

1st Pasteur-Asia Immunology Course

A seminar entitled

‘Pathogen associated molecular patterns (PAMPs)’

will be given by

Dr Jean-Marc Cavillon

Institute Pasteur, France

Date: Friday, 24 October 2008

Time: 15:30 pm to 17:30 pm

Venue: Mrs Chen Yang Foo Oi Telemedicine Centre
2/F, William MW Mong Block, Faculty of Medicine Building
23 Sassoon Road, Pokfulam, Hong Kong

Contact: hku-pasteur@hku.hk or Anne Li at +852 2816 8403

Abstract:

The concept of “pathogen-associated molecular pattern” (PAMPs) emerged in 1989 when Charles Janeway revisited the definition of immunology, and concluded that the self-non-self model had reached its end. He also argued that the innate immune system uses ancient pattern-recognition receptors to recognize a pathogen by its unchanging characteristics. One property of PAMPs is to share with the whole microorganism it derived from, the capacity to turn-on or to turn-off a similar group of genes within the host’s cells. The concept of PAMPs is not fully suitable because non-pathogenic microorganisms (e.g. commensal bacteria) share similar molecular compounds with pathogens. Thus, probably the concept of “microorganism-associated molecular pattern” (MAMPs) would be more appropriate. The endotoxin of Gram-negative bacteria (or lipopolysaccharide, LPS) is the most widely studied and used PAMP. More than 24,000 papers with the word endotoxin or lipopolysaccharide in their title have been published since 1940. It is a highly potent molecule and its capacity to activate cells in vitro is observed with only few picograms. In vivo, sensitivity to endotoxin toxic effects differs between species: some are highly sensitive (humans), others are quite resistant (mice), whereas some are resistant (lizard, fish). The endotoxin receptor is made of CD14, Toll-like receptor 4 (TLR4) and MD2 molecule. Numerous PAMPs act either through TLR or Nod-like receptors. They can be proteins (e.g. flagellin, outer-membrane protein from bacteria, capsid proteins from viruses), glycopeptides (e.g. peptidoglycan, PGN), lipopeptides (e.g. PGN-associated lipopeptide), glycolipids (e.g. lipoarabinomannan of Mycobacteria), lipoglycopeptide (e.g. lipoteichoic acid), DNA or RNA. PAMPs trigger immune cells, and act in synergy with each other and with host cells mediators to induce a large panel of cytokines. They can also induce a state of tolerance if the cells are exposed repetitively, leading to cross-tolerance between different TLR agonists.