



EDITORIAL NOTE

Science and technology to combat dengue virus

JERSON L. SILVA and ANDREA C. OLIVEIRA

Instituto de Bioquímica Médica and
Instituto Nacional de Ciência e Tecnologia de Biologia Estrutural e Bioimagem,
Universidade Federal do Rio de Janeiro

The present issue of the Anais da Academia Brasileira de Ciências includes peer-reviewed articles contributed by scientists that participated in the workshop “Science and Technology to Combat Dengue Virus” promoted by the Brazilian Academy of Sciences (June 5-6, 2008). The Dengue virus (DENV) is a member of the virus family *Flaviviridae* and is transmitted to humans through the bite of the mosquito *Aedes aegypti* and, more rarely, by *Aedes albopictus*. Dengue virus is the most common arthropod-borne disease in the world. Global epidemics of DENV have occurred, in part, due to a reduced commitment with regard to the control of mosquitoes coupled with social factors, such as increase of population in urban areas.

According to the World Health Organization, more than 50 million cases of infection caused by DENV are estimated to occur annually. Dengue is mainly found in the tropics because the mosquitoes require a warm climate. The majority of deaths that result from dengue infection is due to Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS). It is believed that sequential infection by multiple serotypes of DENV can lead to the development of DHF; and it has been estimated close to 500 thousand cases per year worldwide. The Dengue virus has 4 subtypes that share about 60-80% homology among each other. The major difference lies in the proteins present in the membrane envelope. Infection with a particular DENV subtype leads to the development of an immune response. However, when an individual is infected with another subtype, the immune response might not work perfectly, which may lead the antibodies to bind to the surface proteins but with failure to inactivate the virus. It is believed that DHF might result from an antibody-dependent enhancement (ADE), when the viral particles coated with antibodies are taken by macrophages, followed by the release of cytokines that cause the endothelial tissue to become permeable, which results in hemorrhagic fever and fluid loss from the blood vessels. The basic treatment of DHF is to prevent fluid loss, which usually requires hospitalization in intensive care units. This poses a big burden to the health system in countries affected by the disease. Because a tetravalent vaccine is not available yet, the most effective prevention measures lie in mosquito control.

Brazil has been affected periodically by DENV outbreaks. The workshop on Dengue virus promoted by the Brazilian Academy of Sciences had the participation of the leading groups from different states of the country working on mosquito control, diagnostics, vaccine development, epidemiology and the clinics of the disease. The articles published in this issue cover the development of molecular markers to predict DHF (Calzava-Silva et al. 2009) new strategies to vaccine development (Dhalia et al. 2009) and entomological surveillance (Regis et al. 2009).

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