilical vein endothelial cells (HUVECs) grown in transwells were cocultured with smooth muscle cells (SMCs) in 24-well plate to mimic the major components of vascular wall. The model was incubated with TNF- α (10 ng/ml) for 12 hours, prior exposed to E_2 (100 pg/ml) for 6-12 hours, then investigated by transmission and scanning electron microscope. The result indicated recovered morphology with good tight junction, and decreased platelet adhesion was noted in defective HUVEC after E_2 treatment. E_2 represented as an antiatherosclerogenic agent to demonstrate feasibility of the model. Although our finding focused only on endothelium, this would be the basis for our further studies to develop ex vivo continuous perfusion of human vessel segment for atherosclerosis study.

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A QUANTITATIVE ULTRASTRUCTURAL STUDY OF THE LIVER AND THE SPLEEN IN FATAL FALCIPARUM MALARIA

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WE performed a retrospective study of 25 patients who died of severe falciparum malaria in Thailand and Vietnam using electron microscopy. The aims of the present study were: to determine if there was any significant association between parasitized red blood cell (PRBC) sequestered in liver or spleen and particular pre-mortem clinical complications and to compare the degree of parasite load between the liver and spleen within the same patients. PRBC sequestration in the spleen was higher than the liver (S.I. median = 3.13, 0.87, respectively) ($p < 0.05$). The results of quantitative ultrastructural study of the present study showed a significantly higher parasite load in the liver of patients with jaundice, hepatomegaly and liver enzyme elevation ($p < 0.05$). We found a significant correlation between PRBC sequestration in the liver and the level of serum bilirubin, the level of aspartate aminotransferase (AST) and the size of palpable liver (Spearman's correlation coefficient = 0.688, 0.572, 0.736, respectively). Furthermore, more parasite load was found in the liver of patients with acute renal failure (ARF) compared to patients without ARF ($p < 0.05$). These findings suggest that PRBC sequestration in the liver is quantitatively associated with pre-mortem hepatic dysfunction and renal impairment. There was no significant difference between splenomegaly and PRBC sequestration and the size of palpable spleen was not correlated to parasite load in the spleen. When ultrastructural features were compared between two reticuloendothelial organs, we found that the spleen had more PRBC and phagocytes than the liver and the spleen of non-cerebral malaria (NCM) patients had more phagocytes than cerebral malaria (CM) patients. This observation provided that the spleen plays a major role in the malaria parasites clearance and associated with host defence mechanism against malaria.

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ULTRASTRUCTURAL CHANGES OF PANCREATIC ISLETS MICROCIRCULATION IN NONOBESE DIABETIC (NOD) MICE

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THE objective of this study was to investigate the ultrastructural changes of vascular pancreatic islets using a transmission electron microscopic technique. The major ultrastructural changes of microvessel in NOD mice are indicated by the swelling and vacuolization of the endothelial cell. Swollen cells are the first noticeable lesion of the cell response in reversible degeneration that is caused by the failure of homeostatic control. Loss in endothelial cell homeostasis is primarily a marker of endothelial dysfunction that plays a key role in the pathogenesis of diabetic vascular disease by losing the control of vascular tone. Diabetes also associates with an increased generation of oxygen-derived free radicals that may impair vasodilatation through the inactivation of vasodilators. In conclusion, consistent with a hypothesis that loss of the modulatory role of the endothelium may be a critical and initiating factor in the development of diabetic vascular disease, the ultrastructural changes in this study may indicate the first sign of endothelial dysfunction. This dysfunction correlates to the relationship between diabetes and reversible lesions of vessels in NOD mice, making for a better understanding of the pathophysiology of diabetic vascular disease to set the stage for further investigation to restore endothelial dysfunction in diabetes.

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ULTRASTRUCTURAL INVESTIGATION OF RED CELL DEFORMATION IN SEVERE MALARIA

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THE pathogenesis of severe malaria involves the sequestration of malaria-infected red blood cells in the deep vessels of vital organs such as the brain, kidney and lung. Whilst there has been extensive research

into the role of receptor mediated adhesion between parasitized red blood cells (PRBC) to host endothelial cells, the role of non-receptor mediated adhesion of both PRBC and uninfected red blood cells (uRBC) is less well understood. These events may play a key role in retarding, but not completely obstructing, blood flow in tissues during severe malaria. Evidence from *in vitro* and *in vivo* experiments supports the theory that there are changes to the red cell membrane structure in both PRBC and also uRBC during malaria infection, and that these profoundly effect the rheological characteristics of red cell flow and deformability during severe malaria. We will present pathological data gained from light and electron microscopic examination of fatal malaria cases in 60 adult South East Asian patients, which examined the pathological features of severe malaria in multiple organs including the brain and kidney. Ultrastructural and quantitative histological data will be presented which demonstrates that uRBC are increased in the brain during cerebral malaria, as well as sequestration of PRBC. In addition changes in red cell structure and membrane fluidity occur, which may contribute to vascular sequestration, reduced blood flow and transient hypoxia. We will discuss these findings in the light of the pathological changes in the brain and kidney in severe malaria, where changes in red cell membrane deformability contribute to pathology.

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PATHOGENESIS OF ACUTE RENAL FAILURE IN SEVERE MALARIA: ULTRASTRUCTURAL AND IMMUNOPATHOLOGICAL STUDIES

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TO study the association of parasitized red blood cell (PRBC) sequestration and cytokines expression in the pathogenesis of acute renal failure in severe falciparum malaria. Kidney tissues were collected from the patients who died of severe falciparum malaria. The patients were divided into two groups for those who showed signs of acute renal failure (ARF) and who did not (NARF). To examine the histopathological changes, the tissue sections were stained with H&E. For cytokine expression of INF- α and IL-10, the sections were stained by immunohistochemical staining. For ultrastructural study, the kidney tissues were examined by a transmission electron microscope. PRBC were found

adhered to the glomerular capillary endothelium. Large mononuclear cells were also present within the capillaries, filling most of their lumens. There were only few cases showing mesangial cell proliferation, mesangial matrix expansion and electron dense deposits along the mesangial basement membrane. Statistically results showed that the number of Knob negative (K-) PRBC were significantly higher in the kidney of the ARF compared to NARF cases. The positive immunoreactivity for TNF- α and IL-10 was found in inflammatory cells, renal tubules and endothelial cells of vasculatures. Knob negative (K-)PRBC in the kidney is associated with acute renal failure. The correlation between severity of histopathologic changes in renal tissue and intensity of inflammatory for INF α and IL-10 will be discussed in detail.

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TRANSCRIPTION ANALYSIS OF IgE AND IgG IN PERIPHERAL BLOOD MONONUCLEAR CELLS INDUCED BY *PLASMODIUM FALCIPARUM* ANTIGEN

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TO investigate whether the crude antigen of *P. falciparum* could induce the transcription of IgE and IgG from the normal peripheral blood mononuclear cells (PBMC). 6x10⁶ human PBMC isolated from normal healthy donor were co-cultured with 10 μ g or 20 μ g of crude *P. falciparum* antigen obtained from parasite clone TM 267. PBMC stimulated with IL-4 was used as positive control. The influence of antigen dosage and their expression during the time interval were determined. RNA was extracted from the stimulated PBMC pellet and RT-PCR was conducted using the specific primers designed from the constant heavy chain region of IgE and IgG. IgE expression was detected later on day 1, 3, 7, and 9. while IgG was detected later on day 5, 7 and 9. IL-4 stimulated PBMC could exhibit both IgE and IgG expression, of which IgE was detected as early as day 1, while IgG was detected later on day 5 whereas unstimulated PBMC shown no expression at all of both IgE and IgG transcripts. This study indicated that the *P. falciparum* antigen at the concentration of 10 μ g or 20 μ g per 6x10⁶ PBMC could induce both IgE and IgG transcription, in the same manner as IL-4.

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HISTOPATHOLOGICAL STUDIES OF LIVER TISSUE OF HIV ANTIBODY-POSITIVE PATIENTS: A NECROPSY STUDY

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LIVER necropsy specimens of 117 HIV antibody-positive patients, and 20 liver tissue of healthy person who die by an accident were collected from Ramathibodi Hospital, Pramongkutkloa Hospital and Hospital for Tropical Diseases, Mahidol University, Bangkok during 1997-2004. The informed consent for tissue necropsy having been given on explanation of the objectives of the study and its procedures. Tissue necropsy was performed using either a disposable liver biopsy set according to Menghini (biopsy needle size 15 G/1.8 mm, needle length 88 mm, distance sleeve 18 mm or a mini-laparotomy technique). The tissue were immediately fixed with 4% paraformaldehyde, dehydrated with ethanol and embedded in paraffin. The paraffin sections (4-5 μ m thick) of individual tissues were placed on slides. Pathological change of liver tissues sections which stained by Hematoxylin and Eosin stain (H&E) were examined under a light microscope. Various special stained, i.e. acid fast stain, modified acid fast stain (Kinyoun), Gomori methenamine silver (GMS) stain were used for diagnosis the pathogenic agents.

Among 117 samples, 55 cases (47%) revealed opportunistic infections, while 62 cases (53%) were no pathogenic agents in liver tissue. The result of H&E and special stained revealed 25 cases 45.45% with cryptococcosis, 19 cases (34.55%) with tuberculosis, 6 cases (10.91%) with cytomegalovirus, 4 cases (7.27%) with penicillosis and 1 cases (1.82%) with small fungus infection. Pathological changes in liver tissue were fatty changes, portal inflammation, and reactive hepatitis, chronic active and chronic passive hepatitis and hepatocellular carcinoma. Predominant pathological changes include granuloma and spotty necrosis, which were attributed to tuberculous hepatitis. Infection with cryptococcus did not give any specific associated pathological changes.

The pathological changes associated with HIV-infection in liver tissue were cryptococcosis, tuberculosis, penicillosis and small fungus infection. Abnormalities in liver tissues of HIV-infected patients were presence mainly of opportunistic infection, usually part of a disseminated multi-organ process arising in the setting profound of immune suppression. Additionally

coincident exposure to hepatotropic viruses and non specific changes associated with the use of drugs and or chronic illnesses.

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CONSEQUENCES OF MALARIA PARASITE-ENDOTHELIAL CELL BINDING

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CYTOADHERENCE of *Plasmodium falciparum*-infected erythrocytes to the microvasculature endothelium is thought to play a crucial role in malaria pathogenesis. Our hypothesis is that this binding process is vital in causing aggravation of host cell signaling processes leading to a loss of cellular function. We have used both a physiological and a proteomic approach to investigate the interaction between cytoadherence of endothelial cells and malaria parasites.

Human umbilical vein endothelial cells (HUVEC) were incubated with *Plasmodium falciparum*-infected erythrocytes and studied with the aid of Confocal Laser Scanning Microscopy (CLSM). We identified apoptotic cells using morphological features, annexin V and propidium iodide stains. We were able to document apoptotic changes with time in the HUVEC incubated with malaria parasite with the aid of Calcein-AM. We found that HUVEC with adhered *Plasmodium falciparum*-infected erythrocytes demonstrated significant apoptotic features at 3, 6 and 24 hours post incubation as compared to HUVEC incubated with red blood cells alone. These included cellular shrinkage, fragmentation, blebbing of plasma membrane and contracted organelles. Not all morphologically apoptotic cells were annexin positive. We are working on caspase inhibitors for apoptosis.

For a global approach, we have studied the proteome of endothelial cells after malaria parasite binding to understand the pathways involved in parasite-host cell communication. Isolated HUVEC protein samples were separated by two-dimensional polyacrylamide gel electrophoresis (2D-PAGE), visualized by silver staining and quantified by image processing (Phoretix 2D Evolution software). Proteins of interest were extracted by in-gel digestion with trypsin and quantified by matrix-assisted laser desorption-ionization time-of-flight mass spectrometry (MALDI-TOF-MS). The resulting mass fingerprint was searched against the National Center for Biotechnology

Information protein-sequence database using Mascot search engine. More than 1000 protein spots were detected by 2D electrophoresis using a non-linear pH range of 3-10. A number of protein spots which are differentially expressed upon malaria parasite binding have been observed. Definitive protein identification of these spots is on going

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THE DIVERSE PATHOLOGIES OF INFECTED LIVER WITH *OPISTHORCHIS VIVERINI*

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O*VIVERINI* (Liver fluke) is one of the causative agent of food-borne parasitic zoonoses, which infects animals or humans that found mainly in the North and the Northeast Thailand, Laos and Kampuchea. Transmission to humans probably occurs often from eating raw fish, raw crayfish, etc., containing viable metacercariae. We performed a retrospective studied of the twenty-nine autopsy cases of patients aged from 7 to 68 years who lived in the Northeastern part of Thailand and were infected with these adult worms. By gross examination of the liver appeared enlargement of the liver (28 cases), dilation of the bile ducts (16 cases at intrahepatic, 13 cases at subcapsular), fibrosis (7 cases at portal area, 4 cases at periductal of the bile ducts), intrahepatic tumors (10 cases) and congestion of the liver (5 cases). The adult worms were found in the bile ducts of all cases. The livers were processed for microscopic examination. The diverse pathologies were pericholangitis (28 cases), fibrous tissue infiltration at the wall of the bile ducts (27 cases), adenomatous formation (25 cases), dilatation of the bile ducts (24 cases), hyperplasia of epithelium (21 cases), desquamation of epithelium (20 cases), proliferation of epithelium (19 cases), dense fibrous tissue at portal areas (16 cases), cholestasis (12 cases), adenocarcinoma of the bile ducts (8 cases), hepatocellular carcinoma (2 cases), ruptured dilated bile duct with peritonitis (1 case) and perioval granuloma (1 case).

The data presented in this study indicated that *O. viverini* is one of the causative agent of liver disease of human. Enlargement of the liver was a common finding. The pathology was confined to the large and medium sized bile ducts where the worms inhabited.

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THE DIVERSE PATHOLOGIES OF INFECTED LUNG WITH *PARAGONIMUS HETEROTREMUS*

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P *HETEROTREMUS* (Lung Fluke) is one of the food-borne parasitic zoonoses; which infects animals and humans. We studied the pathology of the cat lung which was infected with this parasite that caused morbidity and pathology. By gross examination of the lung appeared small hemorrhagic spots. Some of the worms were seen in the pleural cavity together with turbid pleural serosanguinous effusion miliary lung abscesses, cystic lesions with dense fibrous connective tissue around the cysts. The visceral pleura covering the cyst was thickened and inflamed. By microscopic examination, revealed a worm located in the subpleural alveolar parenchyma, cross sections of the worm in the dilated bronchus which has already undergone squamous metaplasia, Adjacent and surrounding the worm is a large granulomatous tissue contusing, around the cystic lesion were compressed and was surrounded by an acute hemorrhagic area. The adjacent lung tissue showed marked congestion, atelectasis and pneumonia.

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DETECTION OF *LEGIONELLA PNEUMOPHILA* IN WATER SAMPLES BY USING NESTED POLYMERASE CHAIN REACTION

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L *LEGIONELLA PNEUMOPHILA*, the causative agent of legionnaires' disease and pontiac fever, can colonize in water distribution systems as well as in natural aquatic waters. In this study, nested polymerase chain reaction (PCR) was applied to detect the macrophage infectivity potentiator (*mip*) gene of *L. pneumophila* in water samples, and to determine sensitivity, specificity of primers and compare with conventional culture method. One hundred and thirty-five water samples were collected from cooling towers, water reservoir, condenser drain water, pool, river, and canal. Thirty-four swab samples were collected from showerheads and condenser drains.

The nested PCR assay amplified a specific product size of 471 bp. The sensitivity of nested PCR for detecting *L. pneumophila* DMS 6283 was 10 fg of genomic DNA or 10 colony forming unit (cfu)/ml, which was seeded in phosphate buffer (PB). The primers used in nested PCR were specific for *L. pneumophila*, without cross-reaction to other tested gram negative and gram positive bacteria. Results showed that the sensitivity of detection of seeded *L. pneumophila* DMS 6283 in majority of water samples was equal to that of seeding in PB. It was found that water samples from river and canal contained amplification inhibitors, which could be removed by using spin column (Qiagen). The nested PCR was applied to detect *L. pneumophila* directly in water samples from various sources. The detection rate of *L. pneumophila* by nested PCR was 30.8% higher than that of the conventional culture method at 2.4%. *L. pneumophila* were found in 35 out of 63 cooling tower water samples, 1 out of 5 samples from water reservoirs, 1 out of 4 water samples from fountain, 2 out of 11 samples from hot water faucet, 3 out of 8 samples from condenser drain water, and 10 out of 27 samples from swab of condenser drains. All PCR products of 52 positive samples were confirmed by restriction analysis with the digestion of *EcoR* I and *Kpn* I. Restriction fragments of the PCR products were the same expected sizes as those of the positive control.

The nested PCR had improved sensitivity and specificity for the detection of *L. pneumophila* in non-culturable state in water samples from various sources. It could be applied for rapid screening in detection of *L. pneumophila* from water and swab samples in the environmental laboratory.

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EARLY ANTIBODY RESPONSE TO MULTIPLE IM DOSES OF PURIFIED VERO CELL RABIES VACCINE

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W E studied early antibody response to multiple IM-dose regimens of purified Vero cell rabies vaccine in 120 healthy adults with no history of previous rabies immunization, who were randomly given one of 3 PVRV IM post-exposure regimens: Gr A 22111 (2 doses each on days 0, 3), Gr B 31111 (3 doses on day0), and

Gr C 11111 one dose each on days 0, 3, 7, 14, 28 (reference standard Essen schedule). RFFIT were performed for rabies NAb (RNAb). Age, weight, height and sex ratio were similar between the 3 groups. Nine subjects were excluded from immunity analysis because they had RNAb titers on D0 ≥ 0.07 IU/ml. The antibody response patterns of the subjects in Gr. A and B were similar. At D5, early antibody response (titers ≥ 0.07 IU/ml) was observed in 5.4 and 2.6% in Gr. A and B, respectively, with none in Gr. C. At D7, 67.6% of the subjects in Gr. A, and 60.5% in Gr. B, had RNAb titers ≥ 0.07 IU/ml, about 1.7-1.6 times greater, respectively, than Gr. C (38.9%). In addition, 5% of subjects in Gr. A and B also had RNAb titers ≥ 0.5 IU/ml (WHO protective level), compared to none in Gr. C. On days 14 and 28, all subjects in the 3 groups had RNAb titers ≥ 0.5 IU/ml. By one year, the proportions of subjects with RNAb titers ≥ 0.5 IU/ml in Gr. A, B and C were 65, 92 and 75%, respectively. The RNAb GMTs for days 7, 14, 28, and 365 of the 3 groups were similar. The side effects of the 3 regimens were transient and in the acceptable range ($\leq 5\%$).

In conclusion, at day 7, early antibody responses (≥ 0.07 IU/ml) were observed in 60-67% of the subjects who received the two multiple-dose IM PVRV regimens; the proportion was 1.6-1.7 times higher than the reference schedule. However, the titers reached the protective level of ≥ 0.5 IU/ml in only 5% of subjects, and no subject in the reference group. Therefore, where rabies immunoglobulin is not available, a rabies vaccine schedule that produces the earliest and highest RNAb responses would be the best option.

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KINETICS OF MATERNALLY TRANSFERRED NEUTRALIZING DENGUE ANTIBODIES AND WILD TYPE DENGUE INFECTIONS IN THE FIRST TWO YEARS OF THAI INFANTS

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BACKGROUND: It is important to determine the minimum age that is appropriate to administer the available dengue vaccine which based upon the immunogenicity and safety of dengue vaccine and also the duration of persistent maternal antibody.

Methods: A prospective study of maternally

transferred dengue neutralizing antibodies and dengue infections in the first two years of life were assessed in the endemic area of dengue infection.

Results: Ninety-seven percent of the 219 pregnant women in Bangkok had neutralizing antibody to at least one dengue serotype at delivery. Placental transmission of dengue neutralizing antibodies from almost all the mothers to their infants was demonstrated in the cord sera. Maternal transferred neutralizing antibodies to dengue tended to decline six months after birth. At least one dengue serotype antibody persisted in the infants at age 3, 6, and 9 months in 94.7 %, 73.1 %, and 20.2 %, respectively. At 12 months of age, 5.5 % (6/110) of them had low maternal dengue antibody titers against DEN-1 or DEN-2. No dengue antibody was detected in 102 infants at age 18 months. In-apparent dengue infections were observed in 12 infants during the 2-year follow up period. The infected dengue serotypes were DEN-2 nine cases and one each for DEN-1, DEN-3, and DEN-4. The 6-month incidence rates of acute dengue infection were 28.8 and 41.7 per 1,000 infants at the age between 13-18 and 19-24 months, respectively with the cumulative incidence rate of 11%.

Conclusions: Most infants have maternally transferred antibodies and no maternal dengue antibody was detected in infants at age 18 months. Eleven percent of the studied infants acquired dengue infection during the 2- year period. In dengue endemic area, the optimal period to immunize infants with live attenuated tetravalent dengue vaccine between 12 and 18 months of age would be considered.

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LIFE-SAVING RECTAL ARTESUNATE FOR COMPLICATED MALARIA IN CHILDREN

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WE report the effectiveness of two regimens of rectal artesunate formulation in the treating 13 Thai children with cerebral/complicated falciparum malaria. The drug was given at an initial dose of 40 mg/kg bodyweight once daily for three consecutive days. Mefloquine at the dose of 15 mg/kg bodyweight was given orally at 72 hr after

the initial dose of artesunate, followed by 10 mg/kg bodyweight 6 hours later. Three cases with cerebral malaria gained consciousness within 20 hours of artesunate administration. The median time required for the reduction of parasitemia by 90% of the initial value (P_{90}) in 13 children was 11.2 hr. No recrudescence was observed in any of the patients during the 28-day follow-up period. Plasma concentrations of artesunate and dihydroartemisinin (active plasma metabolite of artesunate) measured in two patients who received the high initial dose regimen (20 mg/kg bodyweight) suggested rapid absorption and adequate plasma concentrations of both compounds following the administration of artesunate *via* the rectal route. Further studies for the optimized regimen of rectal artesunate in the treatment of cerebral/complicated childhood falciparum malaria in the area of multidrug resistance are warranted.

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A COMPARISON OF PAIN SCALES IN THAI CHILDREN

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THREE commonly used pain scales, the visual analogue scale, the Wong-Baker Faces Pain Scale, and the Faces Pain Scale Revised were administered to 122 Thai children, of whom half were HIV infected, in order to assess their validity. These scales presented moderate to good correlation and moderate agreement, sufficient for valid use in Thai children.

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PRE-EXPOSURE IM AND ID REGIMENS OF RABIES VACCINE ADMINISTERED CONCOMITANTLY WITH JAPANESE ENCEPHALITIS VACCINE IN TODDLERS

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OBJECTIVE: To compare the immunogenicity and safety of Purified Chick Embryo Cell rabies vaccine (PCECV) for primary pre-exposure prophylaxis after intramuscular (IM) and intradermal (ID) injections given concomitantly with Japanese encephalitis vaccine (JEV) in toddlers with booster dose at one year.

Methods: Two-hundred healthy toddlers aged 12 to 18 months were randomly allocated into one of four pre-exposure PCECV regimens administered within 28 days: 1 ml IM x 3, 0.5 ml IM x 3, 0.1 ml ID x 3, 0.1 ml ID x 2. These four groups also received JEV x 2. The control group received JEV x 2 only. Toddlers in studies group received one booster dose of PCECV at one year later according to the previous allotted regimens. JEV was also given to all toddlers at one year follow-up as well. Safety was evaluated after each injection. Pre- and post-vaccination blood samples were analyzed for neutralizing antibodies (NA) to rabies and Japanese encephalitis virus (JE).

Results: At day 49 after the first injection, all PCECV recipients achieved adequate titers against rabies (RFFIT antibody titers ≥ 0.5 IU/ml) and JE (JE antibody titers ≥ 10 serum dilution). After receiving a booster dose one year after the primary vaccination, a rapid increase in rabies NA was detected, demonstrating an excellent anamnestic immune response. Both vaccines were well tolerated.

Conclusions: PCECV and JEV administration concomitantly in toddlers is safe and induces protective antibodies against both rabies and JE. Long term follow-up to evaluate the persistence of immunogenicity in terms of rabies virus NA titers is on going.

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ELEVATION OF SERUM TRANSCOBALAMIN II IN PATIENTS WITH SCRUB TYPHUS

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SERUM transcobalamin II level were measured in scrub typhus patients. Eighteen out of fifty-two patients admitted to Maharat Nakhon Ratchasima Hospital were diagnosed as scrub typhus infection. The serum unsaturated vitamin B₁₂ binding protein (UBBC) and total vitamin B₁₂ binding protein (TBBC) levels in these patients were significantly higher than in normal subjects ($P < 0.001$). The mean serum transcobalamin II level in the typhus patients was also significantly higher than

in the normal subject ($P = 0.004$). There was a significant correlation between serum TCII levels and typhus IgM or IgG titer ($P < 0.05$), but not to total IgM levels. These findings indicated that patients with scrub typhus had stimulation of reticuloendothelial system as a result of a considerable increase of transcobalamin II levels.

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TRANSIENT REPORTER RNA ASSAY; QUANTIFICATION OF REPORTER GENE MRNA DURING IMMEDIATE EARLY RESPONSE IN MAMMALIAN CELLS BASED ON REAL-TIME REVERSE TRANSCRIPTION POLYMERASE CHAIN REACTION

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WE developed a method for the exact quantification of a reporter gene RNA based on the use of real-time RT-PCR following the transient introduction of the gene into cultured cells. Using a reporter gene controlled by an upstream region of the murine *junB* gene and responsive to phorbol ester, the immediate early and temporal activation and subsequent decrease in transcription were determined. The results showed that relative reporter gene RNA levels decreased to 11- and 7-fold at 4 and 6 h after induction, respectively. The attenuation of promoter activity subsequent to the immediate-early induction observed by the reporter RNA assay was similar to the profile of endogenous *junB* mRNA. These results indicate that the reporter gene RNA level determined with this method precisely reflects the transcriptional activity of the reporter gene.

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ARE TRANSPORTER GENES OTHER THAN THE CHLOROQUINE RESISTANCE LOCUS (PF CRT) AND MULTIDRUG RESISTANCE GENE (PFMDR) ASSOCIATED WITH ANTIMALARIAL DRUG RESISTANCE?

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MU *et al.* (Mu, J., M. T. Ferdig, X. Feng, D. A. Joy, J. Duan, T. Furuya, G. Subramanian, L. Aravind, R. A. Cooper, J. C. Wootton, M. Xiong, and X. Z. Su, *Mol. Microbiol.* 49: 977-989, 2003) recently reported exciting associations between nine new candidate transporter genes and in vitro resistance to chloroquine (CQ) and quinine (QN), with six of these loci showing association with CQ or QN in a southeast Asian population sample. We replicated and extended this work by examining polymorphisms in these genes and in vitro resistance to eight drugs in parasites collected from the Thailand-Burma border. To minimize problems of multiple testing, we used a two-phase study design, while to minimize problems caused by population structure, we analyzed parasite isolates collected from a single clinic. We first examined associations between genotype and drug response in 108 unique single-clone parasite isolates. We found strong associations between single nucleotide polymorphisms in *pfmdr* and mefloquine (MFQ), artesunate (AS), and lumefantrine (LUM) response. We also observed associations between an ABC transporter (G7) and response to QN and AS and between another ABC transporter (G49) and response to dihydro-artemisinin (DHA). We reexamined significant associations in an independent sample of 199 unique single-clone infections from the same location. The significant associations with *pfmdr*-1042 detected in the first survey remained. However, with the exception of the G7-artesunate association, all other associations observed with the nine new candidate transporters disappeared. We also examined linkage disequilibrium (LD) between markers and phenotypic correlations between drug responses. We found minimal LD between genes. Furthermore, we found no correlation between chloroquine and quinine responses, although we did find expected strong correlations between MFQ, QN, AS, DHA, and LUM. To conclude, we found no evidence for an association between 8/9 candidate genes and response to eight different antimalarial drugs. However, the consistent association observed between a 3-bp indel in G7 and AS response merits further investigation.

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HIGH THROUGHPUT ASSAY FOR THE DETERMINATION OF LUMEFANTRINE IN PLASMA

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A high throughput bioanalytical assay for the determination of lumefantrine in plasma has been developed and validated extensively. The within-day precisions for lumefantrine were 5.2, 3.5 and 2.5% at 200, 2000 and 15000 ng/mL, respectively. The between-day precisions were 4.0–2.8 and 3.1% at 200, 2000 and 15000 ng/mL, respectively. The lower limits of quantification (LLOQ) and the limits of detection (LOD) were 25 and 10ng/mL, respectively using 0.250 mL plasma. The average recovery of lumefantrine was 85% and independent upon concentration. The use of 96-well plate format and short chromatographic run has increased the daily sample throughput four times. The assay is particularly suitable for large therapeutic drug monitoring studies using day 7 sampling.

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A RANDOMIZED, CONTROLLED STUDY OF A SIMPLE, ONCE-DAILY REGIMEN OF DIHYDROARTEMISININ-PIPERAQUINE FOR THE TREATMENT OF UNCOMPLICATED, MULTIDRUG-RESISTANT *FALCIPARUM* MALARIA

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BACKGROUND: Dihydroartemisinin-piperazine (DP) is a fixed-combination antimalarial drug increasingly deployed in Southeast Asia. The current regimen involves 4 doses given over 3 days. Simplification of the dose regimen should facilitate treatment adherence and thereby increase effectiveness.

Methods: In a randomized, controlled, 3-arm trial conducted along the northwestern border of Thailand, the standard 4-dose course of DP (DP4) was compared to an equivalent dose given as a once-daily regimen (DP3) and to the standard treatment of mefloquine-artesunate (MAS3).

Results: A total of 499 patients were included in

the study. Times to fever and parasite clearance were similar in all groups. The PCR genotyping-adjusted cure rates at day 63 after treatment initiation were 95.7% (95% confidence interval [95% CI], 92.2%-98.9%) for MAS3, 100% for DP4, and 99.4% (95% CI, 98.1%-100%) for DP3. The DP4 and DP3 cure rates were significantly higher than that for MAS3 ($P=.008$ and $P=.03$, respectively). All regimens were well tolerated. There were 3 deaths (1 in the MAS3 group and 2 in the DP3 group), all of which were considered to be unrelated to treatment. Rates of other adverse events were comparable between the groups, except for diarrhea, which was more common in the DP4 group ($P=.05$ vs. the MAS3 group).

Conclusions: A once-daily, 3-dose regimen of DP is a highly efficacious treatment for multidrug-resistant falciparum malaria. This simple, safe, and relatively inexpensive fixed combination could become the treatment of choice for falciparum malaria.

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POPULATION BIOLOGY AND ANTIMALARIAL RESISTANCE: THE TRANSMISSION OF ANTIMALARIAL DRUG RESISTANCE IN *PLASMODIUM FALCIPARUM*

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MALARIA morbidity and mortality continue to increase across sub-Saharan Africa. This is largely as a result of the continued use of chloroquine and sulfadoxine-pyrimethamine, despite widespread resistance. Although eliminating the asexual stages of *Plasmodium falciparum* is the focus of treatment of individual symptomatic patients, at a population level, reducing the carriage of gametocytes – the sexual stage responsible for infection of the mosquito vector – is necessary to limit the transmission of malaria parasites and the spread of antimalarial resistance. The probability of a mosquito being infected depends on the prevalence, duration and density of viable gametocyte carriage in the human host, although additional humoral and leukocyte factors also affect transmissibility. There is a log-sigmoid relationship between gametocyte density in the patients' blood and infectivity to the mosquito. The infectivity and thus transmission potential associated with a particular

antimalarial treatment can be characterised as a function of blood gametocyte density and time, summing these over the acute and all subsequent recrudescences of that infection. Gametocyte carriage and infectivity to mosquitoes is consistently higher in patients infected with drug resistant compared with drug sensitive malaria parasites. It is the ratio of transmission potential in drug resistant versus sensitive infections that drives the spread of resistance.

Early access to highly effective antimalarial treatment reduces the risk of disease progression and limits gametocyte carriage. The remarkable spread of sulfadoxine-pyrimethamine (SP) resistance across vast regions results from the very high post-treatment prevalence and density of gametocyte carriage following SP treatment. In areas of low intensity malaria transmission, the gametocyte-reducing effect of widespread use of artemisinin-based combination therapy has resulted in a sustained decrease in malaria transmission and a decrease in the spread of resistance. Malaria treatment policy should be based primarily on therapeutic efficacy against asexual stages, but should also consider transmission reduction potential. Artemisinin-based combination therapies are the only antimalarials currently available which rapidly reduce both asexual and gametocyte stages of the *P. falciparum* lifecycle.

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BASELINE CORRELATION AND COMPARATIVE KINETICS OF CEREBROSPINAL FLUID COLONY-FORMING UNIT COUNTS AND ANTIGEN TITERS IN CRYPTOCOCCAL MENINGITIS

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CEREBROSPINAL fluid (CSF) cryptococcal colony-forming unit counts and CSF cryptococcal antigen titers serve as alternative measures of organism load in cryptococcal meningitis. For these measures, we correlated baseline values and rates of decline during the

first 2 weeks of therapy in 68 human immunodeficiency virus-seropositive patients with cryptococcal meningitis. At baseline, there was a strong correlation between CSF cryptococcal colony-forming unit counts and CSF cryptococcal antigen titers. During the first 2 weeks of therapy, CSF cryptococcal colony-forming unit counts decreased by >5 logs, and CSF cryptococcal antigen titers decreased by 1.5 dilutions. In individual patients, there was no correlation between the rate of decline in CSF cryptococcal colony-forming unit counts and that in CSF cryptococcal antigen titers.

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BURKHOLDERIA PSEUDOMALLEI STRAIN TYPE, BASED ON PULSED-FIELD GEL ELECTROPHORESIS, DOES NOT DETERMINE DISEASE PRESENTATION IN MELIOIDOSIS

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MELIOIDOSIS, the infection due to *Burkholderia pseudomallei*, may present with a spectrum of severity and may affect any site in the body. Differential strain virulence and tropism suggested by previous studies would have implications for virulence and vaccine work. We explored clinical correlations using pulsed-field gel electrophoresis (PFGE) typing in a well-characterised clinical collection. Two methods of analysis were used based on band-based similarity values: first, a conventional cluster analysis formed by the unweighted paired group mean analysis, and second, an analysis of the distribution of the "within-group" and "between-group" Dice coefficient. Clinical isolates from 114 cases of melioidosis occurring in the Northern Territory, Australia were studied; 71 strain types were defined with a Simpson's index of 0.91. No correlation was found between strain type and disease severity or site of melioidosis on presentation, with no differences in similarity values found when comparing within and between-groups. In particular, isolates from patients with neurological melioidosis were not clustered. There was evidence of geographical localisation. This study suggests that the variation in strain type may not be as important as host and environmental factors in determining the pattern of disease.

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THE GLOBAL THREAT OF COUNTERFEIT DRUGS: WHY INDUSTRY AND GOVERNMENT MUST COMMUNICATE THE DANGERS

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THE production of substandard and fake drugs is a vast and underreported problem, particularly affecting poorer countries. It is an important cause of unnecessary morbidity, mortality, and loss of public confidence in medicines and health structures. The prevalence of counterfeit drugs appears to be rising (see "The Scale of the Problem") and has not been opposed by close cooperation between drug companies, governments, or international organizations concerned with trade, health, customs and excise, and counterfeiting.

In this article we suggest that many pharmaceutical companies and governments are reluctant to publicize the problem to health staff and the public, apparently motivated by the belief that the publicity will harm the sales of brand-name products in a fiercely competitive business. Publicly, at least, several industry sources say the justification for secrecy is to avoid any alarm that could prevent patients taking their genuine medicines. We argue that this secrecy, and the subsequent lack of public health warnings, is harming patients and that it is also not in the long-term interests of the legitimate pharmaceutical industry. We urge a change to mandatory reporting to governmental authorities, which should also have a legal duty to investigate, issue appropriate public warnings, and share information across borders. This is not a role for the pharmaceutical industry, which has a serious conflict of interest.

While some drug companies have given public warnings to protect patients, others have been criticized for withholding information and, in a recent development in the United States, taken to court for failing to act. The industry is addressing the problem. In 2003, US pharmaceutical companies made an agreement with the US Food and Drug Administration (FDA) that they would report suspected counterfeit drugs to the FDA within five days of discovery (see "Companies That Have Warned"), although this remains a voluntary arrangement. In many poorer countries, where the problem is at its worst, there are no similar

governmental and industry initiatives.

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ACTIVATION OF CYTOTOXIC LYMPHOCYTES IN PATIENTS WITH SCRUB TYPHUS

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THAI patients with scrub typhus caused by the intracellular pathogen *Orientia tsutsugamushi* displayed elevated plasma concentrations of granzymes A and B, interferon- γ (IFN)- γ -inducible protein 10, and monokine induced by IFN- γ . These data suggest that activation of cytotoxic lymphocytes is part of the early host response to scrub typhus

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STAGE-DEPENDENT PRODUCTION AND RELEASE OF HISTIDINE-RICH PROTEIN 2 BY *PLASMODIUM FALCIPARUM*

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BECAUSE of their sequestration in the microcirculation, the pathogenic late stages of *Plasmodium falciparum* are under-represented in peripheral blood samples from patients with falciparum malaria. Excreted products of the parasite might help to estimate this sequestered biomass. We quantified the stage-dependent production and release per parasite of *P. falciparum* histidine-rich protein 2 (PfHRP2) with the objective of measuring the sequestered biomass.

A simple method to relate parasite stage to parasite age was developed to facilitate this. In four isolates of *P. falciparum*, the median (range) PfHRP2 content was 2.0fg (0.5-4.3fg) for a young ring stage infected erythrocyte, and 5.4fg (2.1-10.2fg) for the schizont stage. The amount of PfHRP2 in the parasitized erythrocyte increased most during development to the mature trophozoite stage. The median (range) amount of PfHRP2 secreted per parasite per entire erythrocytic cycle was 5.2fg (1.1-13.0fg). A median of 89% of the total PfHRP2 was excreted at the moment of schizont rupture. This assessment of the stage-dependent release of PfHRP2 is an essential prerequisite for future studies aimed at estimating the total patient parasite mass from the peripheral blood PfHRP2 concentration.

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PRACTICAL PCR GENOTYPING PROTOCOLS FOR *PLASMODIUM VAVAX* USING PVCS ANF PVMSP1

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BACKGROUND: *Plasmodium vivax* is the second most prevalent malaria parasite affecting more than 75 million people each year, mostly in South America and Asia. In addition to major morbidity this parasite is associated with relapses and a reduction in birthweight. The emergence and spread of drug resistance in *Plasmodium falciparum* is a major factor in the resurgence of this parasite. *P. vivax* resistance to drugs has more recently emerged and monitoring the situation would be helped, as for *P. falciparum*, by molecular methods that can be used to characterize parasites in field studies and drug efficacy trials.

Methods: Practical PCR genotyping protocols based on polymorphic loci present in two *P. vivax* genetic markers, *Pvcs* and *PvmSP1*, were developed. The methodology was evaluated using 100 *P. vivax* isolates

collected in Thailand.

Results and Discussion: Analysis revealed that *P. vivax* populations in Thailand are highly diverse genetically, with mixed genotype infections found in 26 % of the samples (average multiplicity of infection = 1.29). A large number of distinguishable alleles were found for the two markers, 23 for *Pvcs* and 36 for *PvmSP1*. These were generally randomly distributed amongst the isolates. A total of 68 distinct genotypes could be enumerated in the 74 isolates with a multiplicity of infection of 1.

Conclusion: These results indicate that the genotyping protocols presented can be useful in the assessment of *in vivo* drug efficacy clinical trials conducted in endemic areas and for epidemiological studies of *P. vivax* infections.

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ROLE AND SIGNIFICANCE OF QUANTITATIVE URINE CULTURES IN DIAGNOSIS OF MELIOIDOSIS

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MELIOIDOSIS is associated with significant mortality in countries in which it is endemic. Previous studies have demonstrated that quantitative *Burkholderia pseudomallei* counts in blood are predictive of mortality. Here we examine the relationship between outcomes and quantitative *B. pseudomallei* counts in urine. A total of 755 patients presenting to Sappasithiprasong Hospital, Ubon Ratchathani, northeast Thailand (in the northeast part of the country), with melioidosis between July 1993 and October 2003 had quantitative urine cultures performed within 72 h of admission. Urine culture results were divided into the following groups: (i) no growth of *B. pseudomallei* from a neat sample or pellet, (ii) positive result from a centrifuged pellet only (<10³ CFU/ml), (iii) detection of between 10³ CFU/ml and 10⁵ CFU/ml from a neat sample, or (iv) detection of 10⁵ CFU/ml from a neat sample. The overall in-hospital mortality rate was 45%. Patients with negative urine cultures had the lowest

death rate (39%). Mortality rates rose with increasing *B. pseudomallei* counts in urine, from 58% for those with positive spun pellets only to 61% for those with between 10³ CFU/ml and 10⁵ CFU/ml and 71% for those with 10⁵ CFU/ml. This was independent of age, presence of bacteremia, known risk factors for melioidosis such as diabetes, and the prior administration of antibiotics. The presence of *B. pseudomallei* in urine during systemic infection is associated with a poor prognosis.

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DEVELOPMENT AND VALIDATION OF A BIOANALYTICAL METHOD USING AUTOMATED SOLID-PHASE EXTRACTION AND LC-UV FOR THE SIMULTANEOUS DETERMINATION OF LUMEFANTRINE AND ITS DESBUTYL METABOLITE IN PLASMA

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A BIOANALYTICAL method for the determination of lumefantrine (LF) and its metabolite desbutyl-lumefantrine (DLF) in plasma by solid-phase extraction (SPE) and liquid chromatography has been developed. Plasma proteins were precipitated with acetonitrile:acetic acid (99:1, v/v) containing a DLF analogue internal standard before being loaded onto a octylsilica (3 M Empore) SPE column. Two different DLF analogues were evaluated as internal standards. The compounds were analysed by liquid chromatography UV detection on a SB-CN (250 mm x 4.6 mm) column with a mobile phase containing acetonitrile-sodium phosphate buffer pH (2.0; 0.1 M) (55:45, v/v) and sodium perchlorate 0.05 M. Different SPE columns were evaluated during method development to optimise reproducibility and recovery for LF, DLF and the two different DLF analogues. The within-day precisions for LF were 6.6 and 2.1% at 0.042 and 8.02 microg/mL, respectively, and for DLF 4.5 and 1.5% at 0.039 and 0.777 microg/mL, respectively. The between-day precisions for LF were 12.0 and 2.9% at 0.042 and 8.02 microg/mL, respectively, while for DLF 0.7 and 1.2% at 0.039 and 0.777 microg/mL, respectively. The limit of quantification was 0.024 and 0.021 microg/mL for LF and DLF, respectively. Different amounts of lipids in plasma did not affect the absolute recovery of LF or DLF.

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DEVELOPMENT AND VALIDATION OF A SOLID-PHASE EXTRACTION-LIQUID CHROMATOGRAPHIC METHOD FOR DETERMINATION OF AMOXICILLIN IN PLASMA

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A BIOANALYTICAL method for the determination of amoxicillin in plasma by hydrophilic interaction solid-phase extraction and liquid chromatography has been developed and validated. Plasma was precipitated with acetonitrile before samples were loaded onto a zwitterionic hydrophilic interaction liquid chromatography (ZIC-HILIC) solid-phase extraction column. Amoxicillin was analyzed by liquid chromatography on an Aquasil (150 x 4.6 mm) LC column with mobile-phase acetonitrile: phosphate buffer (pH 2.5; 0.1 mol/L) (7:93, v/v) and UV detection at 230 nm. A regression model using 1/concentration weighting was found the most appropriate for quantification. The intraassay precision for plasma was 3.3% at 15.0 mug/mL and 10.9% at 0.200 mug/mL. The interassay precision for plasma was 1.8% at 15.0 mug/mL and 7.5% at 0.200 mug/mL. The total-assay precision for plasma over 4 days using a total of 20 replicates was 13.2%, 5.5%, and 3.8% at 0.200 mug/mL, 3.00 mug/mL, and 15.0 mug/mL, respectively. The lower limit of quantification and the limit of detection were 0.050 mug/mL and 0.025 mug/mL, respectively, for 100 muL plasma. Long-term storage stability studies of amoxicillin in plasma indicate that a temperature of -80 degrees C is necessary to prevent degradation of amoxicillin.

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SIMULTANEOUS QUANTITATION OF THE HIGHLY LIPOPHILIC STOVAQUONE AND HYDROPHILIC STRONG BASIC PROGUANIL AND ITS METABOLITES USING A NEW MIXED-MODE SPE APPROACH AND STEEP-GRADIENT LC

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A BIOANALYTICAL method is described for the simultaneous quantitative analysis of the highly lipophilic atovaquone and the strong basic proguanil with metabolites in plasma. The drugs are extracted from protein precipitated plasma samples on a novel mixed-mode solid-phase extraction (SPE) column containing carboxypropyl and octyl silica as functional groups. The analytes are further separated and quantitated using a steep-gradient liquid chromatographic method on a Zorbax SB-CN column with UV detection at 245 nm. Two different internal standards (IS) are used in the method to compensate for both types of analytes. A structurally similar IS to atovaquone is added with acetonitrile to precipitate proteins from plasma. A structurally similar IS to proguanil and its metabolites is added with phosphate buffer before samples are loaded onto the SPE columns. A single elution step is sufficient to elute all analytes. The method is validated according to published guidelines and shows excellent performance. The within-day precisions, expressed as relative standard deviation, are lower than 5% for all analytes at three tested concentrations within the calibration range. The between-day precisions are lower than 13% for all analytes at the same tested concentrations. The limit of quantitation is 25 nM for the basic substances and 50 nM for atovaquone. Several considerations regarding development and optimization of a method for determination of analytes with such a difference in physicochemical properties are discussed.

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HIGH THROUGHPUT ASSAY FOR THE DETERMINATION OF PIPERAQUINE IN PLASMA

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A HIGH throughput assay for the determination of the antimalarial piperazine in plasma has been developed and validated. The assay utilises 96-wellplate formats throughout the whole procedure, and easily enables a throughput of 192 samples a day using a single LC system. Buffer (pH 2.0; 0.05M) containing internal standard was added to 0.25mL plasma in a 96-wellplate (2mL wells). The samples were extracted on a MPC solid phase extraction deep well 96-wellplate (3M Empore). Piperazine and internal standard were analysed by liquid chromatography with UV detection on a Chromolith Performance (100mmx4.6mm) column with a mobile phase containing acetonitrile-phosphate buffer (pH 2.5; 0.1M) (8:92, v/v) at a flow rate of 3.0mL/min. The within-day precisions for piperazine were 3.3 and 2.3% at 40 and 1250ng/mL, respectively. The between-day precisions for piperazine were 5.8 and 1.3% at 40 and 1250ng/mL, respectively. The total assay precisions using 29 replicates over 5 days were 6.7, 4.5 and 2.7% at 40, 200 and 1250ng/mL, respectively. The lower limit of quantification (LLOQ) and the limit of detection (LOD) were 10 and 5ng/mL, respectively using 0.25mL plasma. Using 1mL of plasma, it was possible to decrease LLOQ and LOD to 2.5 and 1.25ng/mL, respectively.

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CEREBROSPINAL FLUID LEVELS OF MARKERS OF BRAIN PARENCHYMAL DAMAGE IN VIETNAMESE ADULTS WITH SEVERE MALARIA

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A RETROSPECTIVE study of cerebrospinal fluid (CSF) markers of brain parenchymal damage was conducted in Vietnamese adults with severe malaria. Three markers were analysed by immunoassays: the microtubule-associated protein tau, for degenerated axons; neuron-specific enolase (NSE), for neurons; and S100B for astrocytes. The mean concentration of tau proteins in the CSF was significantly raised in patients with severe malaria compared with controls

($P = 0.0003$) as reported for other central nervous system diseases. By contrast, the mean concentration of NSE and S100B remained within the normal range. Tau levels were associated with duration of coma ($P = 0.004$) and S100B was associated with convulsions ($P = 0.006$). Concentrations of axonal and astrocyte degeneration markers also were associated with vital organ dysfunction. No association was found between the level of markers of brain parenchymal damage on admission and a fatal outcome. On admission to hospital, patients with severe malaria had biochemical evidence of brain parenchymal damage predominantly affecting axons.

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SELECTION STRENGTH AND HITCHHIKING AROUND TWO ANTI-MALARIA RESISTANCE GENES

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NEUTRAL mutations may hitchhike to high frequency when they are situated close to sites under positive selection, generating local reductions in genetic diversity. This process is thought to be an important determinant of levels of genomic variation in natural populations. The size of genome regions affected by genetic hitchhiking is expected to be dependent on the strength of selection, but there is little empirical data supporting this prediction. Here, we compare microsatellite variation around two drug resistance genes (chloroquine resistance transporter (pfcr), chromosome 7, and dihydrofolate reductase (dhfr), chromosome 4) in malaria parasite populations exposed to strong (Thailand) or weak selection (Laos) by anti-malarial drugs. In each population, we examined the point mutations underlying resistance and length variation at 22 (chromosome 4) or 25 (chromosome 7) microsatellite markers across these chromosomes. All parasites from Thailand carried the K76T mutation in pfcr conferring resistance to chloroquine (CQ) and 2–4 mutations in dhfr conferring resistance to

pyrimethamine. By contrast, we found both wild-type and resistant alleles at both genes in Laos. There were dramatic differences in the extent of hitchhiking in the two countries. The size of genome regions affected was smaller in Laos than in Thailand. We observed significant reduction in variation relative to sensitive parasites for 34–64kb (2–4cM) in Laos on chromosome 4, compared with 98–137kb (6–8cM) in Thailand. Similarly, on chromosome 7, we observed reduced variation for 34–69kb (2–4cM) around pfcr in Laos, but for 195–268kb (11–16cM) in Thailand. Reduction in genetic variation was also less extreme in Laos than in Thailand. Most loci were monomorphic in a 12kb region surrounding both genes on resistant chromosomes from Thailand, whereas in Laos, even loci immediately proximal to selective sites showed some variation on resistant chromosomes. Finally, linkage disequilibrium (LD) decayed more rapidly around resistant pfcr and dhfr alleles from Laos than from Thailand. These results demonstrate that different realizations of the same selective sweeps may vary considerably in size and shape, in a manner broadly consistent with selection history. From a practical perspective, genomic regions containing resistance genes may be most effectively located by genome-wide association in populations exposed to strong drug selection. However, the lower levels of LD surrounding resistance alleles in populations under weak selection may simplify identification of functional mutations.

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PHARMACOKINETICS OF ORAL DOXYCYCLINE DURING COMBINATION TREATMENT OF SEVERE FALCIPARUM MALARIA

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THE pharmacokinetics of oral doxycycline administered at 200 mg every 24 h were investigated in 17 patients recovering from severe *Plasmodium falciparum* malaria. The data suggest that the doses of doxycycline currently recommended (circa 3.5 mg/kg of body weight daily) may not be optimal.

ABSTRACTS

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DESTABILISATION AND SUBSEQUENT LYSIS OF HUMAN ERYTHROCYTES INDUCED BY *PLASMODIUM FALCIPARUM* HAEM PRODUCTS

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IN falciparum malaria, both infected and uninfected red cells have structural and functional alterations. To investigate the mechanisms of these modifications, we studied the effects of two *Plasmodium falciparum* haem products (haematin and malaria pigment in the synthetic form beta-haematin) on isolated human red blood cells (RBCs) and purified RBC ghosts. A dose- and time-dependent incorporation of haematin into RBC ghosts and intact cells was observed, which was in proportion to the extent of haematin-induced haemolysis. RBCs pre-incubated with haematin were more sensitive to haemolysis induced by hypotonic shock, low pH, H₂O₂ or haematin itself. Haemolysis was not related to membrane lipid peroxidation and only partially to oxidation of protein sulphhydryl groups and it could not be prevented by scavengers of lipid peroxidation or hydroperoxide groups. N-acetylcysteine partly protected the oxidation of SH groups and significantly reduced haemolysis. In contrast, beta-haematin was neither haemolytic nor oxidative towards protein sulphhydryl groups. Beta-haematin did destabilise the RBC membrane, but to a lesser extent than haematin, inducing increased susceptibility to lysis caused by hypotonic medium, H₂O₂ or haematin. This study suggests that the destabilising effect of haematin and, to a much less extent, beta-haematin on the RBC membrane does not result from oxidative damage of membrane lipids but from direct binding or incorporation which may affect the reciprocal interactions between the membrane and cytoskeleton proteins. These changes could contribute to the reduced red cell deformability associated with severe malaria.

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A RANDOMIZED COMPARISON OF ORAL CHLORAMPHENICOL VERSUS OFLOXACIN IN THE TREATMENT OF UNCOMPLICATED TYPHOID FEVER IN LAOS

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WE conducted a randomized open trial of oral chloramphenicol (50 mg/kg/day in four divided doses for 14 days) versus ofloxacin (15 mg/kg/day in two divided doses for 3 days) in 50 adults with culture-confirmed uncomplicated typhoid fever in Vientiane, Laos. Patients had been ill for a median (range) of 8 (2–30) days. All *Salmonella enterica* serotype typhi isolates were nalidixic acid-sensitive, four (8%) were chloramphenicol-resistant and three (6%) were multidrug-resistant. Median (range) fever clearance times were 90 (24–224) hours in the chloramphenicol group and 54 (6–93) hours in the ofloxacin group ($P < 0.001$). One patient in the chloramphenicol group developed an ileal perforation. Three days ofloxacin was more effective than 14 days chloramphenicol for the in-patient treatment of typhoid fever, irrespective of antibiotic susceptibility, and was of similar cost.

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IFN- γ AT THE SITE OF INFECTION DETERMINES OF CLEARANCE OF INFECTION IN CRYPTOCOCCAL MENINGITIS

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In animal models, immunity to cryptococcal infection, as in many chronic fungal and bacterial infections, is associated with a granulomatous inflammatory response, intact cell-mediated immunity, and a Th1 pattern of cytokine release. To examine the correlates of human immunity to cryptococcal infection in vivo, we analyzed immune parameters at the site of infection over time and assessed the rate of clearance of infection by serial quantitative cerebrospinal fluid (CSF) fungal cultures in 62 patients in a trial of antifungal therapy for HIV-associated cryptococcal meningitis. CSF IL-6, IFN-gamma, TNF-alpha, and IL-8 were significantly higher in survivors compared with nonsurvivors. There were negative correlations between log TNF-alpha, IFN-gamma, and IL-6 levels and baseline cryptococcal CFU. Log IFN-gamma, G-CSF, TNF-alpha, and IL-6 were correlated positively with the rate of fall in log CFU/ml CSF/day. In a linear regression model including antifungal treatment group, baseline CFU, and these cytokines, only treatment group and log IFN-gamma remained independently associated with rate of clearance of infection. The results provide direct in vivo evidence for the importance of quantitative differences in IFN-gamma secretion in human immune control of granulomatous infections, and increase the rationale for adjunctive IFN-gamma in the treatment of refractory HIV-associated cryptococcosis.

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FATAL *PLASMODIUM FALCIPARUM* MALARIA CAUSES SPECIFIC PATTERNS OF PLENIC ARCHITECTURAL DISORGANIZATION

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THE spleen is critical for host defense against pathogens, including *Plasmodium falciparum*. It has a dual role, not only removing aged or antigenically altered erythrocytes from the blood but also as the major lymphoid organ for blood-borne or systemic infections. The human malaria parasite *P. falciparum* replicates within erythrocytes during asexual blood stages and causes repeated infections that can be associated with severe disease. In spite

of the crucial role of the spleen in the innate and acquired immune response to malaria, there is little information on the pathology of the spleen in human malaria. We performed a histological and quantitative immunohistochemical study of spleen sections from Vietnamese adults dying from severe falciparum malaria and compared the findings with the findings for spleen sections from control patients and patients dying from systemic bacterial sepsis. Here we report that the white pulp in the spleens of patients dying from malaria showed a marked architectural disorganization. We observed a marked dissolution of the marginal zones with relative loss of B cells. Furthermore, we found strong HLA-DR expression on sinusoidal lining cells but downregulation on cordal macrophages. *P. falciparum* infection results in alterations in splenic leukocytes, many of which are not seen in sepsis.

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INTERMITTENT PRESUMPTIVE TREATMENT FOR MALARIA

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INTERMITTENT presumptive treatment (IPT) in pregnancy involves giving a curative treatment dose of an effective antimalarial drug at predefined intervals during pregnancy. IPT in pregnancy was first introduced in areas of high malaria transmission as a measure to reduce the adverse impact of *Plasmodium falciparum* malaria in pregnancy. Later, based on trials showing that IPT could reduce anaemia in young children and also malaria episodes in infants, it was extended as a measure to reduce morbidity and mortality in the first year of life.

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DYNAMIC DETERMINANTS OF THE CYTOADHERENCE OF *PLASMODIUM FALCIPARUM*-INFECTED ERYTHROCYTES

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SINCE Marchiafava and Bignami noted in their pathologic studies of falciparum malaria that “malignancy coincides with an exceptionally abundant quantity of parasitic forms, a quantity much more abundant—where the cases terminate fatally—in the blood of the viscera than in the blood of the finger,” sequestration has been considered central to the pathology of this potentially lethal infection. The Roman pathologists also observed that the process was not uniform among the vital organs, noting particularly the “accumulation in the cerebral vessels of red blood corpuscles loaded with amoebae.” The result of this pathologic process was described as “mechanical alterations in the circulation”; or, in other words, a traffic jam. With the development of methods for *ex vivo* culture of *Plasmodium falciparum*, malariologists have studied this process of cytoadherence of parasitized erythrocytes to endothelial cells (or the purified immobilized cell surface “receptors”) in the laboratory and have progressively tried to recreate the same conditions that occur *in vivo*. This is not easy, as blood is a thick and complex soup of deformable cells suspended in a variable consommé of plasma proteins, electrolytes, and a variety of small organic molecules. Its effective viscosity changes nonlinearly under the different shear rates encountered in the circulation (non-Newtonian behavior). Malaria is associated with fever, progressive anemia, thrombocytopenia, an increase in acute phase proteins, reduction in serum albumin, and, in severe infections, reduced uninfected red cell deformability.

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RAPID IMMUNOFLUORESCENCE MICROSCOPY FOR DIAGNOSIS OF MELIOIDOSIS

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AN immunofluorescent (IF) method that detects *Burkholderia pseudomallei* in clinical specimens within 10 min was devised. The results of this rapid method and those of an existing IF method were prospectively compared with the culture results for 776 specimens from patients with suspected melioidosis. The sensitivities of both IF tests were 66%, and the specificities were 99.5 and 99.4%, respectively.

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DETECTION OF *BURKHOLDERIA PSEUDOMALLEI* IN SOIL WITHIN THE LAO PEOPLE’S DEMOCRATIC REPUBLIC

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CLINICAL cases of melioidosis caused by the saprophyte *Burkholderia pseudomallei* were first noted in the Lao People’s Democratic Republic (PDR) in 1999. In this study, 36% of 110 soil samples in northern Lao PDR were positive for *B. pseudomallei*, providing further evidence for the presence of melioidosis in this country

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TRIMETHOPRIME SULFAMETHOXAZOLE RESISTANCE IN CLINICAL ISOLATES OF *BURKHOLDERIA PSEUDOMALLEI*

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OBJECTIVES: Trimethoprim/sulfamethoxazole is commonly used to treat melioidosis. Antimicrobial susceptibility testing using the disc diffusion method is commonly used in melioidosis-endemic areas, but may overestimate resistance to trimethoprim/sulfamethoxazole.

PATIENTS AND METHODS: We performed disc diffusion and Etest on isolates from the first positive culture for all patients presenting to Sappasithiprasong Hospital, Ubon Ratchathani, Thailand, with culture-confirmed melioidosis between 1992 and 2003.

RESULTS: The estimated resistance rate for 1976 clinical *Burkholderia pseudomallei* isolates was 13% by Etest and 71% by disc diffusion. All isolates classed as either susceptible (n=358) or as having intermediate resistance (n=218) on disc diffusion were susceptible by Etest. Only 258 of the 1400 (18%) isolates classed as resistant on disc diffusion were resistant by Etest.

CONCLUSIONS: Disc diffusion testing of *B. pseudomallei* may be useful as a limited screening tool in resource poor settings. Isolates assigned as 'susceptible' or 'intermediate' by disc diffusion may be viewed as 'susceptible'; those assigned as 'resistant' require further evaluation by MIC methodology

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HOW DO PATIENTS USE ANTIMALARIAL DRUGS? A REVIEW OF THE EVIDENCE

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PATIENT adherence is a major determinant of the therapeutic response to antimalarial drugs, as most treatments are taken at home without medical supervision. With the introduction of new, effective, but more expensive antimalarials, there is concern that the high levels of efficacy observed in clinical trials may not be translated into effectiveness in the normal context of use. We reviewed available published evidence on adherence to antimalarial drugs and community drug usage; 24 studies were identified of which nine were 'intervention' studies, seven were classified as 'outcome studies', and the remainder were purely descriptive studies of antimalarial adherence. Definitions, methods, and results varied widely. Adherence was generally better when treatments were effective, and was improved by interventions focusing on provider knowledge and behaviour, packaging, and provision of correct dosages. There is insufficient information on this important subject, and current data certainly do not justify extrapolation from results with ineffective drugs to new effective treatments. Research in this area would benefit from standardization of methodologies and the application of pharmacokinetic modelling.

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