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Expert Commentary

Novel Scheme for International Academic Collaboration

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The importance of academic collaboration has been undervalued in international public health. Huge gaps between developed and developing countries in various aspects, including medical facilities, logistics and culture, have hindered such collaboration. We started bilateral collaboration in 2001, when JICA (Japan International Cooperation Agency) decided to send M. Imada as a senior volunteer to the Medical School of National Sam Ratulangi University in Manado, North Sulawesi, Indonesia, to establish and improve the research facilities for molecular biology. Recently, we successfully produced a full-length cDNA library from a human malaria parasite, *Plasmodium vivax,* using blood samples collected from Indonesian patients and determined a large number of 5'-end-one-pass sequences. This parasite cannot at present be propagated in culture and production of a full-length cDNA library from clinical samples will make possible extensive analysis of expressed genes from field isolates.

The project has been successively supported for five years by JICA, the Heiwa-Nakajima Foundation and the Japan Society for Promotion of Science. In 2001, we started a week-long "Tropical Disease Training Course" in Manado in which Japanese participants learn about malaria and other tropical diseases in the field from Indonesian parasitologists. A total of 13 medical students and nurses participated in 8 courses that were held during five years. The participation fee provided a small income that was used to supplement the very small local

budget. It has also helped nurture self-initiative in Indonesian scientists. It is worth noting that one of the participants joined the collaboration after graduation from medical school: J. Tuda visited laboratories in Japan in 2003 and decided to start the "full-length cDNA library of *P. vivax*" project after extensive discussion with Japanese investigators; this project will be a cornerstone for future developments. In 2005 and 2006, a total of 6 Indonesian scientists visited Japanese Universities to broaden the collaboration. It took two years to collect sufficient blood samples, which were obtained from patients after informed consent. After filtration with Plasmodipur filters (Euro-Diagnostica) to remove white blood cells, blood was homogenized with Trizol LS (Invitrogen) using a Polytron homogenizer, snap frozen in liquid nitrogen and sent to Japan on dry ice. Total RNAs were extracted and a full-length cDNA library was produced using the oligo-capping method. 5'-end-one-pass sequences were determined from a large number of random clones, mapped onto the genome sequences and published as a database, Full-malaria (http://fullmal.ims.u-tokyo.ac.jp).

To follow up the aforementioned experience, we would like to propose a new scheme for international academic collaboration. 1) It should be supported for an extended time. An independent local budget will be indispensable. 2) Nurturing of self-initiative in developing countries is of the utmost importance. 3) The project should be selected by scientists in developing countries. 4) Support for an incubation period prior to selection of the project has had unexpected merits. It has provided not only basic facilities for collaborative work but also the freedom to choose a project by the local scientists themselves. 5) Utilization of personnel and facilities of universities should be encouraged.

In conclusion, we hope our experience will help reorganize the grant system to improve international collaboration in academic fields, which should play a pivotal role in international public health.