

Showcase on Research

EDITORIAL

Inflammation - A Hot Topic

In this issue of the *Australian Biochemist* we have a series of articles on the general theme of inflammation research. We tend to think of inflammation only in terms of the common debilitating diseases that can attack all our major organ systems. These include rheumatoid arthritis, inflammatory bowel disease, chronic obstructive lung disease and asthma, multiple sclerosis and psoriasis. However, all infectious diseases cause at least part of their pathology by activating the immune system and causing "collateral damage". Thus, atherosclerosis is clearly an inflammatory disease of the vessel walls, and the invasion front of an aggressive tumour is an inflammatory lesion in which immune cells contribute to local tissue damage as well as systemic immunosuppression and pathology. Indeed, it is arguable that inflammation is the root of the vast majority of our health problems.

Inflammation research in the past has fallen into a number of camps. One major group has focussed on the acquired immune system. Many inflammatory diseases have a specific autoimmune component, so that the body's T cells and B cells react against normal tissue components. The search for the specific antigens involved and the elucidation of the underlying reasons for the breakdown in self tolerance have progressed significantly. However, they have opened up relatively few therapeutic avenues other than application of non-specific immunosuppressants. A second major group of inflammation researchers has focussed on small molecule pro-inflammatory agents, archetypes of which include the prostaglandins and histamine. Pharmacological approaches to dealing with proinflammatory agents have been developed around preventing their production (e.g. COX-2 antagonist) or their actions (specific receptor antagonists). The third group of researchers was brought somewhat in from the cold by the rediscovery of the immune system's dirty little secret, attributed to Charles Janeway, that the nature and extent of immune responses and inflammatory reactions is determined in large measure by the initial interaction between the initiating agent and the innate immune system. Macrophages (including dendritic cells), granulocytes and NK cells are clearly key players in both initiation, and pathology, of inflammatory diseases, and an understanding of their biology represents a key avenue towards new therapies.

John Hamilton, Gary Anderson, Paul Hertzog and myself are the key investigators in the newly-formed CRC for Chronic Inflammatory Diseases, which brings distinct complementary skills together in the search for approaches to rheumatoid arthritis and obstructive lung disease. Hamilton and Anderson (Melbourne) present an overview of their work implicating the major macrophage growth factors, CSF-1 and GM-CSF in the pathology of lung and joint inflammation. Paul Hertzog's group at Monash University focusses on the roles of the interferons and their receptors, as well as transcription factors of the Ets family. In summarising the activities of my own group in Queensland, I have chosen to highlight global approaches made possible by transcriptome analysis. Finally, our colleague Carolyn Geczy from University of New South Wales reviews her long standing interest in the S100 proteins as pro-inflammatory agents produced by macrophages, granulocytes and epithelial cells, and her recent exciting and unexpected finding about their redox function. These reviews are a small slice of inflammation research in Australia, which is an especially vibrant area.

David Hume

Institute for Molecular Biosciences, School of Molecular Biosciences, ARC Special Research Centre for Functional and Applied Genomics and CRC for Chronic Inflammatory Diseases, University of Queensland, QLD 4072

Cover Illustration -

Macrophage dragon

This is an image of a pair of mouse macrophages stimulated with lipopolysaccharide, and immunostained for expression of tumour necrosis factor protein, which accumulates in the Golgi apparatus. The image has been artistically manipulated. The image was prepared by Darren Brown and Wendy Shurety, of the Institute for Molecular Biosciences. Image supplied courtesy of Ångström Art (www.angstrom-art.com).

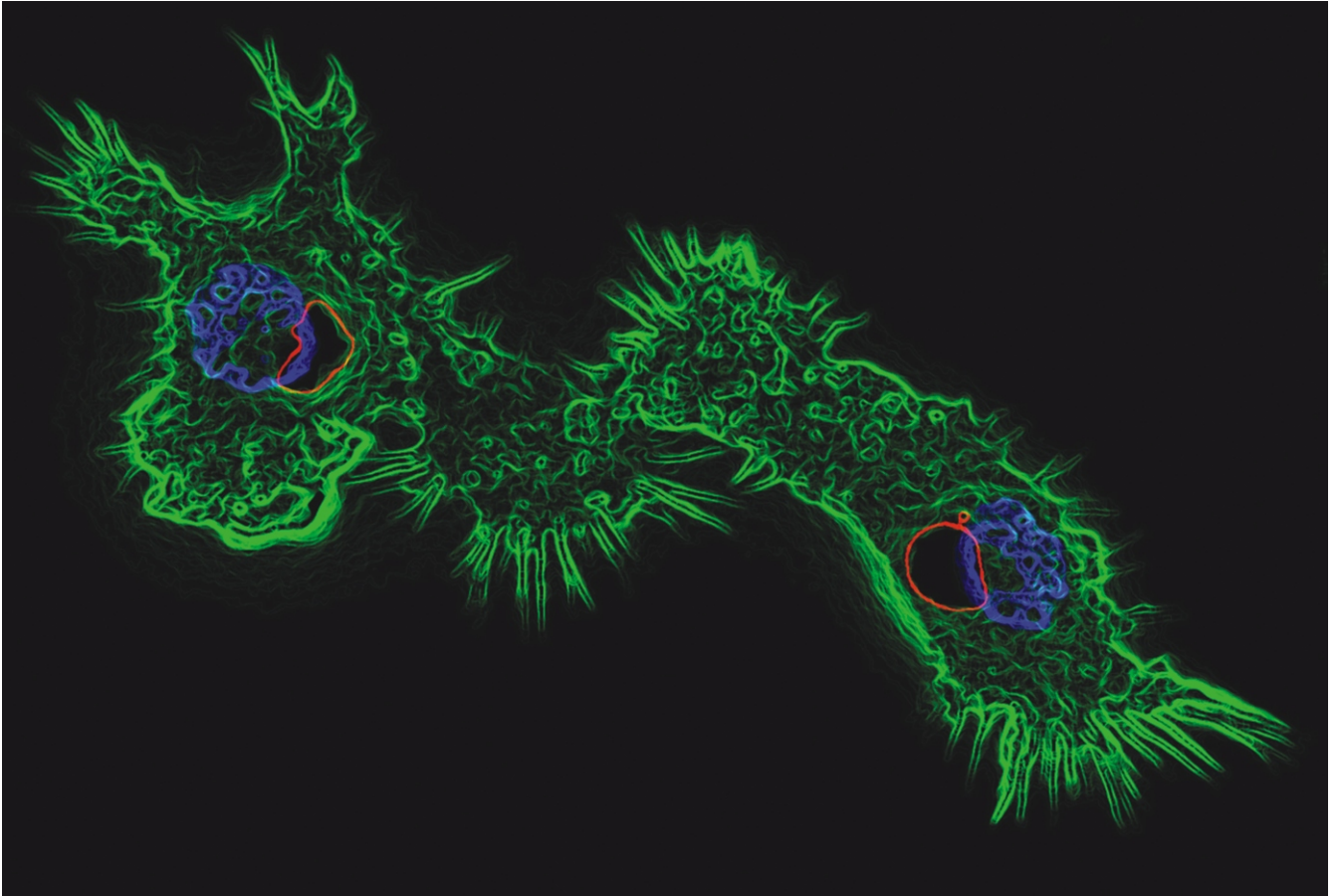
Inflammation - A Hot Topic

Guest Editor: David Hume

- Macrophages as Critical Targets in Chronic Inflammation
John Hamilton and Gary Anderson
- Cytokine Signals and Target Validation in Inflammation
Paul Hertzog, Ernst Wolvetang, Trevor Wilson, Dakang Xu, Catherine Owczarek and Melanie Pritchard
- Towards a Systems Biology View of Macrophage and Osteoclast Function
David Hume
- S100 Proteins in Inflammation: New Aspects of Old Problems
Ken Hsu, Mark Raftery, Zheng Yang and Carolyn Geczy

Next Issue...

In August, Showcase on Research will be on **Protein Domains** – Guest Editor: **Joel Mackay**



Front Cover Image