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The role of oxygen insufficiency in the onset and development of the vascular complications of diabetes

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The ability of oxygen to be delivered to and utilised by cells is of fundamental importance to their ability to survive and function within normal parameters. Regulatory mechanisms within the cell provide a range of tools to facilitate the acquisition and utilisation of oxygen in such a way that the ability of the cell to function within normal parameters is not compromised. The regulation of blood flow, changes in pressure and high, and/or fluctuating concentrations of glucose will affect the ability of cells to metabolise glucose and will be of particular significance if the cell has high energy demands. Endothelial cells form the lining of the vasculature and are influenced by conditions within the diabetic milieu resulting in impaired function leading to the vascular dysfunction. Using isolated endothelial cells and a retinal vascular explant model, results will be presented to demonstrate the key role that oxygen plays in the ability of endothelial cells/vessels to proliferate in a wound model. The increase in migration and proliferation resulting from decreased oxygen tension will be contrasted with the detrimental effect that high glucose concentration has on the response. In addition data demonstrating the role of anti-oxidants in the amelioration of glucose-mediated damage will be presented and the role of hyperoxia for the treatment of recalcitrant ulcers will be discussed to highlight the significance of oxygen to the onset, progression and treatment of the vascular complications of diabetes.

Biography

Rachel M Knott completed her PhD in 1988 from the University of Aberdeen. She carried out Post-doctoral work at the Rowett Research Institute and at the Department of Ophthalmology in the University of Aberdeen. She is currently a reader within the School of Pharmacy & Life Sciences at Robert Gordon University and is the Graduate School Leader for the Faculty of Health & Social Care. She has published over 50 papers in reputed journals and regular reviews for journals of international repute.

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