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Atherosclerosis: Mechanisms, current therapies and the potential of natural products in the prevention and treatment of the disease

Atherosclerosis, a chronic inflammatory disorder of medium and large arteries and the underlying cause of heart attacks and stroke, is responsible for more global deaths than any other disease. A slight reduction in morbidity and mortality from atherosclerosis and its complications has been seen recently, at least in the western world, due to lifestyle changes and pharmaceutical interventions (e.g. statins). However, the global burden from this disease is expected to worsen in the near future because of recent increases in risk factors such as diabetes and obesity. Current pharmaceutical treatments for atherosclerosis are associated with considerable residual risk for cardiovascular disease together with various side effects. With the exception of few successes (e.g. ezetimibe, PCSK9 inhibitors), many pharmaceutical leads against established targets have proved disappointing at the clinical level. It is therefore important that further research is carried out on the molecular basis of atherosclerosis together with alternative therapies for its prevention and treatment.

Natural products have received substantial recent interest in the prevention and treatment of atherosclerosis. However, more research is required that addresses the molecular mechanisms underlying the beneficial effects of natural products together with large clinical trials that evaluate their efficacy. We have recently initiated studies on the effects of many natural products, including certain polyunsaturated fatty acids, polyphenols and probiotics, on several key monocyte/macrophage processes associated with atherosclerosis *in vitro* and various risk factors *in vivo* together with the underlying mechanisms. These will be presented in the context of molecular mechanisms underlying atherogenesis together with current therapies and those that are being developed.

Biography

Dipak P Ramji is Professor of Cardiovascular Science at the School of Biosciences in Cardiff University. He received his BSc (Hons) degree (Biochemistry) and his PhD (Molecular Biology) from the University of Leeds. This was followed by post-doctoral research at the European Molecular Biology Laboratory (Heidelberg) and the Istituto di Ricerche di Biologia Molecolare P. Angeletti (Rome) with fellowships from the Royal Society and the EU. He joined Cardiff University in 1992 and completed 25 years of service in August 2017. His research is focused on understanding how the immune and inflammatory responses regulate cellular processes in heart disease with the goal of attaining deeper mechanistic insight and identifying preventative/therapeutic agents. His research has been funded by several organisations and received continuous funding from the British Heart Foundation since 1997. He has published over 150 research articles (h index 34 and i10 index 68 with over 5700 citations). He is an Editorial Board member of 16 international journals; regular organising committee member, speaker and track/session chair at international conferences on heart disease; involved in grant evaluation for over 20 organisations; and supervised over 25 PhD students. In addition to research, he is involved in teaching and administration, including Postgraduate Tutor for the Biomedicine division at the School of Biosciences and external examiner for Biochemistry and Biomedical Sciences at the University of Reading and King's College London.

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