gustav / August 19, 2010 03:43PM

[International Cooperation][Medicine] Taiwan-Canada Cooperation Succeeds in Inventing Miniature Fluorescent Virus Detector

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CNA (2010/08/19) Under the support of the National Science Council of R.O.C. (NSC), Industrial Technology Research Institute (ITRI) and the National Research Council of Canada (NRC), one advanced miniature fluorescent virus detector has been innovated.

The research group co-directed by Fu-Jen KAO, Professor, Institute of Biophotonics Engineering, National Yang-Ming University, Jau-Jiu JU, Director, ITRI-OES, and the NRC representatives from Canada, Dr. Albert STOLOW and Dr. John PEZACKI, has succeeded in innovating a set of micro-platform FLIM-CARS, with which the studies in hepatitis C virus infection and the related molecular dynamics studies will be greatly assisted.

The group applies the disk read-and-write head technology to the development of the miniature virus detector, creating a rapid virus screening equipment of small size, low cost and high sensitivity. This equipment is believed to largely benefit the diagnosis and treatment of chronic hepatitis C.

Fu-Jen KAO points out, hepatitis C is transmitted via blood contact. About 170 million people in the world are infected while we do not have any effective vaccine against it. We do not fully understand the damage mechanism of chronic hepatitis C, merely whose pathological effects in our observation include oxidation, esterification, fibrosis and aging. Because the hepatitis C carriers have a carcinogenesis rate ten times than the regular people, an efficient way to detect and diagnose hepatitis C is in urgent demand.

KAO continues, the way the group develops to screen hepatitis C is based on the observation of the chemical changes of the virus proteins in their life cycle. By observing (1) the relevant metabolism and structural changes of the host cells together with (2) the natural contrast produced by CARS to the membranes, lipid particles, lipid vesicles, etc., (3) an unprecedented investigation of the infection process of hepatitis C could be conducted.

KAO further specifies, one of the major breakthroughs of the project lies in the application of the optical storage technology to the hepatitis C study. Taiwan is highly developed in optical storage technology to produce a low-cost and high-efficient fluorescent read-and-write head which is based on photon-counting, so that the the micro-light signals such as fluorescence, anti-Stokes Raman signals, etc., could be caught for further “point-of-care” testing.

STOLOW says, hepatitis C virus is very dangerous for its strong mutability and immune stealth; hence, better detections and prevention strategies are in urgent need. KAO continues, a great number of relevant research and development in the world are being executed; the Taiwan-Canada cooperation program specially aims at innovating rapid and efficient non-intrusive photoelectric measures whose applications to other diseases and infections are considered as well.

Further Information:
CNA 2010/08/19 (Chinese)

Edited 1 time(s). Last edit at 08/19/2010 03:44PM by gustav.