Project FI-1

Complement evasion by viruses and opportunistic bacteria

(Supervisors: **Prof. Seppo Meri, Prof. Cecilia Garlanda**)

Infections pose a global threat because of spread of antibiotic resistance, hospital infections and problems in the third world. On the other hand, rapidly increasing information of microbial genomes now provides new opportunities to tackle virulence mechanisms of pathogenic microbes. We have delineated earlier new immune evasion mechanisms of important pathogens, like borrelia, yersinia and streptococci. The aim of this project is to search and analyze molecules and mechanisms that bacteria or vaccine viruses use to escape the complement system. We are focusing on complement factor H (FH), FH-related proteins and the pentraxins, especially PTX-3. The information obtained will be important in developing new ways to overcome microbial resistance to complement or to improve biocompatibility of vaccine viruses. The particular bacteria we will be working on include antibiotic-resistant gram-negative enterobacteria. The first mechanism involves hijacking host complement regulatory proteins, factor H that under natural circumstances down-regulates the amplification pathway of complement activation. We will study direct inhibitory effects of factor H and the potentially interfering or promoting effects that the FHR-proteins or pentraxins could have. The evasion molecules will be identified and further characterized. In the second mechanism, we will study hijacking the central complement component C3 and its activation product, the opsonin C3b in a nonactive form from the host blood or proteolytic cleavage of C3/C3b by the microbial enzymes. The use of the microbial proteins that mediate human complement evasion as vaccines would lead to an immune response that could block complement resistance and promote microbial clearance.

General description of your individual PhD-schedule:

- Your main university will be University of Helsinki (Finland) with Prof. Meri as supervisor.
- You will have a 6-months research secondment at Humanitas University Milano (Italy) with Prof. Garlanda as supervisor, where you continue to scientifically work on your thesis project.
- You will have a further 6-months research secondment at MSD Finland (Helsinki) where you will learn industrial approaches to vaccine research.
- You will have a 1-month clinical training at Tirol Kliniken Innsbruck (Austria).
- You will have a 1-month entrepreneur training at MSD Finland (Helsinki).
- You will finally receive a PhD issued by University of Helsinki and Humanitas University Milano if you fulfil the respective requirements.

Application

The position is advertised on **www.corvos.eu**. Please apply via this homepage.