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IDENTIFICATION OF PROTEIN TARGETS IN CEREBRAL ENDOTHELIAL CELLS FOR BRAIN ARTERIOVENOUS MALFORMATION (AVMS) MOLECULAR THERAPIES

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To develop a new molecular targeted treatment for brain (AVMs), identification of membrane proteins that are localised on the AVM endothelium is crucial. Current treatment methods are surgery and radiosurgery. However, complete occlusion post radiosurgery are achieved within 3 years, while patient remain at risk of haemorrhage. This study aims to identify potential protein targets in AVM endothelial cells that discriminate these vessels from normal vessels; these proteins targets will be investigated for the molecular therapy of brain AVMs to promote rapid thrombosis after radiosurgery. We employed *in vitro* and *in vivo* biotinylation that we developed, and mass spectrometry to detect cell surface-exposed proteins in cultures of murine cerebral endothelial cells (bEnd.3) and the rat model of AVM. Two forms of mass spectrometry were applied (iTRAQ-MS and MS^E) to identify and quantify membrane protein expression at various time-points following irradiation which simulates a radiosurgical treatment approach. Immunocytochemistry was used to confirm the expression of selected membrane proteins. ProteinPilot V4.0 software was used to analyse the iTRAQ-MS data and the MS_E data was analysed using ProteinLynx Global Server (PLGS) version 2.5 software.

BIOGRAPHY

Margaret Simonian has PhD in Advanced Medicine and MPhil in Biological Sciences from Macquarie University- Australia. She works as a Researcher at UCLA David Geffen School of Medicine, and previously as a Senior Research Fellow at LA-Biomedical Research Institute at Harbor-UCLA, and at Macquarie University. Her research interests focuses on utilizing Proteomics and Molecular Biology in biomarker discovery and drug development of diseases, such as brain arteriovenous malformations (AVMs), brain tumors , aneurysms and multiple sclerosis. Her research on brain AVMs was the first to utilise proteomics to identity protein targets of AVM molecular and vascular therapies post radiosurgrey. She presented her research in many international conferences and published in many peer reviewed journals. She is also a reviewer for the Journal of Proteomics, Journal of Arthritis & Research Therapy and Journal of European Proteomics. An Associate Editor for the Journal of Applied Biotechnology and Bioengineering, and Editorial Board Member for Journal of Data Mining in Genomics & Proteomics, and Journal of Science publications, as well as an Organizing Committee Member for the International Conference on Precision Medicine 2017.

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