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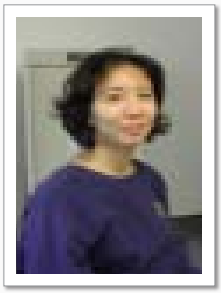

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Deciphering the role of lipid rafts by subcellular proteomics

Lipid rafts are cholesterol and sphingolipid-rich membrane micro domains thought to modulate cellular signaling. Caveolin-1 is a structural component of plasma membrane invaginated pits called caveolae, a subtype of lipid rafts. Caveolin-1 is implicated in many cancers as well as diabetes and obesity; however, the cellular mechanism of function is not well-understood. Caveolin-1 is a cholesterol-binding protein and localizes to plasma membrane as well as internal membranes. In addition, caveolin-1 has been found on secreted cancer exosomes. Hence we hypothesized that caveolin-1 acts by altering lipid raft proteome, which in turn impacts on subcellular membrane organization and cell function. To test this hypothesis, we undertook a novel subcellular systems biology approach. Caveolae or lipid rafts in cells were modulated by gene expression or drug treatment, and then subcellular proteomes were quantitatively profiled. Functional annotation was performed for significantly altered proteins in each fraction, and networks of the altered proteins were analysed within and across fractions. These studies showed that altering caveolin/caveolae quantitatively affected lipid raft proteome, leading to alterations in the cytoskeleton as well as signaling proteins and secretory pathways.

Biography

Michelle Hill received a PhD in cell biology from the University of Queensland (UQ), Brisbane, Australia. Following post-doctoral work at Friedrich Miescher Institute for Biomedical Research, Trinity College Dublin, and the Institute for Molecular Biosciences UQ, Dr Hill established the cancer proteomics group at UQ Diamantina Institute. Current major focus is on the role of caveolin and lipid rafts in prostate cancer progression and cancer biomarker discovery using lectin magnetic bead array. She is an organizing member of Australasian Proteomics Society and Queensland Proteomics Discussion Group and serves on the editorial boards of international proteomics and cell biology journals.

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