

Results report

1. Title of Research and Development : Establishment of the model for controlling neglected tropical diseases based on the development of rapid diagnostic methods and risk analysis
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4. Results of Research and Development:

The achievements obtained by the project started from November, 2015 are summarized as below.

- 1) We held domestic stirring committee meeting and the conference entitled “The first study group conference on the control of neglected tropical diseases” in Sapporo in December, 2015. In this meeting, we decided the direction of research activities to be done in the project. In addition, we held Japan-Zambia joint stirring committee meeting and the international conference entitled “The 1st International Conference on the Control Measure of Neglected Tropical Diseases” in Lusaka, Zambia in March, 2016. In this meeting, we exchanged the information on leprosy and human African Trypanosomiasis with researchers in Zambia, Zimbabwe and Marawi, confirmed the progress in Japanese Fiscal year (JFY) 2016 and future activities to be done in JFY2016.
- 2) Totally 8 and 3 researchers on leprosy and trypanosomiasis, respectively, visited Zambia and had discussions with counter parts (project manager of national tuberculosis and leprosy control project, director of Zambia tuberculosis and leprosy trust, professor and lecturer of the University of Zambia). By the meetings, we collected detailed information on the situation of leprosy and human African trypanosomiasis (HAT) in Zambia and specified the items essential for the implementation of epidemiological studies. Information on the situation of leprosy and HAT are used for the preparation of questionnaires for the patients and house hold contacts. And furthermore, we transferred the technique of DNA sequencing as a tool of molecular epidemiological study of leprosy and HAT.
- 3) In collaboration with Leprosy Research Center, National Institute of Infectious Diseases, a method for efficient extraction of nucleic acids such as DNA and RNA using special beads has been established using *Mycobacterium leprae* grown in mice footpads as a model. For the development of serodiagnostic methods, we tried to prepare target recombinant antigen, *M. leprae* Major Membrane Protein-II (MMP-II), for enzyme linked immuno solvent assay using *M. smegmatis* belonging to the same genus as *M. leprae* and succeeded to rise the sensitivity to be twice higher. In addition, we looked for the candidate antigens for serodiagnosis and found nearly 100 genes encoding proteins with low similarity with those in other member of genus *Mycobacterium*. In collaboration with Obihiro University of Agriculture and Veterinary Medicine and Oita University, the development and improvement of diagnostic methods of HAT has been started. To establish automated preparation system of dry type Loop mediated amplification (LAMP) kit, we introduced ink-jet type printer and tried to make test kit of dry type LAMP targeting HAT LAMP as a model. As a result of evaluation experiment, we confirmed that ink-jet type printer can be used for the preparation of dry type LAMP kit with sufficient sensitivity. In addition, Obihiro University of Agriculture and Veterinary Medicine team investigated the marker for the diagnosis of stage-1 HAT and found anti-GM6 antibody to be utilized as a good marker.
- 4) Prof. Yasuhiko Suzuki and Prof. Hideaki Higashi in leprosy research team visited Zambia and had a detailed discussion on the methodology for the analysis of infection risks with Dr. Nathan Kapata, leader of National Tuberculosis and Leprosy Control Project, Ministry of Health and Dr. Paskalina Chanda, manager of epidemiological study, Ministry of Health and drew out the method of epidemiological study. Prof. Chie Nakajima, Dr. Tetsu Mukai, Dr. Yumi Maeda and Yuji Miyamoto in leprosy research team visited Zambia Tuberculosis Leprosy Trust and had a discussion with Ms. Charity Habeenzu and collected the information on the situation of leprosy and the diagnostic and treatment strategy. In addition, members of Japanese HAT research team, Prof. Junya Yamagishi and Dr. Kyoko Hayashida got information on the target area for HAT survey through the discussion with Prof. Boniface Namangala and Dr. Martin Simuunza, the University of Zambia. The integrated information are used for the preparation of questionnaires for the patients and house hold contacts.