



# HOKKAIDO UNIVERSITY

Title	Laboratory of Parasitology
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## Laboratory of Parasitology

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**HISTORY:** The laboratory was established in 1955 as a solo independent laboratory in this field in Japan. The laboratory studies have been on phylogeny, host-parasite relationship and counter measures of the parasites of domestic and wild animals and zoonotic parasites. Research on echinococcosis has been one of the most intensive studies in the laboratory and its achievements lead the laboratory to be a reference laboratory for echinococcosis of the International Office of Epizootics (OIE).

In the era of professor Jiro Yamashita (1955-74), the causative agent of an endemic disease emerged in Rebun island, Hokkaido, was found to be *Echinococcus multilocularis* which was maintained by domestic dogs and wild rodents in the island and was imported by fox transportation from Simushir island, Russia. In the era of professor Masashi Ohbayashi (1975-88), wide scale parasitological surveys were carried out in South-east Asia. Phylogenetic studies on parallel evolution of parasites with their hosts were taken place and an important zoonotic parasite, *Angiostrongylus siamensis* was discovered in the study.

The present members of the laboratory includes above 3 veterinarians, 3 post-doctoral fellows (one from Mongolia), 7 graduate students (two from Ethiopia and Philippines) and 6 undergraduate students. The members include PhD holders in the field of behavioral science and zoology and thus, parasitological studies are being carried out not only from veterinary point of view but also from multi-disciplinary points of view.

### PRESENT ACTIVITIES

#### (1) ALTERNATIVE DEFINITIVE HOST MOD-

EL: *Echinococcus multilocularis* prevalent in Hokkaido is maintained mainly by wild rodents (intermediate host; parasitized by the larval form) and foxes (definitive host; parasitized by the adult form). Since humans get infection via parasite eggs excreted from the adult cestodes, studies on the adult cestodes requires strict isolation unit for maintenance of infected animals. To overcome this problem, Dr. Kamiya, for the first in the world, developed an alternative definitive host model in which the adult cestodes develop and produce eggs in immunosuppressed hamsters and gerbils. At present, studies are ongoing on the improvement of the model and vaccine development for the definitive hosts using the model.

(2) COPROANTIGEN DETECTION: To develop a diagnostic tool for the definitive hosts of *E. multilocularis*, we have developed a coproantigen detection technique in which excretory/secretory products of the cestodes are detected by the *E. multilocularis* specific antibody in the host feces. It is an advantage that the test samples (feces) can be heat sterilized, enabling safe manipulation of the technique. Moreover, coproantigen can be detected within 4 days after infection. Because it takes about 4 weeks for the cestode to excrete eggs since infection, diagnosis can be feasible before egg excretion, which is an ideal management for domestic dogs which has experimentally shown to be a suitable definitive host of *E. multilocularis*.

(3) EPIDEMIOLOGICAL SURVEYS: A fox prevalence survey using the coproantigen detection technique has been held in urban area of Sapporo, showing the penetration of infected foxes with *E. multilocularis* into the resident area of the city. Another intensive survey of foxes is also being held at the rural town, Koshimizu where control trial by deworming of foxes using praziquantel will be performed. Survey of domestic dogs has also been carried out using the coproantigen detection technique by providing the reagents without

compensation to private company "Amaneser".

(4) GASTRIC HYPERPLASIA : The larval form of *Taenia taeniaeformis* which parasitizes in the liver of rats induces gastric hyperplasia and consequently induces hypergastrinemia, thus those rats have a potential for use in a research on hypergastrinemia. The research efforts are concentrated to clarify the mechanism of induction of gastric hyperplasia by the liver-parasitizing parasites, *T. taeniaeformis*.

(5) OVERSEAS STUDIES AND INTERNATIONAL COLLABORATION : Parasitological investigation has been carried out overseas in context with the survey in South-east Asia. Countries additionally investigated includes USA, Guatemala, Honduras, Uruguay, Brazil and Mongolia. Moreover, a research network has been established in Japan and extended overseas, including North and South America, South-east and Central Asia and Europe.

(6) VETERINARY PARASITOLOGY CATALOGUE (VPC) : Parasitology database (VPC) containing data of presentations in the various

conference held in Japan, journal papers and laboratory filed original reprints has been developed since 1985. At present, VPC contains more than 20,000 documents and can be accessed through our home page (<http://www.hokudai.ac.jp/veteri/organization/dis-cont/parasitol/index.html>) for literature search.

(7) PRODUCTION OF TEACHING MATERIALS : Dr. Y. Oku is producing a computer-base textbook for veterinary parasitology. The textbook is 650MB and composed of texts, figures and more than 1,300 color pictures. The textbook is used in lectures for veterinary students.

Besides those, the laboratory maintains more than 3,000 parasite specimens which are managed by computer database. The laboratory library collection is of worthy mention and you can find more than 2,000 text and professional books and more than 30 international journals including back numbers related to parasitology. We are open to and welcome those who would like to be stimulated by parasite life styles.