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Microbiology and Infectious Diseases

Detailed presentation of the lecture

A pathogen that succeeds in breaking into the tissues and organs of a host represents a threat in response to which the immune system has developed. The body's first response when challenged by an infection is **generic**; the **innate immune response** is mainly expressed as inflammation resulting from the activation of receptors that recognise molecular motives specific to germs and more generally molecules that the host produces when threatened. The **immune response is also adaptive**, that is to say the immune system is capable of providing a response that is **specific** to the antigens produced by each pathogen, ensuring that the infectious agent that initiated the innate response is completely eradicated and protecting the host against any subsequent infection by the same agent. The orientation and efficacy of the body's adaptive immune response depend on the quality and intensity of the innate immune response.

Until recently the virulence of pathogens has largely been analysed in terms of the molecular dialogue that takes place between the factors of microbial pathogenicity and the host cells, resulting in a subversion of the body's main barriers against the progression of the aggressing microorganism: adhesion, invasion and apoptosis are the dominant themes of what is usually called **cellular microbiology**. However, recent studies have shown that we must add the molecules that are capable of **subverting the innate and adaptive immune response** to the range of factors of pathogenicity. In fact some bacterial, viral and parasitic pathogens have mastered the art of camouflage, and even know how to manipulate the signalling pathways that play a key role in the immune response. **Immune manipulation** is thus an integral part of pathogenicity through molecular effectors that can be extremely sophisticated, often calling upon the action of enzymes such as proteases, kinases, phosphatases, ubiquitin-transferases and de-ubiquitinases, etc., i.e. a huge armamentarium of resources built up throughout a long period of **co-evolution between hosts and pathogens**. These factors and their often unexpected targets also represent a yet unused source of innovative goals for anti-infectious, anti-inflammatory and immunomodulatory treatments as well as vaccinology.

The 2011-2012 teaching programme of the Chair in Microbiology and Infectious Diseases will cover all these aspects of how pathogens manipulate their hosts in the form of lectures and seminars given by eminent experts in this area. It will also be illustrated by a symposium on imaging infectious processes, in particular in the context of immune manipulation.