Bacteriology-2013

OMICS Group Conferences
Accelerating Scientific Discovery

International Congress on
Bacteriology & Infectious Diseases

November 20-22, 2013 DoubleTree by Hilton Baltimore-BWI Airport, USA

# Within host infection dynamics in bacterial immunology and vaccine development

**Pietro Mastroeni**
*University of Cambridge, United Kingdom*

## Abstract

Understanding the dynamics of pathogen behavior in the host “across scales” from single cells, to organs, to the whole animal level allows a deeper insight into the intricacies of the infection process and improves our ability to target appropriate vaccination and therapeutic strategies more accurately to the sites of bacterial growth and/or persistence.

We have used multidisciplinary research approaches based on the integration of immunological techniques, advanced microscopy, individually traceable molecularly tagged bacterial populations and mathematical modeling to capture the many variables that underpin the location, spread, division, death and persistence of *Salmonella enterica* within murine models of infection that closely resemble the infection process in other mammalian hosts. These approaches have also allowed us to reveal heterogeneous traits in the behavior of individual subpopulations and their interactions with the immune system.

We have shown that the infection process is complex and consists of multi-stage processes with different bacterial growth/death rates and patterns of spread. The infection is dispersive due to the fact that salmonellae grow intracellularly, exit from host phagocytes, spread in the body and infect new host cells at distant sites in the tissues. The dynamics of spread of salmonellae in the tissues are governed by subtle reciprocal interactions between bacterial virulence factors and the immune system of the host. We are now exploiting these research approaches to gain refined information on how immunisation impacts on the spatial and temporal dynamics of a secondary infection.

## Biography

Pietro Mastroeni received a Degree in Medicine and Surgery from the University of Messina, Italy. He moved to the University of Cambridge, UK where he completed his Ph.D before becoming a Research Fellow at Imperial College, University of London UK. He is currently a Reader in Infection and Immunity at the University of Cambridge. He has published more than 100 papers in reputed journals and served as an editorial board member of repute.