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Cytokines in atherosclerosis: Molecular mechanisms underlying their actions and promising therapeutic targets

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Atherosclerosis and its complications are responsible for more deaths worldwide than any other disease. Atherosclerosis is an inflammatory disorder of medium and large arteries that involves both the innate and adaptive immune systems. The inflammatory response in atherosclerosis is orchestrated by cytokines that are produced by all the cells involved in this disease. Cytokines are generally classified as pro- or anti-atherogenic. Approaches to inhibit the actions of pro-atherogenic cytokines include neutralization via blocking antibodies or soluble decoy receptors and the use of inhibitors of intracellular signaling pathways. On the other hand, approaches for anti-atherogenic cytokines include their local delivery and the use of agents that augment their expression/actions. More than fifty cytokines have been found to be involved in atherosclerosis. It is therefore important that a thorough understanding is obtained of their actions in this disease in order to identify new therapeutic targets or approaches and validate their therapeutic potential. Research in my laboratory has focused on cytokine signaling in atherosclerosis with emphasis on macrophages, which play key roles in all stages of this disease and represent promising therapeutic targets. New insights have been obtained on the molecular mechanisms underlying the actions of interferon-gamma, transforming growth factor-beta, interleukin-33 and tumor necrosis factor-like protein 1A on key macrophage processes in atherosclerosis (e.g. foam cell formation, regulation of gene expression, amplification of the inflammatory response). These will be presented in the context of current therapies and future developments in this field.

Biography

Dipak P Ramji received his BSc (Hons.) degree (Biochemistry) and his PhD from University of Leeds. This was followed by Post-doctoral research at the EMBL (Heidelberg) and IRBM (Rome) with fellowships from the Royal Society and the EU. He joined Cardiff University in 1992 and is currently a Reader at Cardiff School of Biosciences. His research is focused on the impact of the immune and inflammatory responses on atherosclerosis with emphasis on the action of cytokines on macrophages. He has published over 80 peer-reviewed papers, reviews and book chapters. He is an Editorial Board Member of 16 international journals.

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