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Macrophage polarization and chronic bacterial infectious diseases

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Abstract

The activation of macrophages is a key for the success or the failure of the host response to pathogen aggression. Based on limited numbers of markers, activated macrophages have been classified as M1 (microbicides) and M2 (immunoregulatory) macrophages. But this model of activation cannot be used to follow infected patients in whom only monocytes are easily investigable. The use of high-throughput gene expression methods afforded a reappraisal of the polarization. While macrophages are polarized in response to M1 or M2 polarizing agonists, monocytes exhibit early polarization followed by a late pattern of common activation that cannot be reduced to M1/M2 polarization. We are proposing a kinetic model including early and late signatures for monocytes activation in normal and pathological conditions. We investigated Q fever as a model of chronic bacterial infectious disease. While the polarization was accurate for the analysis of monocytes and macrophage response to *Coxiella burnetii*, the agent of Q fever, it failed to assess monocytes activation in the clinical presentation of Q fever. The early signature enables the assessment of monocytes response in acute Q fever. The late signature is enriched in patients who develop a chronic Q fever. The use of a dynamic approach enables the identification of new biomarkers associated with bacterial infectious diseases in which monocytes and/or macrophages are involved. These findings also underline the contribution of omics approach in the pathophysiology of infectious diseases.

Biography:

Jean-Louis Mege lead the team "Gender, pregnancy and infectious diseases" in CNRS Unit (UMR 7278). My activity led to 149 publications and 28 didactic publications. Three topics are developed: the mechanisms of bacterial survival in macrophages; the polarization of monocytes and macrophages; the immunological investigation of infected patients. We are integrated in the "Infectiopole South" network. Since 2004: Director of the Master program "Human Pathology". It includes 6 research specialties (Cancer, Infectious Diseases, Health and Genomics, Health and Environment, Nutrition, Ethics and Society) and 2 professional specialties. The specialties graduate 120 students each year. Co-director of the Doctoral School "Science of Life and Health" (ED62) that manages students from Science Faculty and Medicine Faculty. 2009: President of the Scientific Council of the Medicine Faculty (Marseilles). Student training: 12 students were graduated under my supervision; 1 was recruited by CNRS and 3 by University, 3 obtained an industrial position and 3 are post-doc. I obtained several grants from clinical research (PHRC) and FRM. Member of French Society for Immunology, Society for Leukocyte Biology, American Society for Microbiology, European Cytokine Society.