



PhD position (FPI program) in the new group of Infection Biology at the University Pompeu Fabra (PRBB, Barcelona)

Many infectious agents establish a persistent infection in humans. Examples that are of particular clinical importance are the human immunodeficiency virus (HIV), the hepatitis C virus (HCV), herpesviruses like the cytomegalovirus (CMV) and the bacterium *Mycobacterium tuberculosis* (MTB). In all these cases, innate and adaptive immune responses are usually insufficient to eliminate the invading microorganism during primary infection. This inability of elimination then results in a dynamic balance within the host between microbe expansion and microbe-specific adaptive immune responses that may be stably maintained for years without the need for medical interventions. However a slight shift in favor of the microbe will rapidly distort this dynamic balance and lead to overt disease.

Recent work mainly in the HIV field has documented that it is the quality of the adaptive immune response rather than the mere number of virus-specific immune cells that predicts virus control, indicating that immune control over a microbe can be expected when immune cells with efficient effector function are recruited fast by a local microbial burst. While this relationship seems quite evident, the precise dynamics of human immune cell populations against a defined microbe is not well established today.

The main objective of our group is to analyze in detail the adaptive lymphocyte response to microbial infections that usually lead to persistence. For this, we are currently working on the analysis of the polyfunctionality and dynamic responsiveness of lymphocytes specific for the human pathogens HIV, MTB and CMV. We expect that the results will help to understand in more detail the host-pathogen interactions in persistent infections, and thus allowing a better prediction of infection outcomes.

References

Sester et al. Challenges and perspectives for improved management of HIV/TB coinfection. *Eur. Respir. J.* (in press) (2010); Banks HT. et al. Estimation of Cell Proliferation Dynamics Using CFSE Data. *Bull Math Biol.* Epub ahead of print (2010); Geldmacher C. et al. Rapid depletion of Mycobacterium tuberculosis-specific T helper 1 cell responses after HIV-1 infection. *J Infect Dis.* 198(11):1590-8 (2008); Luzyanina T. et al. Numerical modelling of label-structured cell population growth using CFSE distribution data. *Theor Biol Med Model.* 24;4:26 (2007).

Candidate Requirements

We are seeking for highly motivated and enthusiastic candidates with Graduate studies related to Biology. They will integrate the International PhD Program in Biomedicine of

the Department of Experimental and Health Sciences (UPF).
Announcement of the FPI fellowship is usually in January. Interested candidates please
send a letter of interest, CV and contact details of 2 referees to
andreas.meyerhans@upf.edu

