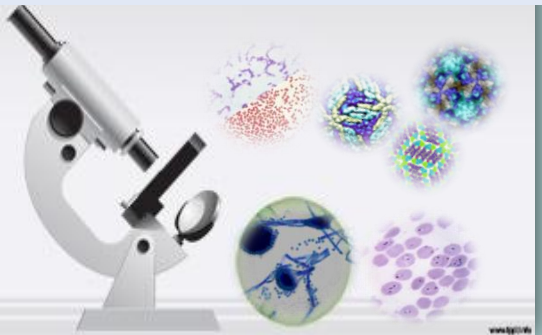
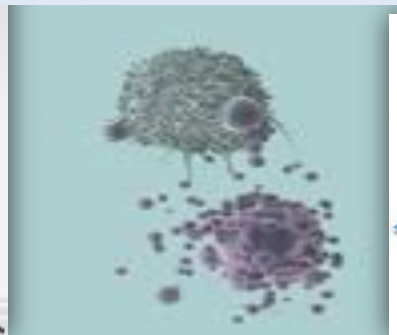
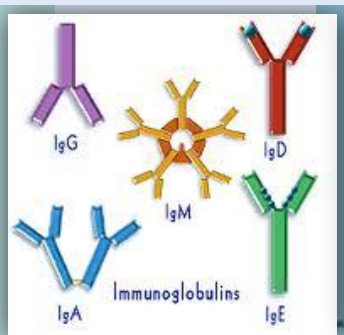
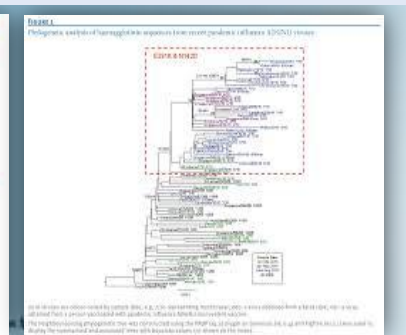
การนำเสนอผลงาน
ภาควิชาจุลชีววิทยาและอิมมิวโนโลยี
คณะเวชศาสตร์เขตร้อน, มหาวิทยาลัยมหิดล
24 ตุลาคม 2557

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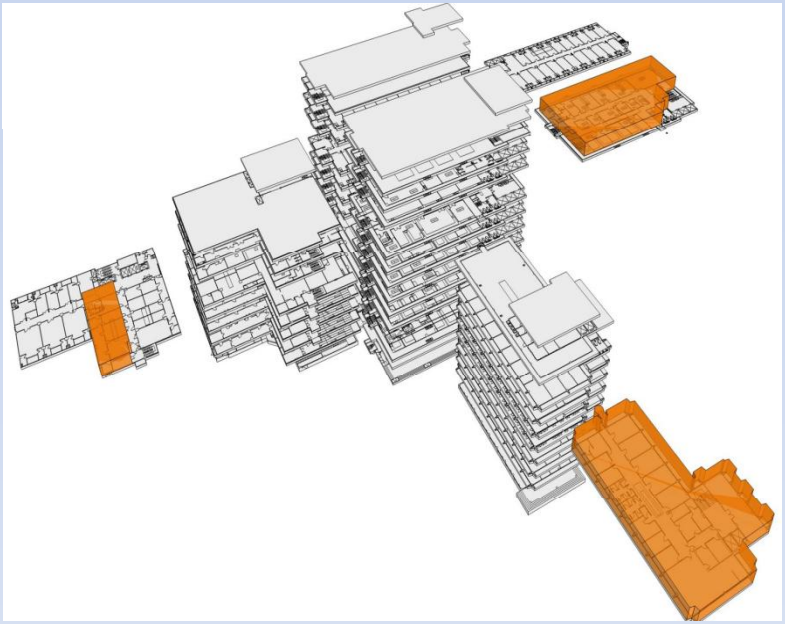
ที่ตั้ง



- อาคารจำลองฯ ชั้น 9
- อาคารเฉลิมพระเกียรติ 50 ปี ชั้น 10
- อาคารคุณหญิงตระหนักจิต ชั้น 6 และ 7

ก่อตั้ง เมื่อ 29 มิถุนายน 2509

หัวหน้าภาควิชา

ศ.ดร.นพ.สวณัฐ ธาระวานิช
รศ.ดร.ประมวญ เทพชัยศรี
ศ.ดร.ศรีสิน คูสมิทธิ์
รศ.สุธางค์ ตันติวณิช
รศ.ดร.มนัส จงสงวน

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บุคลากร

สายวิชาการ

ศาสตราจารย์	1	ตำแหน่ง
รองศาสตราจารย์	1	ตำแหน่ง
ผู้ช่วยศาสตราจารย์	5	ตำแหน่ง
อาจารย์	5	ตำแหน่ง

อาจารย์ ลาศึกษาต่อ	1	ตำแหน่ง

สายสนับสนุนวิชาการ

นักวิทยาศาสตร์ (ป.โท)	4	ตำแหน่ง
นักวิทยาศาสตร์ (ป.ตรี)	6	ตำแหน่ง
ผู้ปฏิบัติงานวิทยาศาสตร์การแพทย์ (อนุปริญญา)	1	ตำแหน่ง

สายสนับสนุนทั่วไป

เจ้าหน้าที่ธุรการ	2	ตำแหน่ง
พนักงานสถานที่	4	ตำแหน่ง

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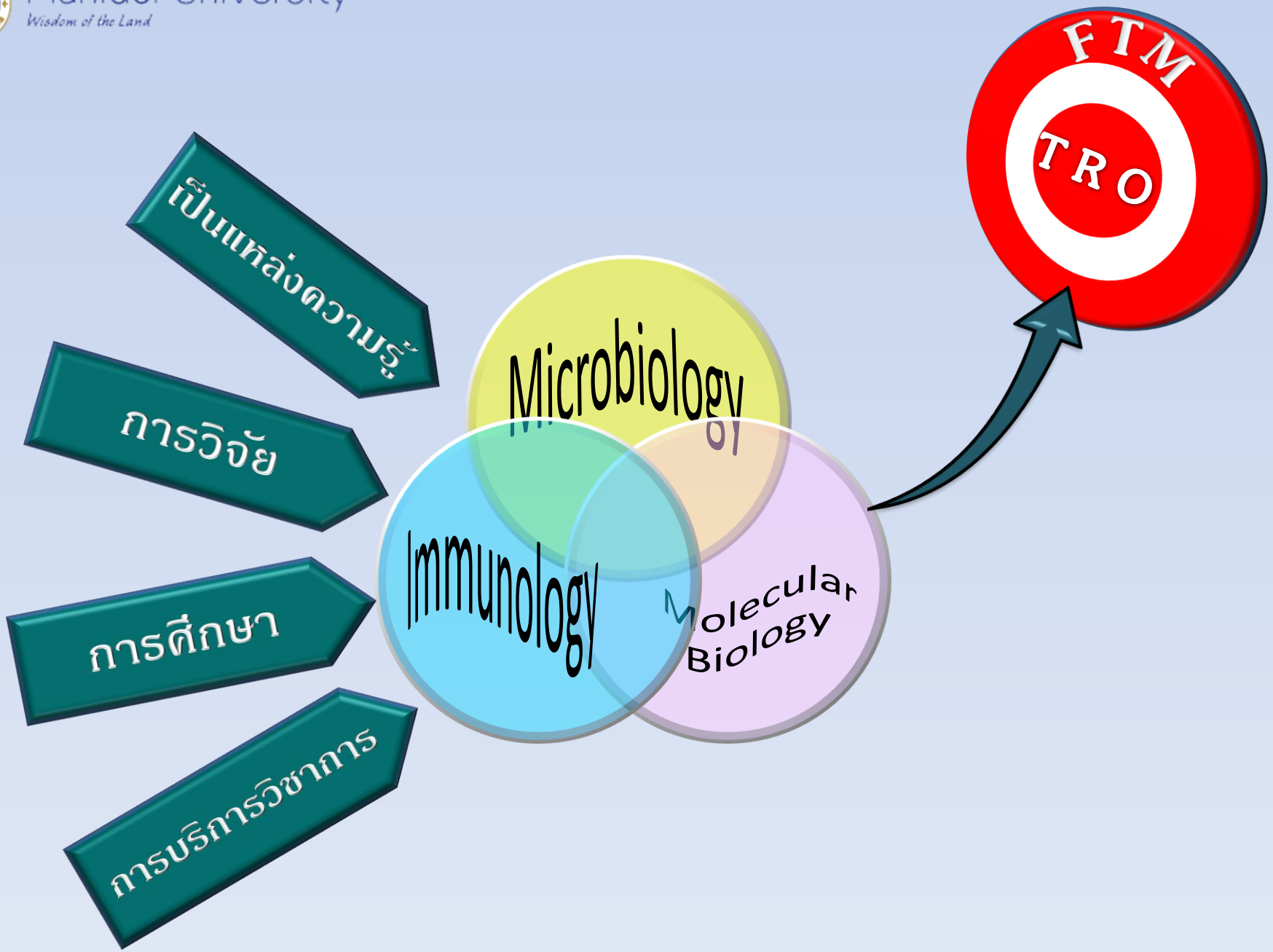
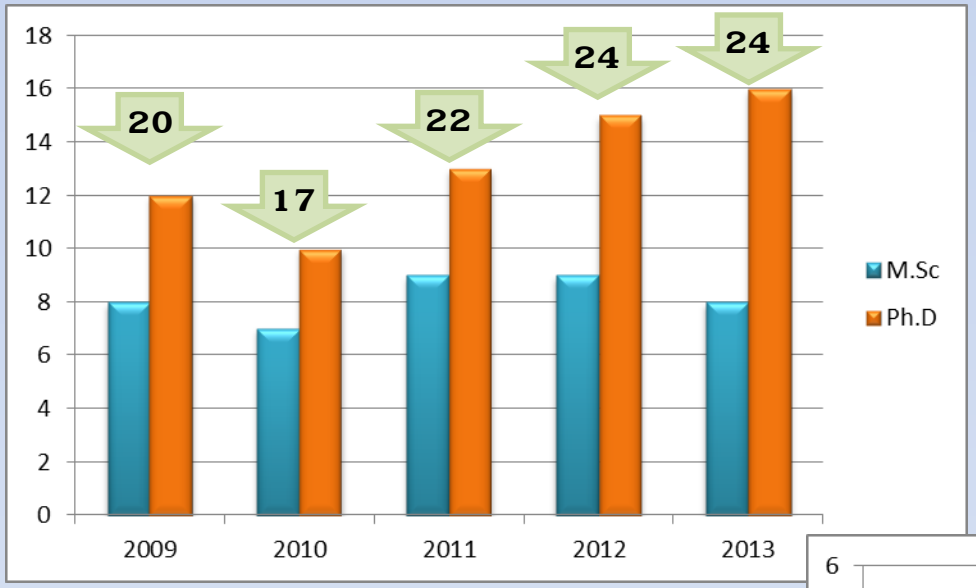
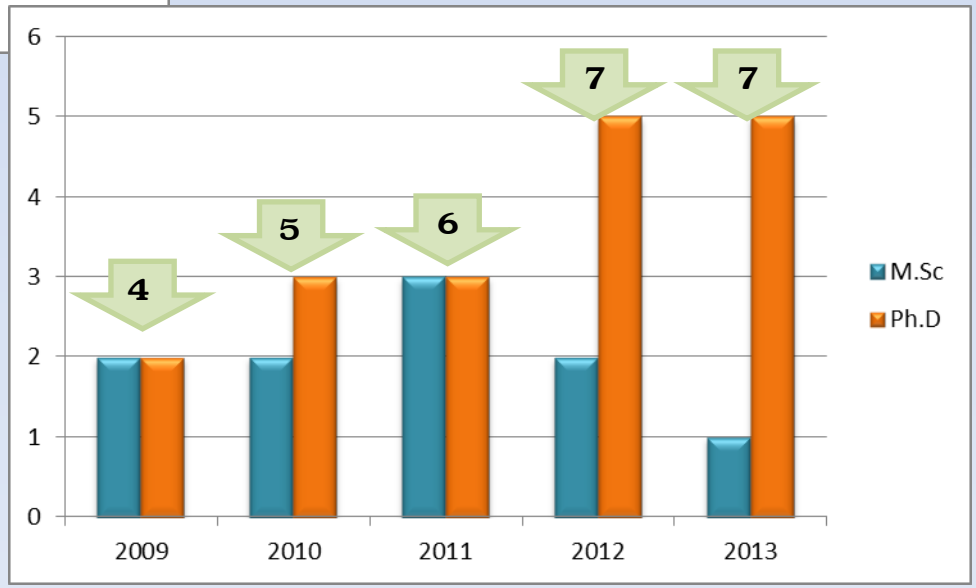


M.Sc & Ph.D (Trop. Med.)



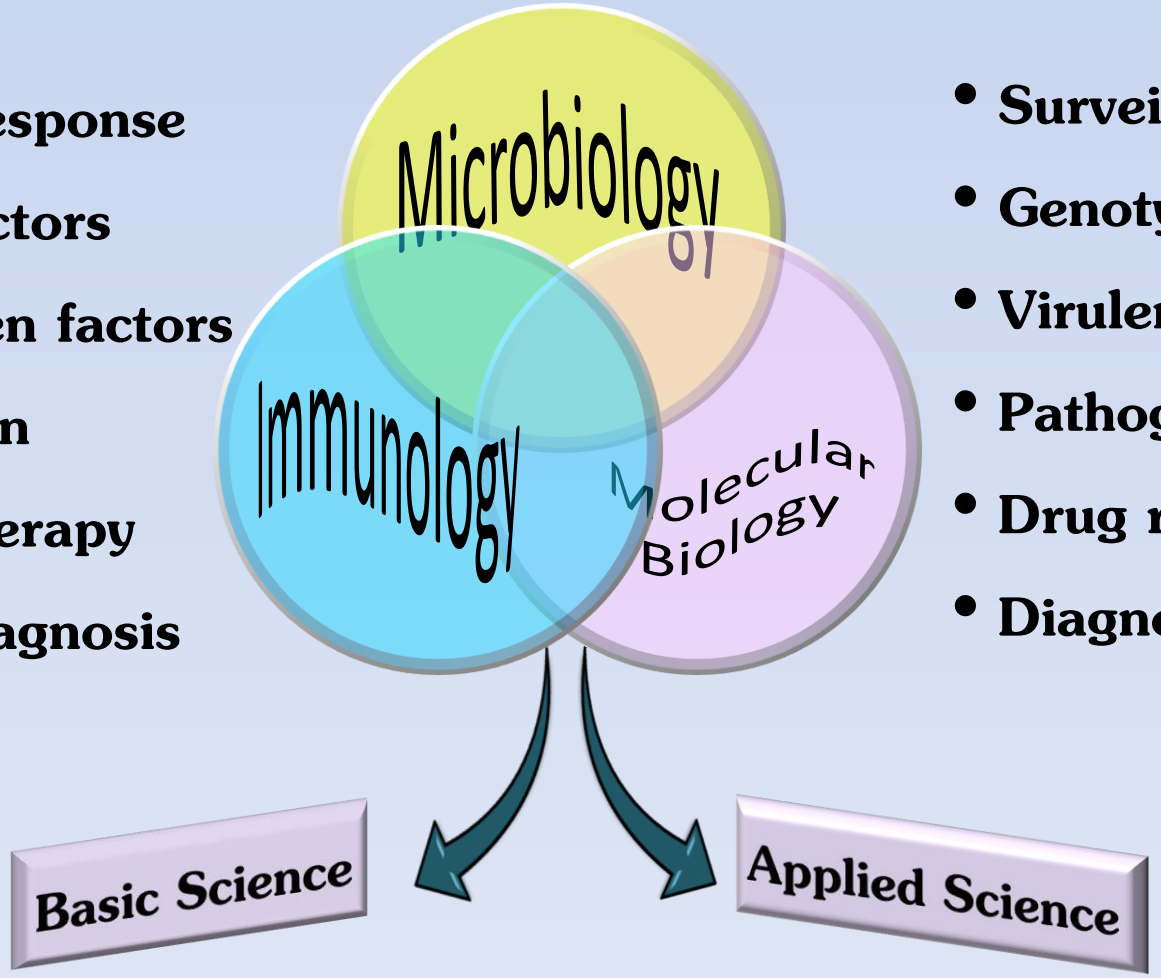
นักศึกษาสะสม

นักศึกษาใหม่



Fields of studies

- Immune response
  - Host factors
  - Pathogen factors
- Vaccination
- Immunotherapy
- Immunodiagnosis



- Surveillance
- Genotyping
- Virulence factors
- Pathogenesis
- Drug resistance
- Diagnosis

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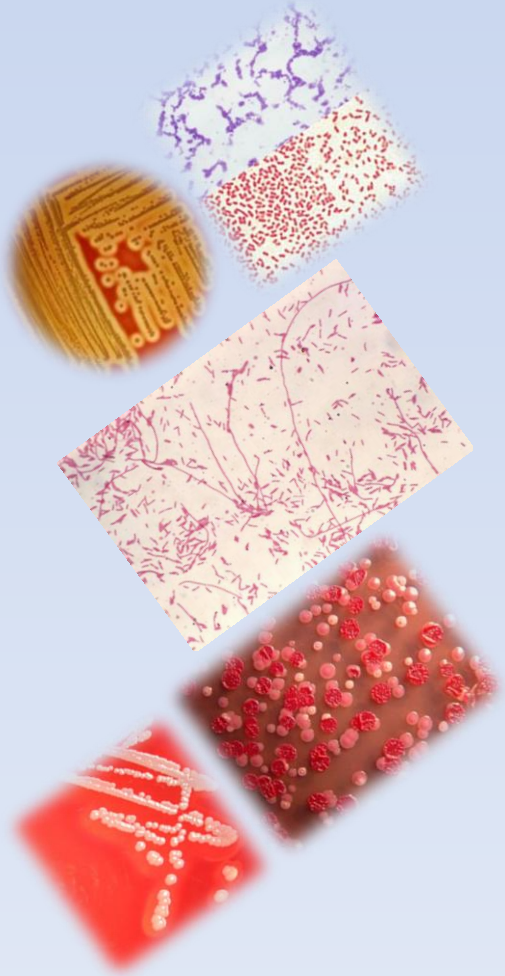
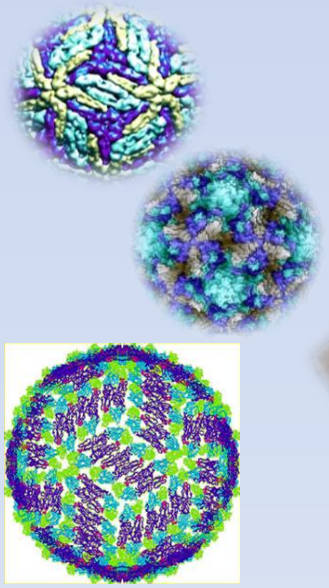
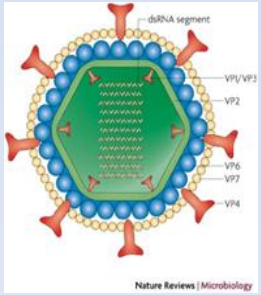
Microbiology

Bacteria

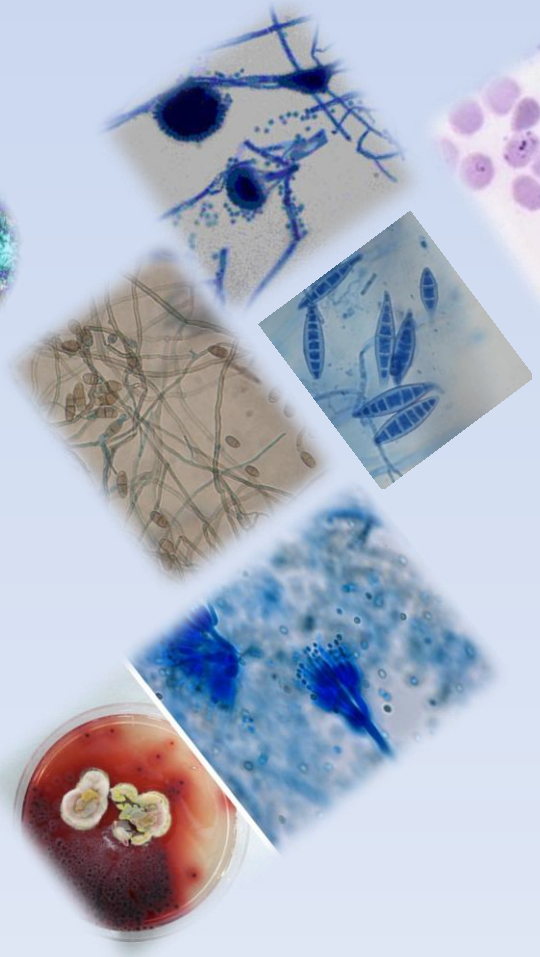


Viruses

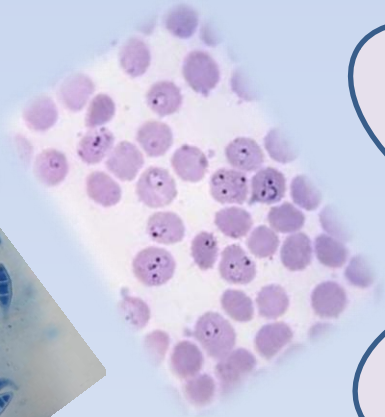




Fungi



Malaria



Others

- Allergy
- Aging
- Parasites

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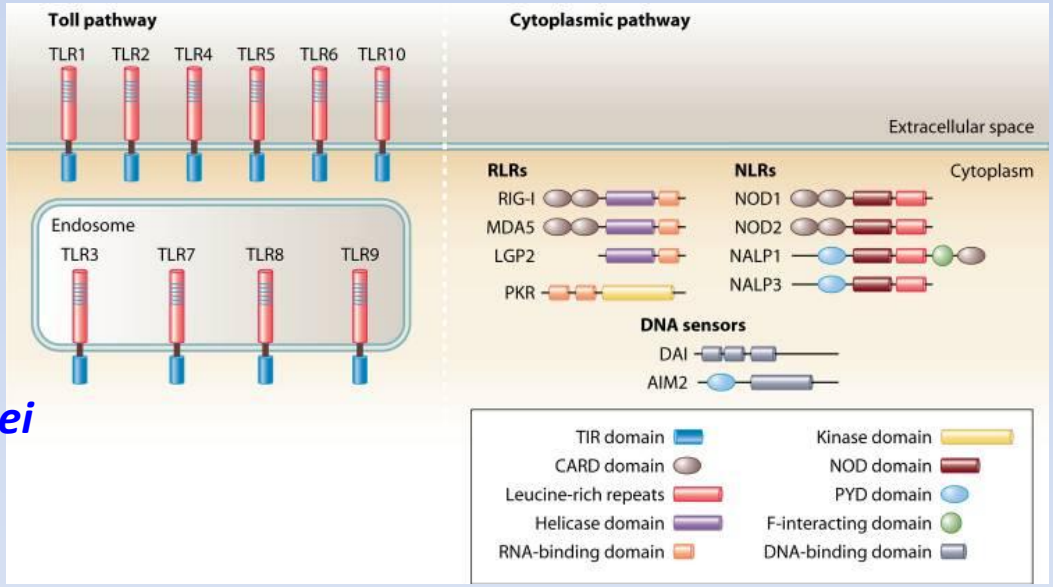
Clinical impact of genetic polymorphisms in the innate immune pathway for patients with melioidosis and *S. aureus* infection



TLR2 impairs host defense in gram-negative sepsis caused by *B. pseudomallei*
Wiersinga WJ, et al. Plos Med 2007

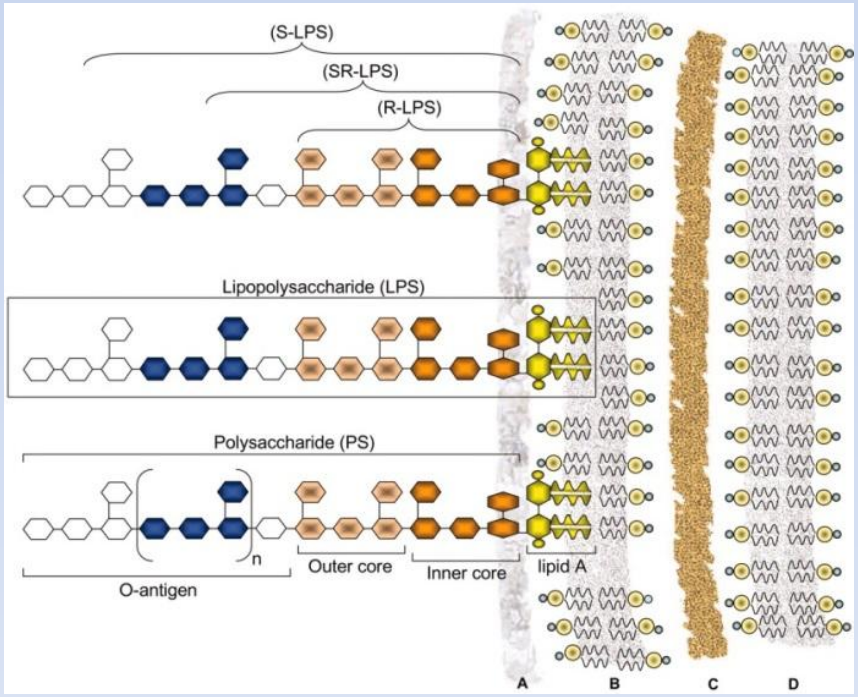
TLR4 region genetic variants are associated with susceptibility to melioidosis
West TE et al. Gene Immune 2012

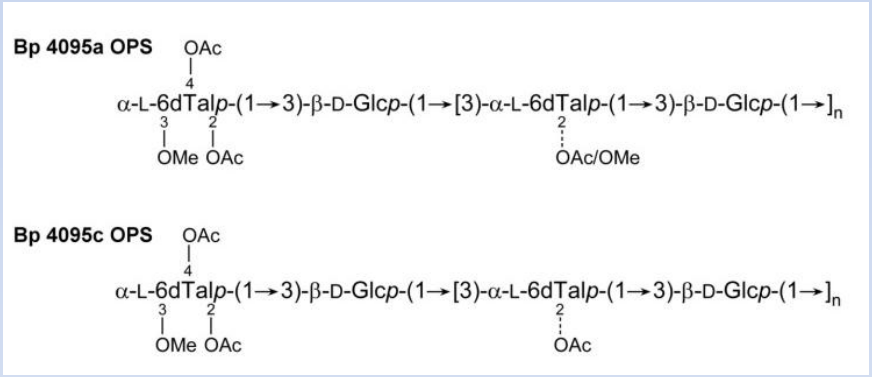
Screen of whole blood responses to flagellin identifies TLR5 variation associated with outcome in melioidosis
Chantratita N, et al. Gene Immun 2013.

Toll-like receptor 5 functionality is associated with survival in melioidosis
West TE et & **Chantratita N** et al.
J Immunol 2014

NOD2 contributes to host susceptibility in murine and human melioidosis
Chantratita N, et al. J Immunol 2014

Investigation of bacterial factors: *B. pseudomallei* LPS stimulates the innate immune response





Survey of innate immune responses to *Burkholderia pseudomallei* in human blood identifies an important role for lipopolysaccharide.
Chantratita N, et al. Plos One 2013

Bacterial virulence factors

The role of trehalase in stress response and virulence of *Burkholderia pseudomallei*

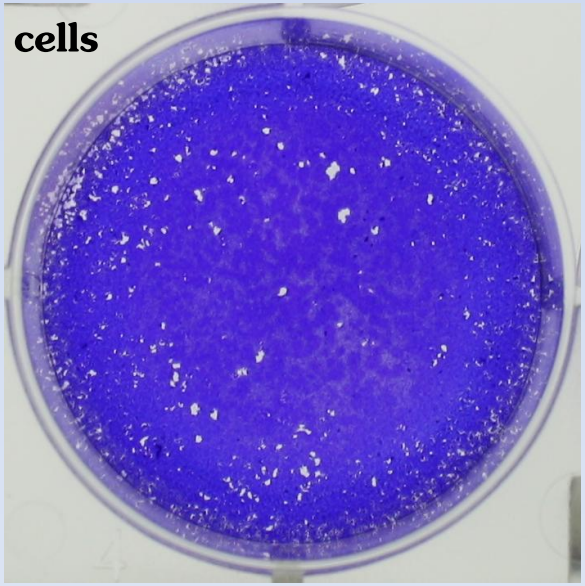
Trehalose is one of carbon source of *B. pseudomallei.*

The bacteria with the trehalase gene mutation grow defectively and lower ability to survive in mouse macrophage.

Pathogenesis mechanism of *Burkholderia pseudomallei*

To study *B. pseudomallei* isolates in aspect of the intracellular survival capability using plague formation assay

Hela cells



Plaque formation induced by *B. pseudomallei*

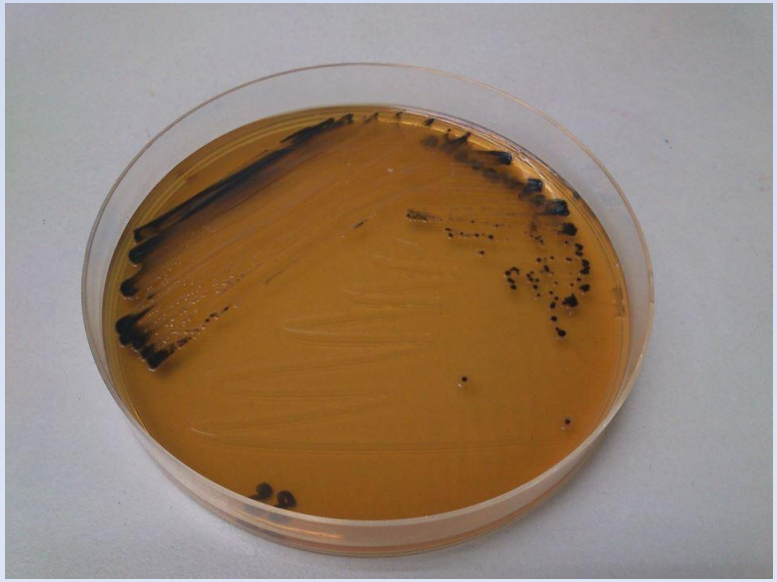
All *B. pseudomallei* clinical isolates were able to induce severe plague formation, suggesting the roles of virulence factors in *B. pseudomallei* pathogenesis.

Identify gene associated with pathogenesis.

Bacterial Surveillance

Detection of *Salmonella* in the community

To determine the prevalence of *Salmonella* in stool samples of humans, pigs, meat (pork and chicken), and water in the community in Nakhon Pathom Provinces, by conventional culture method



Salmonella isolated on SS agar medium

- Less than **1%** of pig feces contained *Salmonella* spp.
- Raw chicken **(7%)** and waste water from pig farms **(5%)** have been found to carry *Salmonella* spp.

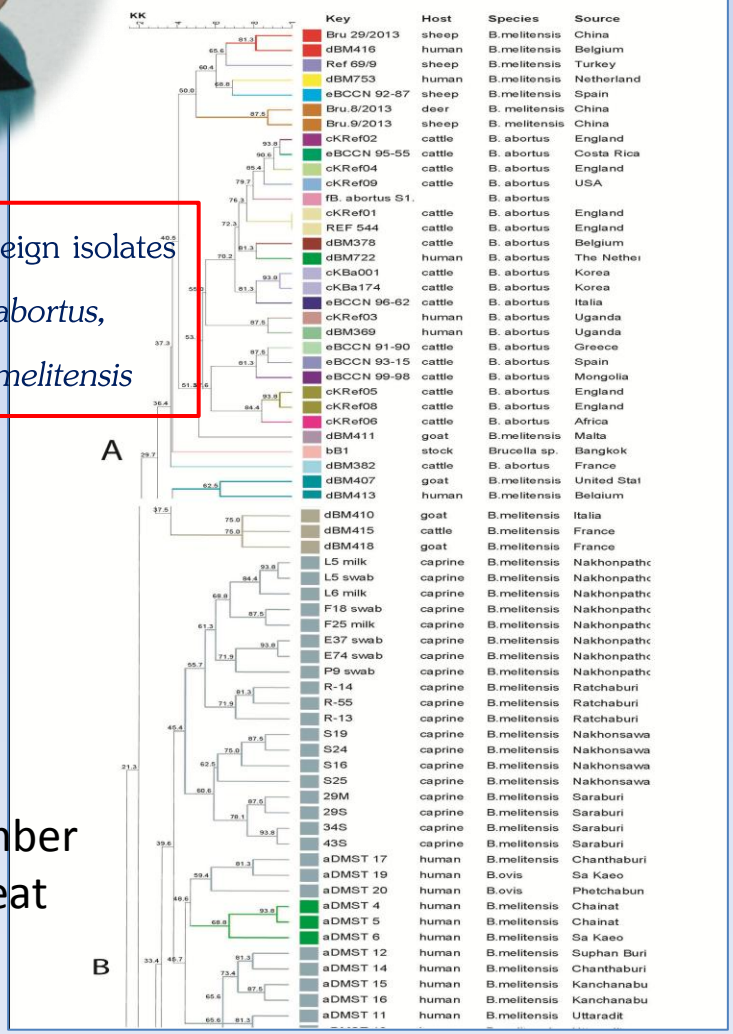
Bacterial genotyping

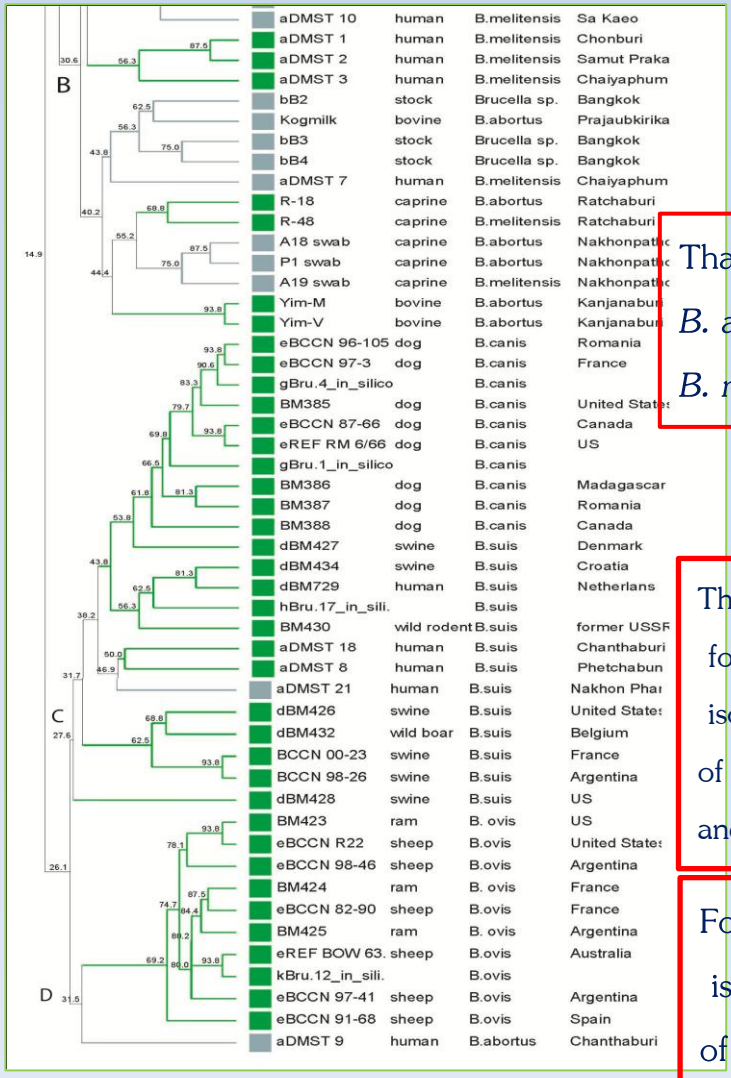
Brucella MLVA-16 genotyping assay

Foreign isolates

B. abortus,

B. melitensis





Thai isolates

B. abortus,

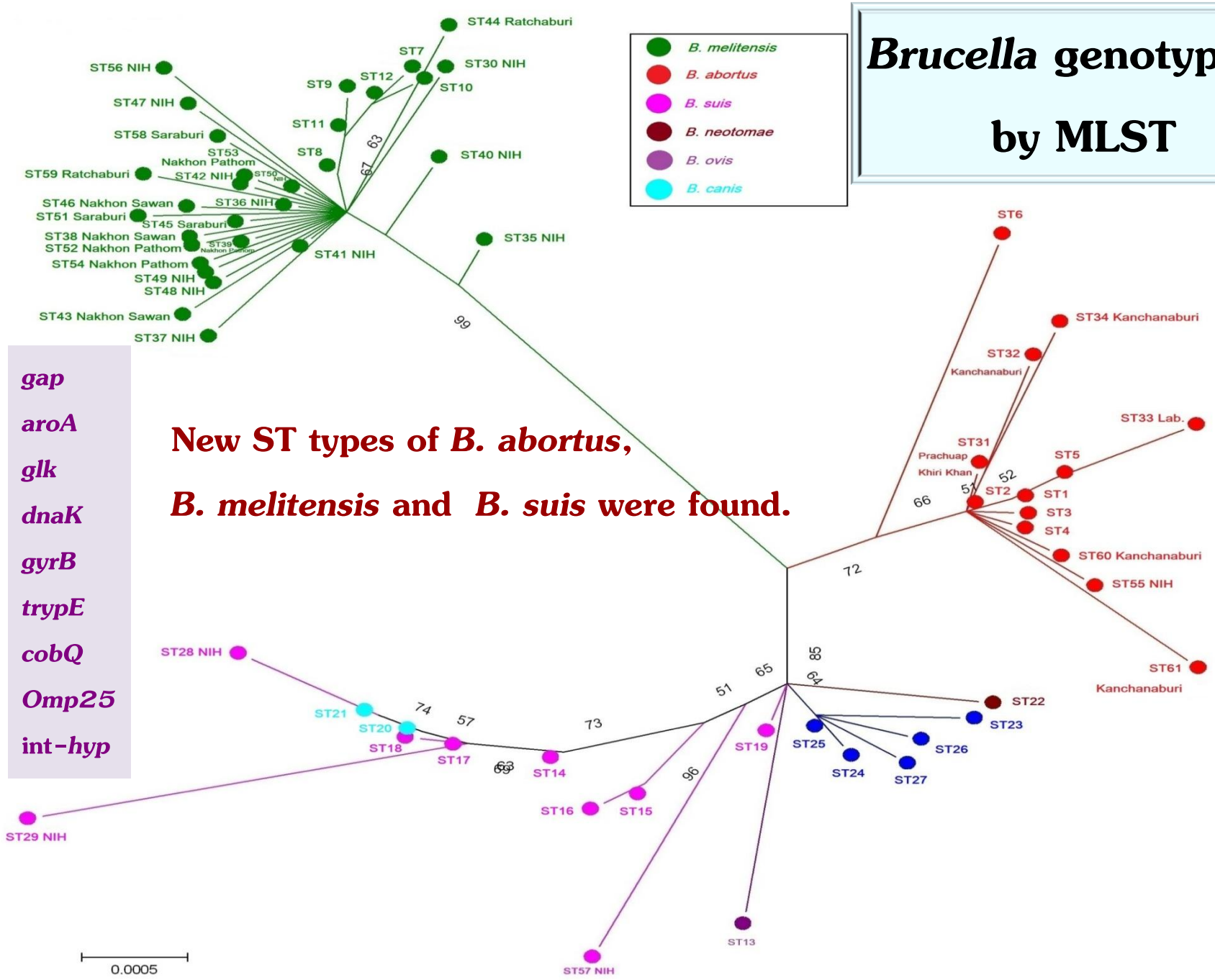
B. melitensis

Thai and foreign isolates of *B. canis* and *B. suis*

Foreign isolates of *B. ovis*

MLVA = multi-locus variable-number tandem-repeat analysis

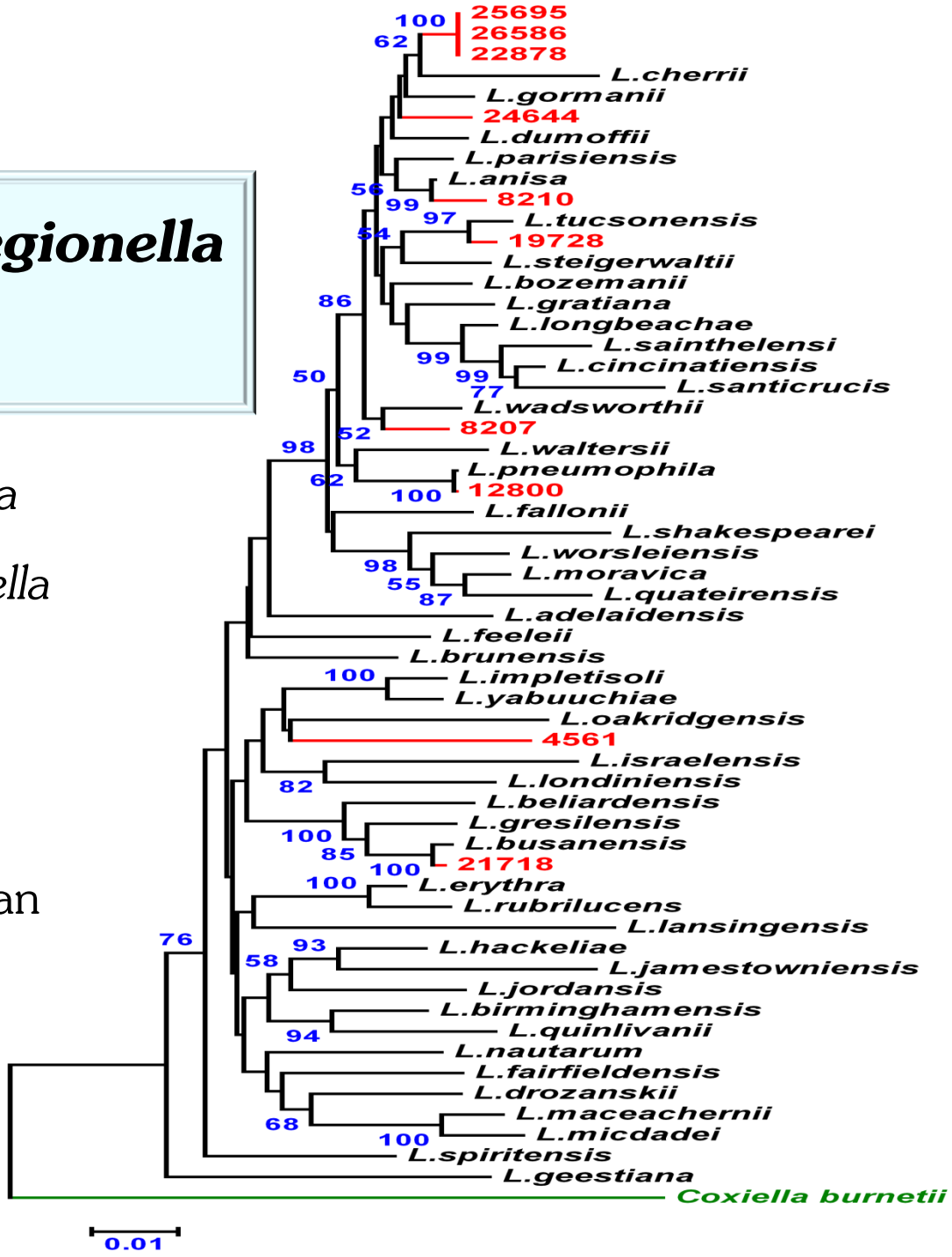
Brucella genotyping by MLST



Non-pneumophila *Legionella* genotyping

Phylogenetic tree of *Legionella* isolates and reference *Legionella* species based on 16SrRNA sequences.

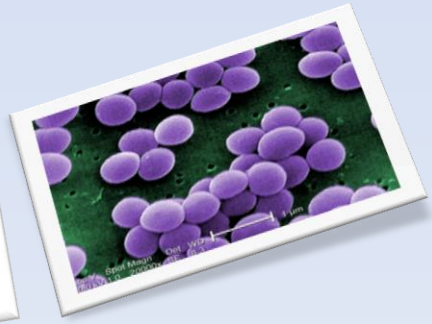
Coxiella burnetii was used as an outgroup.

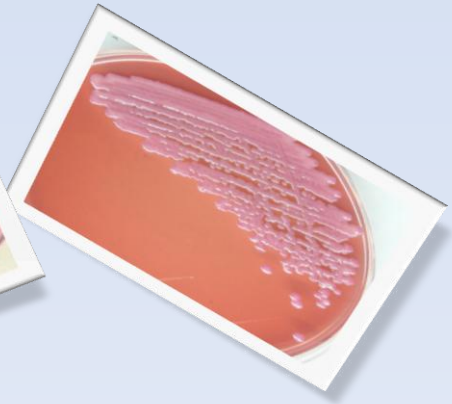


Drug resistant bacteria

The antibiotic resistance profile and its mechanism in *Escherichia coli* and *Klebsiella pneumoniae* from hospital isolations in 2007-2012

Epidemiology and genetic analysis of drug resistant bacteria in patients, environment and farm animals



Immunotherapy

Preparation of fully human monoclonal antibody to enterotoxin A (SEA) of *Staphylococcus aureus* by using phage display technology for further development to therapeutic antibody

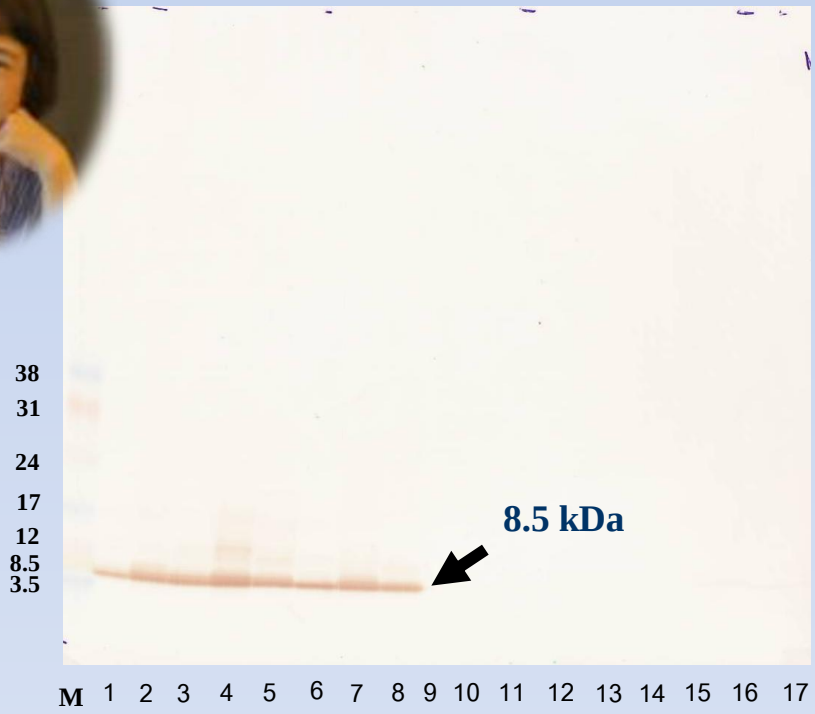
Preparation of human monoclonal antibody specific to thymic stromal lymphopoietin protein for allergic treatment

Immunodiagnosis

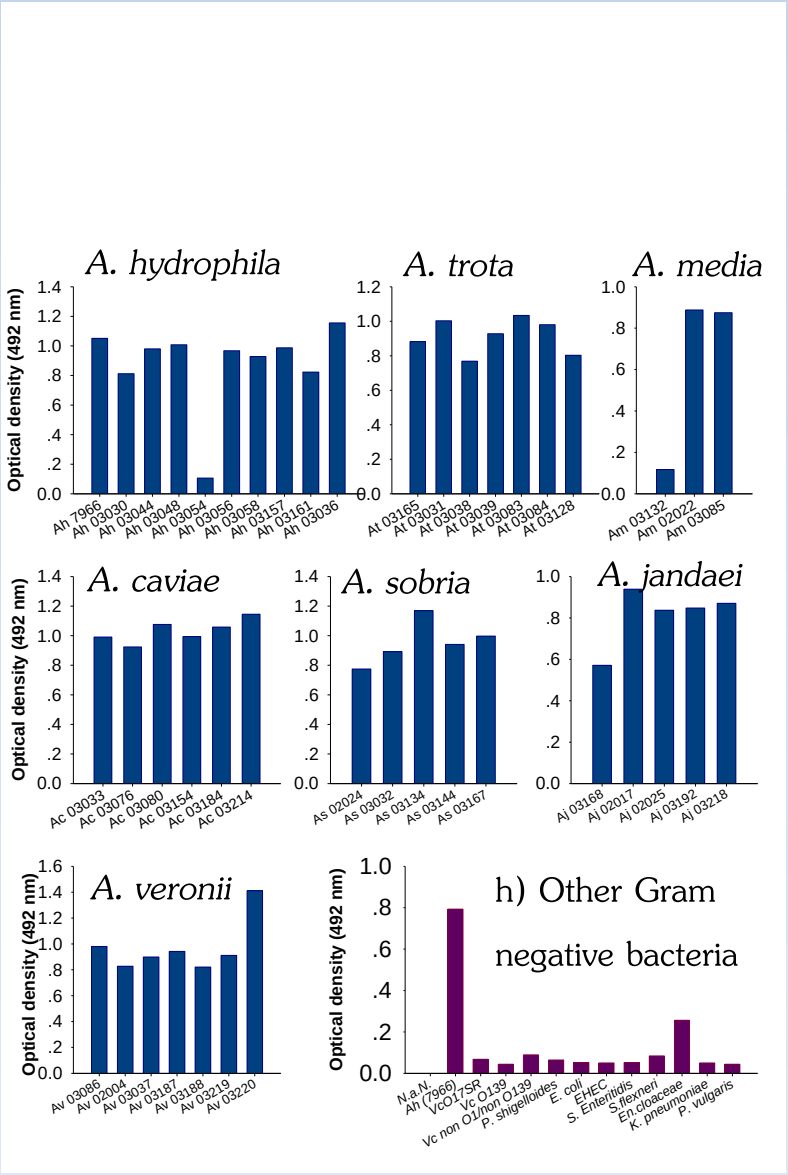
Production of monoclonal antibodies:

- *Burkholderia pseudomallei* → Latex agglutination
  Immunofluorescent assay
- *Aeromonas* spp. → Dot-blot ELISA
- *Listeria* sp.

MAb 88F2-3F4 → *Aeromonas*-specific MAb



Lane M = Low molecular weight marker
Lane 1 = *A. hydrophila* ATCC 7966
Lane 2 = *A. hydrophila* 03036
Lane 3 = *A. sobria* 03133
Lane 4 = *A. veronii* 03086
Lane 5 = *A. caviae* 03125
Lane 6 = *A. media* 03132
Lane 7 = *A. trota* 03165
Lane 8 = *A. jandaei* 03168
Lane 9 = *Vibrio cholerae* O17SR
Lane 10 = *Vibrio cholerae* O139
Lane 11 = *Plesiomonas shigelloides*
Lane 12 = *Escherichia coli*
Lane 13 = *Salmonella* Enteritidis
Lane 14 = *Shigella flexneri*
Lane 15 = *Enterobacter cloacae*
Lane 16 = *Klebsiella pneumoniae*
Lane 17 = *Proteus vulgaris*



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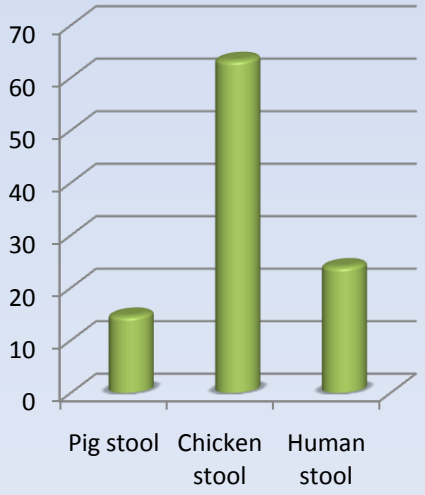
Viral Surveillance

Community-based comprehensive, multi-disciplinary surveillance of enteric/food and waterborne pathogens in Kanchanaburi and Nakhon Pathom Provinces, Thailand

Objectives:

1. To determine the most prevalent virus responsible for gastroenteritis
2. To determine the relationship between the virus strains found in humans and animals.

Type of samples	Total number of samples	No. positive samples					
		Astrovirus	Rotavirus	Enteric Adenovirus	Norovirus GI and GII	Norovirus GII	Total
Pig stool	268	1	0	1	2	35	39 (14.6%)
Chicken stool	30	0	0	0	4	15	19 (63.3%)
Human stool	25	0	0	0	0	6	6 (24.0%)
Total	**323**	**1**	**0**	**1**	**6**	**56**	**64 (19.8%)**



Viral Surveillance

Molecular Surveillance of Zika virus from Southern part of Thailand

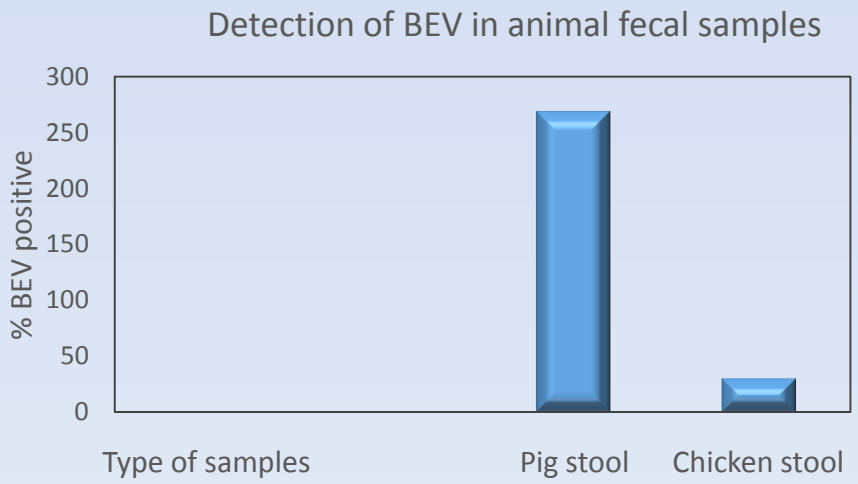
Virus Discovery: Screening of wild caught mosquitoes for flaviviruses and blood specimens from febrile patients from Bangkok with Dengue-Like Symptoms

Prevalence and diversity of bovine enterovirus (BEV) in wildlife and domestic animals in the area of Salakpra Wildlife Sanctuary, Kanchanaburi

Prevalence and diversity of bovine enterovirus (BEV) in wildlife and domestic animals in the area of Salakpra Wildlife Sanctuary, Kanchanaburi

Objectives

1. To detect the present of BEV genome in fecal samples of wild animals (deer and gaur) and domestic animals (cattle and goat) collected from the area of Salakpra Wildlife Sanctuary, Kanchanaburi, Thailand
2. To phylogenetically analyze diversity and genetic relationship of the BEV in domestic and wild animals



Viral Detection

Comparison of Reverse Transcriptase PCR and LAMP technique for the detection of Hepatitis E virus in Porcine and Human

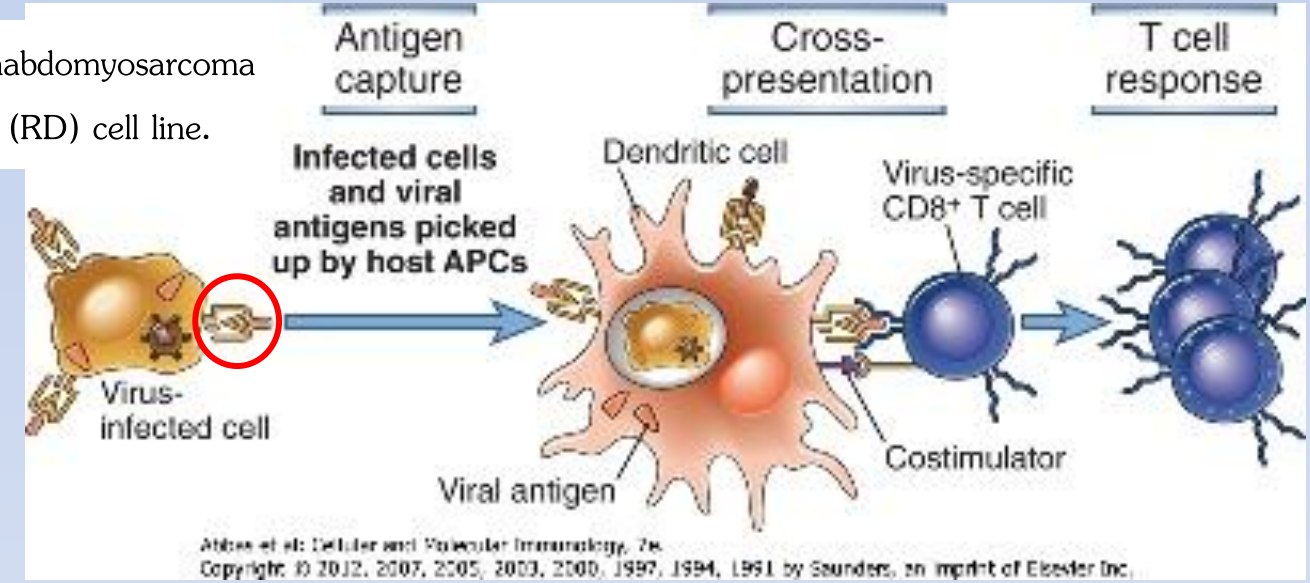
Immunoproteomics

Immunoproteomics for identification of MHC class I-restricted epitopes of enterovirus71

Objectives

1. To develop a mass spectrometry-based immunoproteomics technique for identification of EV71 peptide epitopes presented by MHC class I molecules on infected cells
2. To characterize the immuno-stimulatory function of the MHC class I-restricted EV71 peptide epitopes that are identified by mass spectrometry

Rhabdomyosarcoma (RD) cell line.



Protein lysate has been prepared from the EV71-infected rhabdomyosarcoma (RD) cell line.

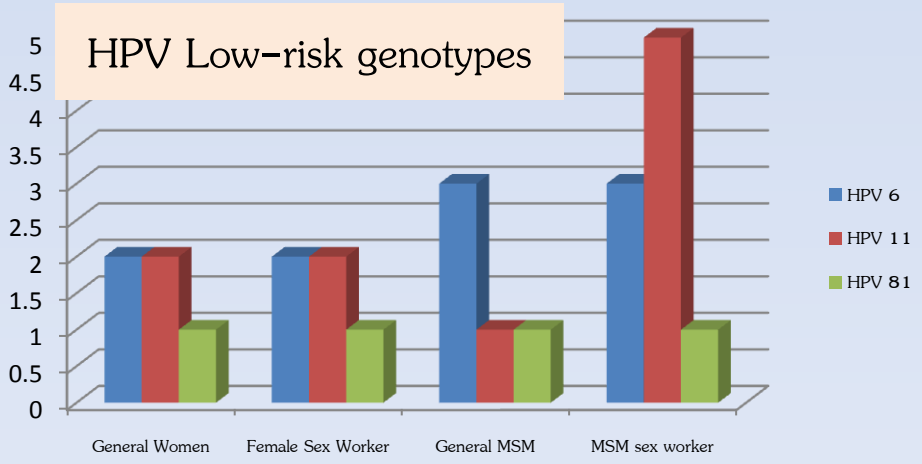
Future plan: MHC class I-bound EV71 epitopes will be separated by immunoprecipitaion using pan-MHC class I-specific antibody and subjected for mass-spectrometry analysis.

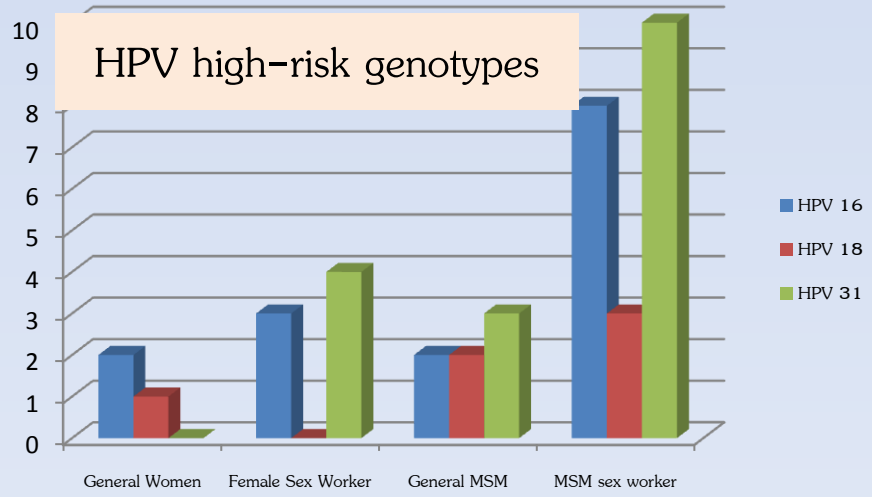
Viral genotyping

Molecular genotyping of HPV L1 gene in low-risk and high-risk populations in Bangkok

Objective:

To measure the prevalence and genotype distribution of HPV infection among low- and high-risk, male and female groups.

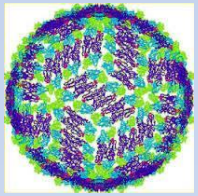




Dengue-virus-infected dendritic cells trigger vascular leakage through metalloproteinase overproduction

Objective

To demonstrate the molecular basis for DHF/DSS that could be a basis for a general model of haemorrhagic fever-inducing viruses, and identify a new therapeutic approach for the treatment of viral-induced vascular leakage by specifically targeting gelatinolytic metalloproteases.



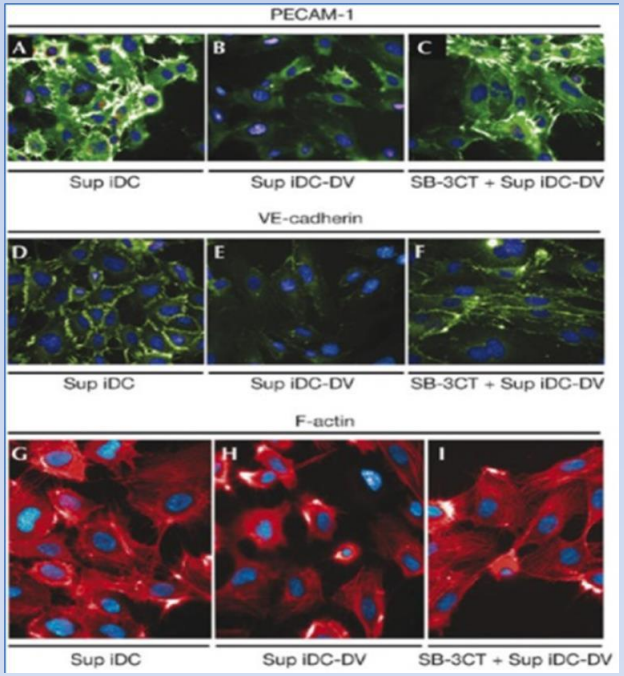
infect

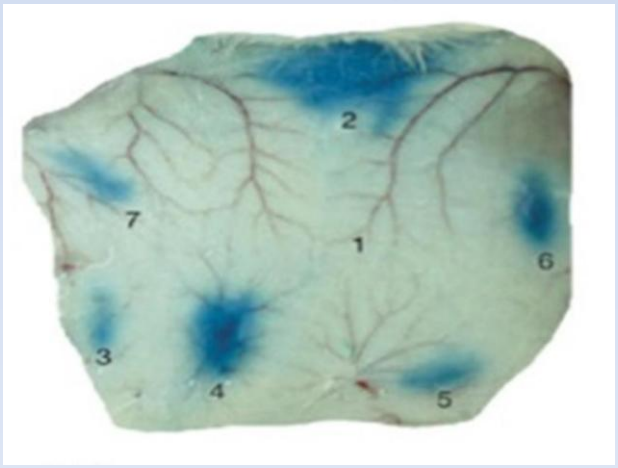
Dendritic cell

Supernatant

MMP

HUVECs





Mouse skin

MMP = matrix metalloproteinase

HUVECs = human umbilical vascular endothelial cells

Tuberculosis and TB/HIV Coinfection

Host immune response and gene studies in TB and TB-HIV coinfection

The immunological and molecular biological aspects of tuberculosis and HIV/TB co-infections

Research in Pathogenic Fungi

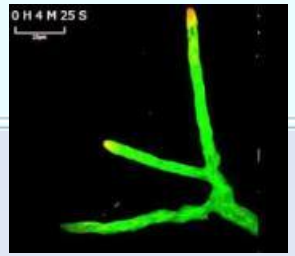
Virulence factors

The correlation between N-myristoyl transferase (NMT) expression and hyphal growth

Study the interaction of pyocyanin, quorum sensing molecule from *Pseudomonas aeruginosa*, to variation phenotypic of dimorphic fungi, *Penicilium marneffi* and *Histoplasma capsulatum*

Spitzenkorper phenomenon in fungal invasion property of *Candida albican*

http://www.youtube.com/watch?v=ZIutFBqI6GM



Drug resistant fungi

Comparative proteomic analysis of differentially expressed proteins between azole-resistant and azole-susceptible *A. fumigatus*-biofilm.

Role of ER stress in *Aspergillus* drug resistance and their pathogensis

Malaria

Human Malaria : *P. falciparum/P.vivax*

Host immune response and gene studies in malaria

Toll like receptors and innate immunity in malaria

Role of innate immune cells Th1 and Th2 cytokine and cytokine receptor gene polymorphisms in relation to functional changes in severe and mild malaria

Vaccine development

Duffy-binding protein II among Thai *P. vivax* (PvDBPII)

Phylogenetic analysis of Thai *P. vivax* isolates to others found internationally demonstrated six distinct allele groups.

Allele groups 4 and 6 were unique to Thailand

Mouse Malaria : *P. yoelii* (Py)

Antibody to MSP1$_{19}$ induce malaria protection in mice

Py pRBC

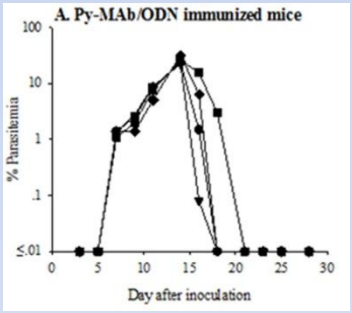
nRBC

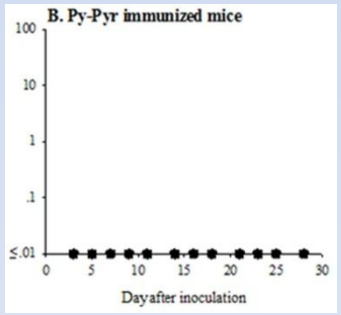
A) Treat with MSP1$_{19}$ specific antibody and CpG ODN

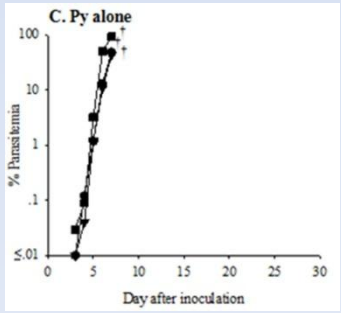
B) Treat with pyrimethamine

C) No Treament (control)

D) Treat with MSP1$_{19}$ specific antibody and CpG ODN







Mouse Malaria : *P. yoelii* (Py)

Antibody to $MSP1_{19}$ induce malaria protection in mice

Py pRBC

nRBC

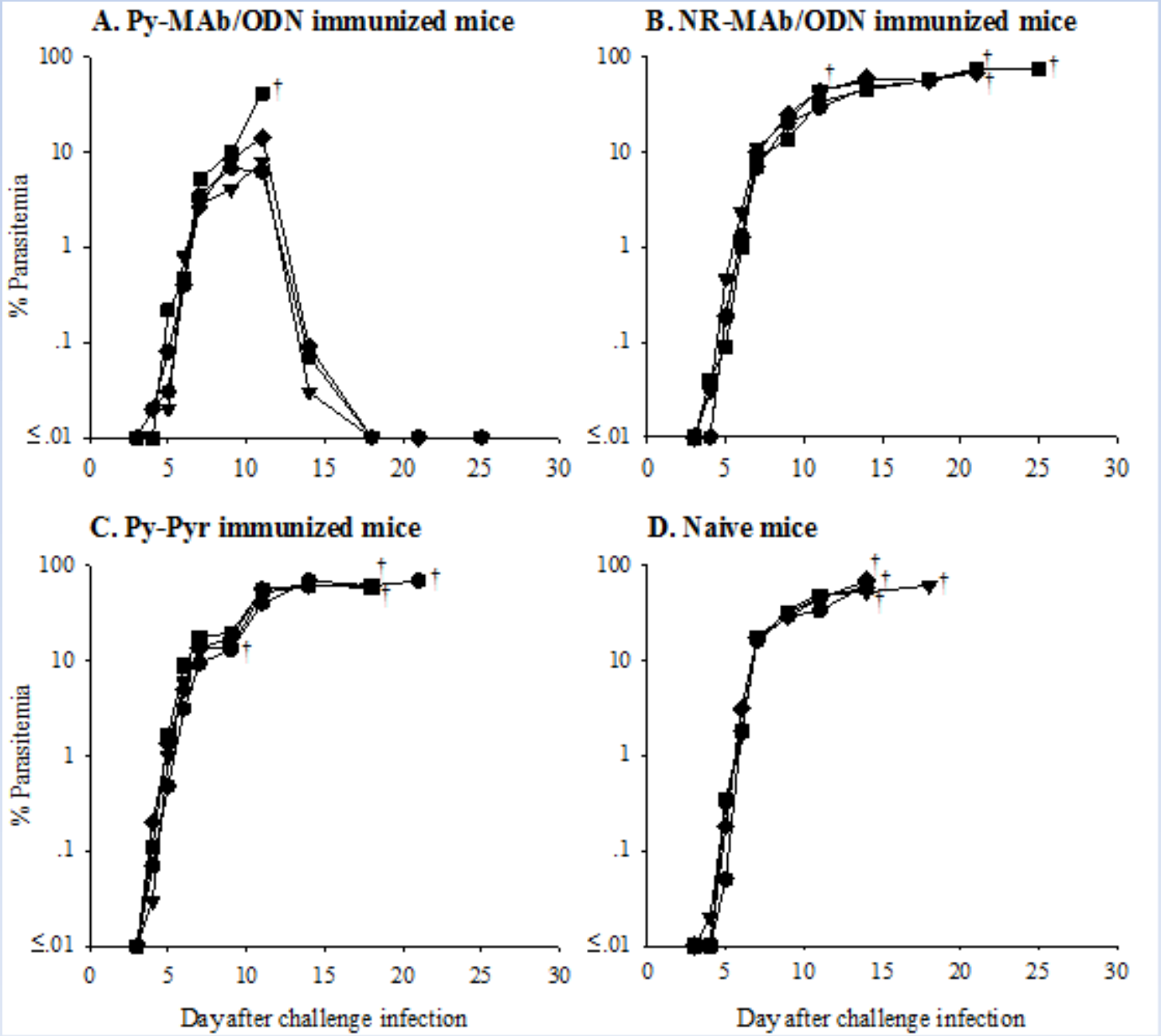
Treat with $MSP1_{19}$ specific antibody and CpG ODN

Treat with pyrimethamine

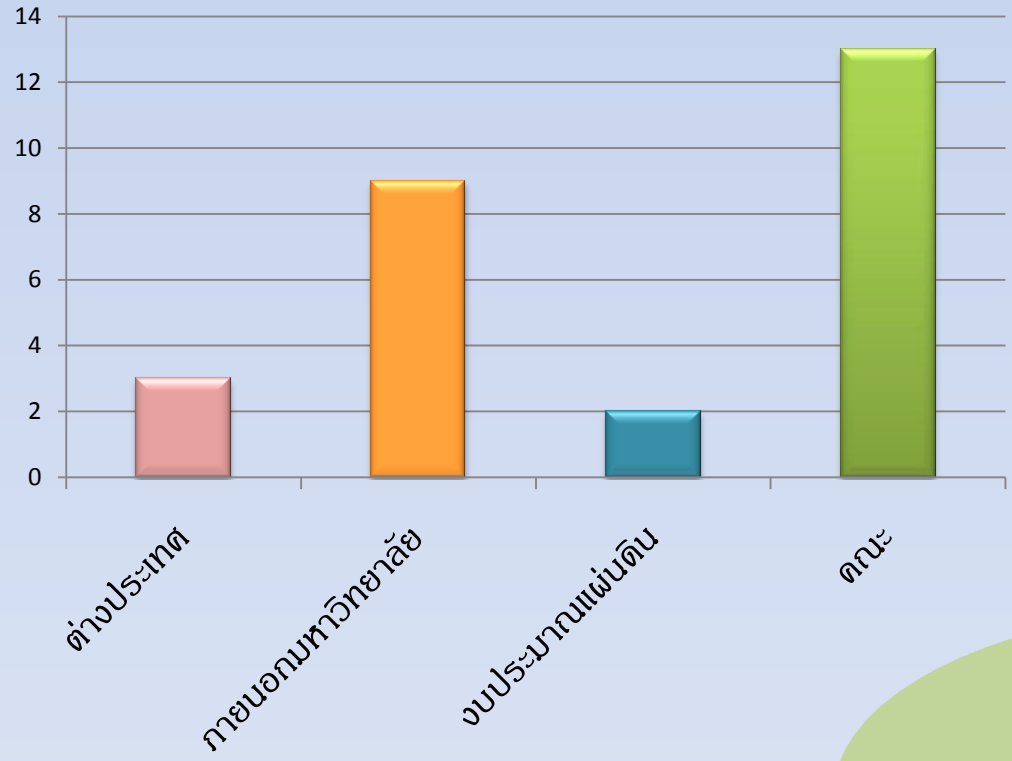
No Treament (control)

Treat with $MSP1_{19}$ specific antibody and CpG ODN

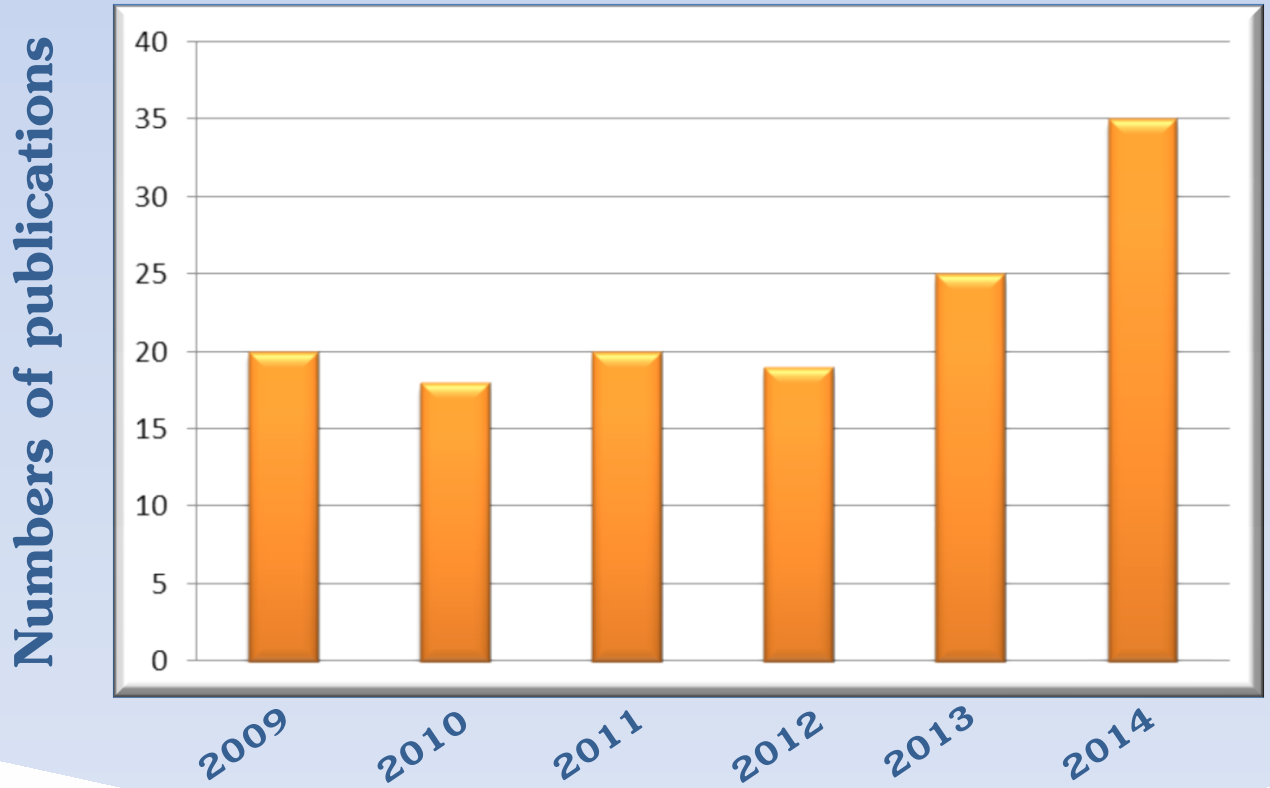
Infected with *Py* pRBC


A. Py-MAb/ODN immunized mice
B. NR-MAb/ODN immunized mice
C. Py-Pyr immunized mice
D. Naive mice
% Parasitemia
100
10
1
.1
≤.01
0
5
10
15
20
25
30
†
Day after challenge infection

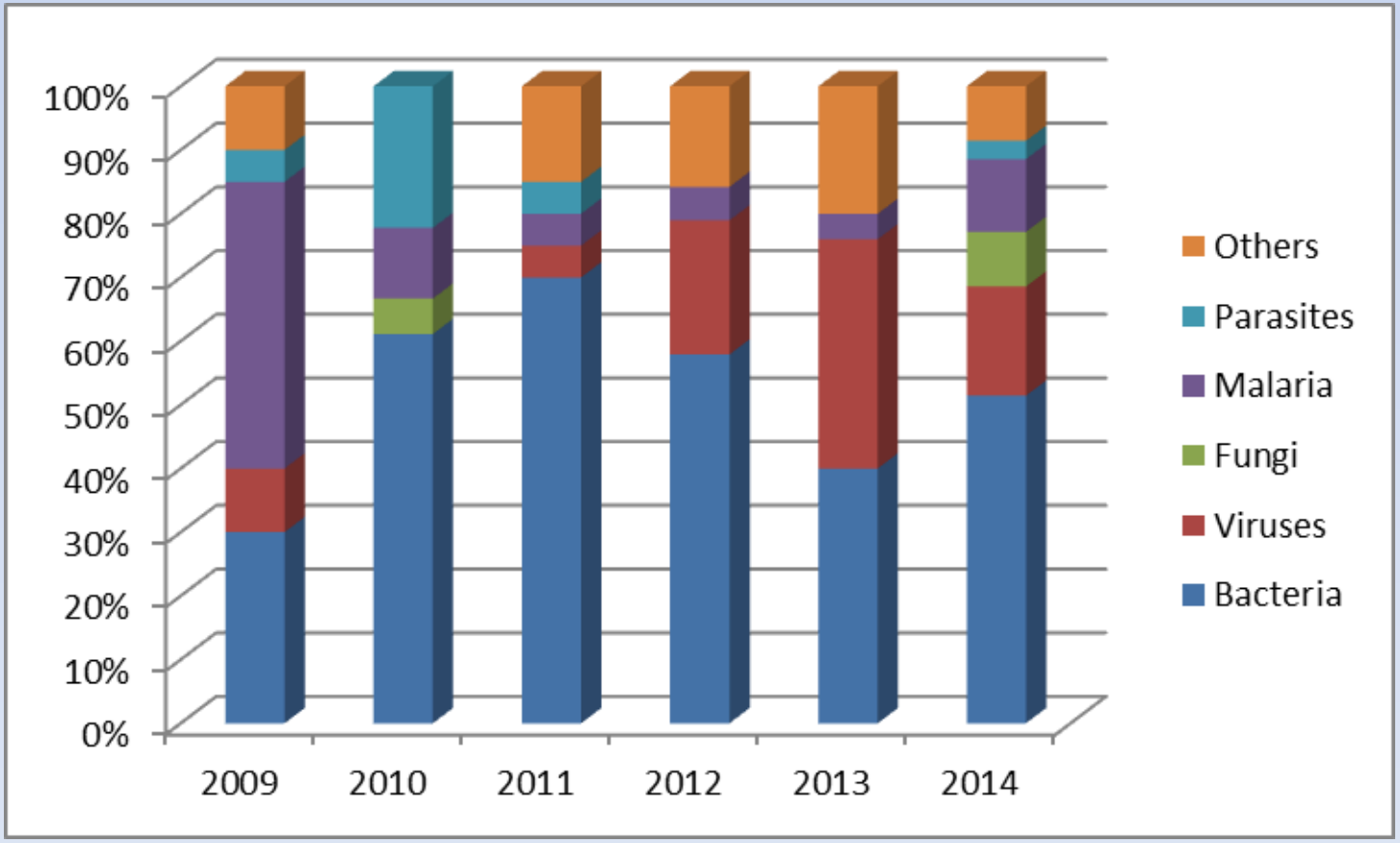
โครงการวิจัย/แหล่งทุน



Publications in International Journals



Publications during 2009 to 2014



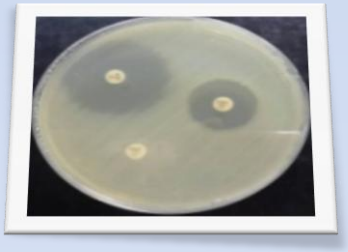
Clinical Service

Conventional cultivation for aerobic bacteria and reagents for biochemical tests

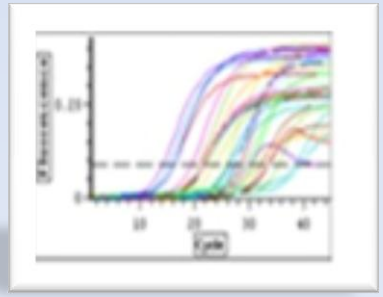
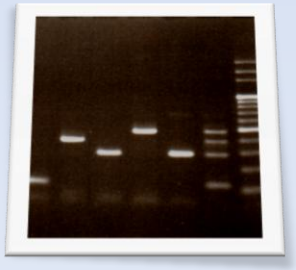
(บริการตรวจวิเคราะห์เชื้อแบคทีเรียแบบ ใช้ออกซิเจน เชื้อรา และผลิตวัสดุสำหรับการตรวจและการสอนทางจุลชีววิทยา)





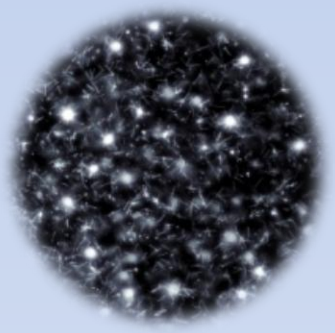


Detection of viral infections by Real-time RT-PCR, RT-PCR, Nested RT-PCR,

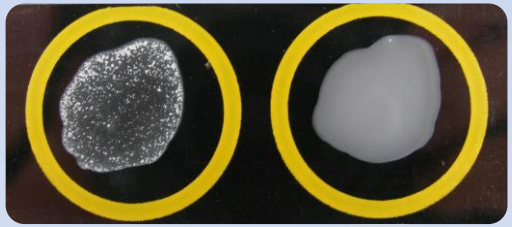



Immunodiagnosis

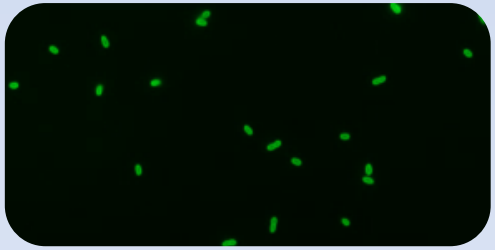
1. Detection of antibody against *Leptospira* spp.
   Microscopic Agglutination Test (MAT)



2. Detection of *Burkholderia pseudomallei*
   by latex agglutination

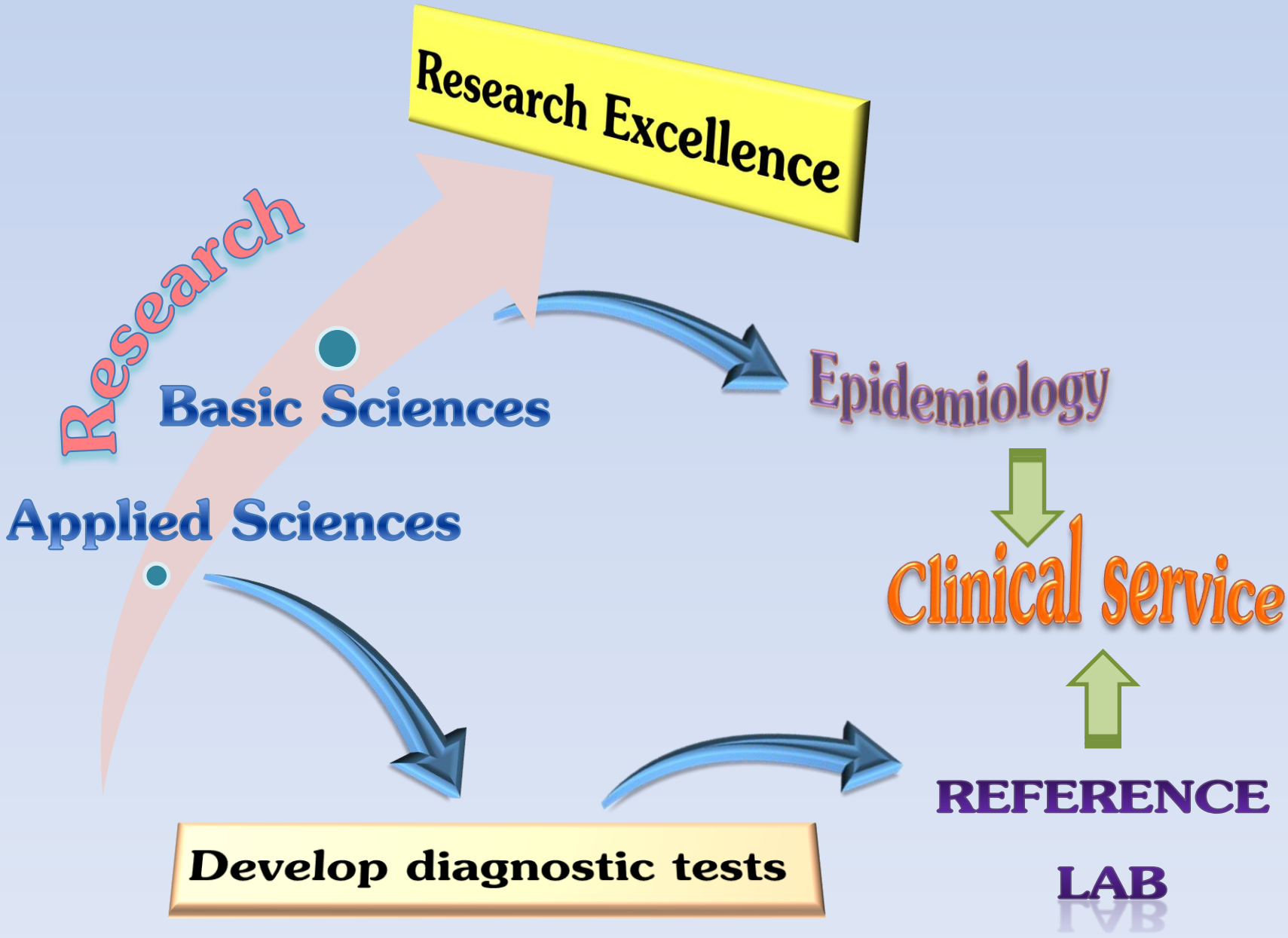


3. Detection of *Burkholderia pseudomallei*
   by Immunofluorescence Assay



4. Detection of viral – specific antibodies by ELISA

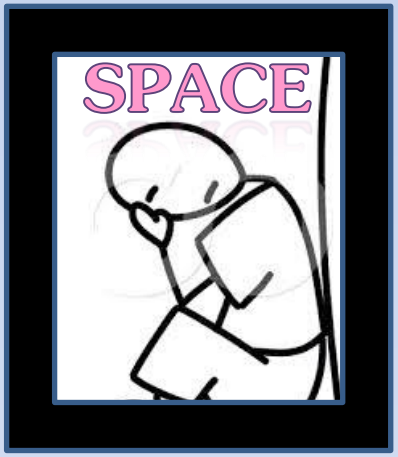
5. Determination of CD4/CD8 T cell population by Flow Cytometry


Research Excellence
Research
Basic Sciences
Applied Sciences
Epidemiology
Clinical service
REFERENCE
LAB
Develop diagnostic tests

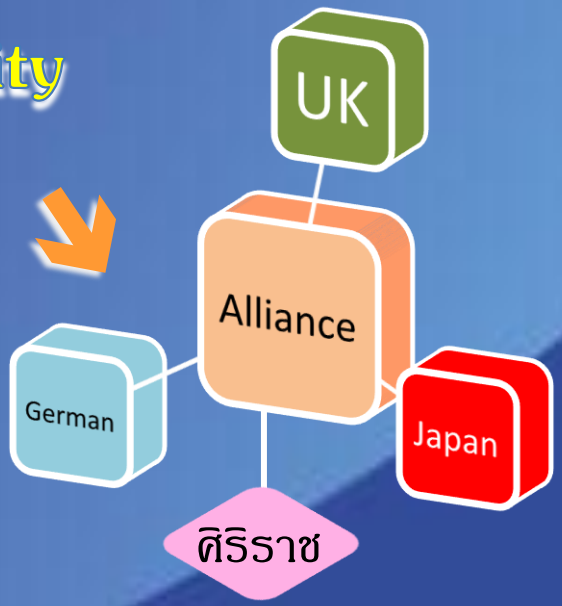
Strength

Diversity

Weakness



Opportunity



Threat

NO SEVERE THREAT

ขอขอบคุณ

- บุคลากรของภาควิชา
- นักศึกษาสังกัดภาควิชา
- เครือข่ายในประเทศ
- เครือข่ายต่างประเทศ
- คณะเวชศาสตร์เขตร้อน
- แหล่งทุน


Thank you for your attention!!!