INTRODUCTION TO THE SYMPOSIUM ON CYSTICERCOSIS

Akira Ito[1] and Carlo Urbani[2]

[1]Department of Parasitology, Asahikawa Medical College, Asahikawa, Japan;
[2]Vector-borne and other Parasitic Diseases, WHO, Hanoi, Vietnam

Taenia solium and *T. saginata* are still the major food-borne zoonotic cestodiases (European Commission, 2000). Based on the importance in medical and public health problems and the limited time schedule, we focus on *T. solium* cysticercosis in this symposium.

Neurocysticercosis (NCC), caused by the metacestode stage of *T. solium* is one of the most serious parasitic zoonoses worldwide and underestimated due to the lack of reliable diagnostic methods (Craig *et al*, 1996; White, 1997; Schantz *et al*, 1998). Unfortunately epidemiological available data are biased in terms of the true geographic origin and prevalence, as the only sources in developing world are usually hospital services. However, during the last decade, diagnostic reliability has greatly been improved due to the advancement in image analysis through CT scanning and MRI (Zee *et al*, 2000) and serology (Gottstein *et al*, 1986; Tsang *et al* 1989; Ito *et al*, 1998).

It is well known that endemic areas exist in Southeast Asia (China, India, Nepal, Vietnam, Cambodia, Lao PDR, Thailand), in Mexico, central and Latin American countries (Guatemala, Honduras, Bolivia, Peru, Ecuador, Brazil) and sporadic foci in Europe (Spain). However, recently, it has become evident that NCC is serious in Indonesia (Simanjuntak *et al*, 1997; Wandra *et al*, 2000) as well as in African countries (South Africa, Mozambique, Zimbabwe, Tanzania, Uganda, Nigeria, Cameroon, etc). According to the Commission on Tropical Diseases of the International League against Epilepsy, the age-adjusted prevalence of active epilepsy in tropical countries ranges from 10 to 15 per 100,000 inhabitants, almost twice the level in Europe. NCC has been estimated by WHO to cause at least 50,000 deaths per year.

The complexity of immunological and physiological relationship of cestode worms with the host, of their epidemiology, pathology and biology, still require a big effort in research. Concerning disease control, we need an interdisciplinary approach, involving several branches of the medical, veterinary and related professions. Although no intervention program at national levels has been implemented with proven success, several strategies for control have been proposed. Two approaches are possible: comprehensive programs of long-term interventions or short-term target interventions.

This symposium has been organized in order to exchange mutual information based on the most recent original topics concerned with NCC and to discuss the prevention and control strategies for this underestimated zoonotic infection worldwide.

We have seven invited speakers to present their own topics and others have not been able to join us. The first speaker is Dr Williingham from Denmark. His main work is not original research but rather diplomacy to organize collaboratve work on parasitic zoonoses including NCC in Africa. On behalf of all collaborators from Africa and Denmark, he presents a summary of up-to-date NCC situation in several countries in Africa and focus on Danish-Tanzania project (Boa *et al*, 1995). The second speaker is Dr Margono from Indonesia. She presents epidemiological topics in Indonesia, mainly in Irian Jaya (West Papua) and Bali (Simanjuntak *et al*, 1997; Wandra *et al*, 2000). The third speaker is Dr Vanijanonta from Thailand. She focuses on clinical aspect of NCC. Then, Dr Urbani from WHO Hanoi briefly summarizes these topics and presents the WHO recommendation on prevention and control of NCC. After a brief intervention (coffee break), the fifth speaker is Dr Ito from Japan. He presents a unique animal model for cysticercosis (Ito *et al*, 1997; Ito and Ito 1999). The sixth speaker is Dr Okamoto from Japan. He overviews mitochondrial DNA analysis on *Taenia solium* from Asia, Africa, and America and discuss the molecular phylogeny of *T. solium* and related species of *T. saginata* and *T. saginata asiatica* (= *T. asiatica*). The last speaker is Dr Sako from Japan. He presents serodiagnosis for NCC in humans and pigs (Ito *et al*, 1998; 1999). His main topics are evaluation of recombinant antigen for serodiagnosis (Hubert *et al*, 1999; Chung *et al*, 1999; Sako *et al*, 2000). After these presentations, we have discussion.

It is a great pleasure for us to exchange information for future collaboration from basic to applied research and for the control of taeniasis/cysticercosis.

REFERENCES

Boa ME, Bøgh HO, Kassuku AA, Nansen P. The prevalence of *Taenia solium* metacestodes in northern Tanzania. *J Helminthol* 1995;69:113-7.

Chung JY, Bahk YY, Huh S, Kang SY, Kong Y, Cho SY. A recombinant 10-kDa protein of *Taenia solium* metacestodes specific to active neurocysticercosis. *J Infect Dis* 1999;180:1307-15.

Craig PS, Rogan MT, Allan JC. Detection, screening and community epidemiology of taeniid cestode zoonoses: cystic echinococcosis, alveolar echinococcosis and neurocysticercosis. *Adv Parasitol* 1996;38:169-250.

European Commission. Opinion of the Scientific Committee on Veterinary Measures Relating to Public Health on the control of taeniosis/cysticercosis in Man and Animals. http://europa.eu.int/comm/food/fs/sc/scv/out36_en.pdf, 2000.

Gottstein B, Tsang VC, Schantz PM. Demonstration of species-specific and cross reactive components of *Taenia solium* metacestode antigens. *Am J Trop Med Hyg* 1986;35:308-13.

Hubert K, Andriantsimahavandy A, Michault A, Frosch M, Muhlschlegel FA. Serological diagnosis of human cysticercosis by use of recombinant antigens from *Taenia solium* cysticerci. *ClinDiagn Lab Immunol* 1999;6:479-82.

Ito A, Ito M. Human Taenia in severe combined immunodeficiency (SCID) mice. *Parasitol Today* 1999;15:64-7.

Ito A, Chung WC, Chen CC, Ito M, Endo S, Okamoto M. Human *Taenia* eggs develop into cysticerci in *scid* mice. *Parasitology* 1997;114:85-8.

Ito A, Plancarte A, Ma L, *et al*. Novel antigens for neurocysticercosis: a simple method for preparation and evaluation for serodiagnosis. *Am J Trop Med Hyg* 1998;59:291-4.

Ito A, Plancarte A, Nakao M, *et al*. ELISA and immunoblot using purified glycoproteins for serodiagnosis of cysticercosis in pigs naturally infected with *Taenia solium*. *J Helminthol* 1999;73:363-5.

Sako Y, Nakao M, Ikejima T, Piao XZ, Nakaya K, Ito A. Molecular characterization and diagnostic value of *Taenia solium* low molecular weight antigen genes. *J Clin Microbiol* 2000:38 (in press).

Schantz PM, Wilkins PP, Tsang VCW. Immigrants, imaging, and immunoblots: the emergence of neurocysticercosis as a significant public health problem. In: Scheld WM, Craig WA, Hughes JM, eds. Emerging Infections, 2nd ed. Washington: ASM Press, 1998:213-42.

Simanjuntak GM, Margono SS, Okamoto M, Ito A. Taeniasis/cysticercosis in Indonesia as an emerging disease. *Parasitol Today* 1997;13:321-3.

Tsang VCW, Brand JA, Boyer AE. An enzyme-linked immunoelectrotransfer blot assay and glycoprotein antigens for diagnosing human cysticercosis. *J Infect Dis* 1989;159:50-9.

Wandra T, Subahar R, Simanjuntak GM, *et al*. Resurgence of cases of epileptic seizures and burns associated with cysticercosis in Assologaima, Jayawijaya, Indonesia, 1991-95. *Trans R Soc Trop Med Hyg* 2000;94:46-50.

White ACJr. Neurocysticercosis: a major cause of neurological disease worldwide. *Clin Infect Dis* 1997;24:101-13.

Zee CS, Go JL, Kim PE, Di Giorgio CM. Imaging of neurocysticercosis. *Neuroimag Clin North Am* 2000;10:391-407.