

Research group/ Company: Microbiologia (Systems Biology Lab)

Leader of the group/ CEO/ Principal Investigator: Marc Torrent Burgas

Positions available: 2

Description/ Research lines:

Our group is interested in understanding how pathogenic bacteria interact with host cells and how the innate immune system reacts to infection. We use a multidisciplinary approach including systems biology, biophysics and computational biology.

Research Line 1: Development of new antibiotics targeting protein-protein interactions

Adhesion of pathogenic bacteria to the host cell surface is an essential process in the development of infection, especially for oral, respiratory and enteric bacteria. After adhesion, bacteria can invade host cells, where they are more resistant to elimination by the immune system and have larger access to nutrients, favoring their proliferation and increasing their chance of survival.

To prevent adhesion and invasion in the early stages it is essential to understand how bacteria coordinate the expression of different effectors and how host cells respond to infection.

We aim to design new therapeutic interventions based on neutralizing the adhesion and invasiveness properties of pathogens.

Successful applicants will be involved in:

- a) analysis of host-pathogen interactome maps
- b) development of new peptide drugs to prevent bacteria adhesion and invasion

Research Line 2: Understanding the systemic effects of infection and inflammation in age-related diseases

Infections cause local cellular injury due to reactive chemical species and other cytotoxic mediators. Pathogens can also suppress, disrupt or evade host defenses and become persistent or chronic.

Though it is well documented that ageing is a risk factor for infection we still do not know whether the inverse is true, this is whether infection may contribute to ageing. During infection, pathogens cause inflammation and tissue damage that can accelerate ageing effects. Moreover, some pathogens can also avoid the immune system, causing latent infections that can reactivate periodically, thereby deteriorating the host condition.

We investigate the side effects of chronic infection and inflammation in the context of age-related diseases, fundamentally Alzheimer and other kinds of dementia. Our goal is to discover new therapies to prevent the onset of neurodegenerative diseases.

Successful applicants will be involved in genomic and proteomic analysis of microglia cells in Alzheimer's disease.

Requirements:

- Bachelor in Biology-related areas
- Basic microbiology protocols (e.g. bacteria culture)
- Basic molecular biology techniques (e.g. bacteria cloning, PCR)
- Fluent level of English
- A highly motivated and organized candidate
- Capable of working in a group and with a high degree of work autonomy

For further information contact: docencia@vhir.org