![SMART logo — Singapore-MIT Alliance for Research and Technology](SMART)

NEWS RELEASE

SMART researchers discover biomarkers for Dengue Haemorrhagic Fever

- *These biomarkers help to distinguish between dengue patients who suffer from mild Dengue Fever (DF) and those who suffer from the potentially lethal Dengue Haemorrhagic Fever (DHF) and require hospitalisation*
- *This discovery has the potential to provide dengue patients greater peace of mind and paves the way to reduce the healthcare burden of nations plagued by Dengue*

1. Singapore, 17 April 2013 – A research team in the Infectious Diseases Interdisciplinary Research Group (ID-IRG) of the Singapore-MIT Alliance for Research and Technology (SMART) has discovered a biomarker panel that is able to predict at an early stage of the dengue fever as to who is likely to suffer from DHF, develop severe complications and require hospitalisation.

2. With a sensitivity and specificity of more than 80% in predicting the DHF, and a turnaround time of 48 hours (as opposed to the current triage of 4-7 days), this biomarker panel is poised to be an important part of the arsenal of tools that may help clinicians in recognising DHF early and giving appropriate patient care.

3. Currently, clinicians admit dengue patients to the hospital based on their platelet count and other factors such as age, underlying conditions and blood pressure etc. Due to the variable clinical course of individuals infected with dengue, the inability to differentiate DF from DHF patients early and accurately, led to 27% of hospitalization. This puts hospitals and resources under pressure. SMART's discovery of the biomarker panel for DHF prediction will help doctors fine-tune the admission criteria while improving the prediction of patients' at-risk accuracy.

4. This aid to the doctors translates to: Firstly, greater peace of mind for dengue patients; secondly, tremendous cost-savings to patients and the healthcare system.

5. Currently in its first phase of research, this eight-component biomarker panel for DHF comprises five proteins and three clinical parameters. Principal Investigator, Professor Steven Tannenbaum explains: "In our study, we have systematically measured a large number of molecules including cytokines (small proteins that modulate the immune system) and serum proteins in blood samples from a dengue patient cohort. We then developed novel statistical methods that allow us to identify small panels of measurable blood markers, which can distinguish dengue patients that develop mild form of dengue from those that progress to develop severe symptoms."

6. Dr Lee Yie Hou, SMART Research Scientist working at CREATE (Campus for Research Excellence and Technological Enterprise), adds: "We hope that the decreased patient admissions would translate to better quality healthcare for those who are admitted for DHF in particular, and hence reduce the incidences of death among Dengue patients. Patients and governments can certainly expect greater cost-savings as a result of better triage through these biomarkers."

7. Phase 1 of this research entitled 'Serum Proteome and Cytokine Analysis in a Longitudinal Cohort of Adults with Primary Dengue Infection Reveals Predictive Markers of DHF' (http://www.plosntds.org/article/info%3Adoi%2F10.1371%2Fjournal.pntd.0001887), was published in PLoS (Public Library of Science) in November 2012. The SMART researchers will be validating this research with a bigger cohort in Phase 2 of its research.

About SMART
The SMART Centre is a major research enterprise established by the Massachusetts Institute of Technology (MIT) in partnership with the National Research Foundation of Singapore (NRF) in 2007. It is the first entity in the Campus for Research Excellence and Technological Enterprise (CREATE) developed by NRF.

The SMART Centre serves as an intellectual hub for research interactions between MIT and Singapore. Cutting-edge research projects in areas of interest to both Singapore and MIT are undertaken at the SMART Centre. SMART comprises an Innovation Centre and five Interdisciplinary Research Groups (IRGs): BioSystems and Micromechanics (BioSym), Center for Environmental Sensing and Modeling (CENSAM), Infectious Diseases (ID), Future Urban Mobility (FM) and Low Energy Electronic Systems (LEES).

About SMART's Infectious Diseases Interdisciplinary Research Group
SMART Infectious Diseases IRG (ID-IRG) seeks fundamental understanding of host-pathogen interactions as well as direct impact on human heath through translational research. The ID-IRG focuses on infectious diseases that have major impact on human health, including influenza, dengue fever, malaria and tuberculosis. The strategy of the IRG is to develop enabling technologies, including humanized mouse model, high resolution proteomics, glycomics, metabolomics and cellular mechanics platforms, to study infectious diseases using novel approaches and from new angles. The ID-IRG has developed an integrated, cutting-edge research program with participation of both MIT faculty and investigators from Singapore universities and research institutes.

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