

## Immunological Response - A Friend or Foe

*Prof. Neelika Malavige*

The primary role of our immune system is defense against harmful pathogens. Individuals born with deficiencies in the immune system develop serious infections, repeatedly, often with unusual pathogens. Although plants and invertebrates, which evolved earlier than vertebrates also have an immune system, the fully developed immune system with cellular and humoral components, along with the spleen and the thymus is only present in terrestrial vertebrates such as reptiles, birds and mammals. This highlights the evolution of the immune system to meet environmental hazards of moving from sea to land. However, along with human evolution, we currently encounter diseases due to an inappropriate reaction of the immune system, such as allergies and autoimmune diseases.

Other than the occurrence of autoimmune diseases and allergies due to an aberrant immune response, the immune response to an infection itself, sometimes result in more severe clinical disease. For

instance, the systemic inflammatory response syndrome (SIRS) that occurs in response to severe sepsis or septic shock, is associated with a high mortality and morbidity. SIRS is associated with the production of a vast array of inflammatory mediators by the immune system which results in endothelial dysfunction, multi-organ failure and death. Certain infections such as influenza and dengue, when severe is also associated with endothelial dysfunction, leading to shock and multi organ dysfunction. However, the immune system does eliminate or control the infection in the vast majority of instances and even minor deficiency states of the immune system does result in more severe infections. In fact, emerging evidence suggests that this 'self-destructive' immune response that sometimes occurs in response to infection is actually due to an altered innate immune response during the first encounter between the microbe and the host immune system. For instance, we have found that those who are likely to develop severe dengue, have an impaired antiviral response when their monocytes are infected with the dengue virus. Similar observations have also been made in other infectious diseases. Therefore, the inappropriate immune responses that

subsequently lead to severe illness appears to be due to a dysfunction of the immune system rather than an 'over reaction'.

***Prof. Neelika Malavige***

*MBBS (Col), MRCP (UK), DPhil (Oxon), FRCP (Lond), FRCPath (UK)*

*Is a Professor and Immunologist and Director of Centre for Dengue Research of Department of Microbiology, Faculty of Medical Sciences, University of Sri Jayawardanapura.*