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The role of protein arginine methylation in cell cycle and tumorigenesis of brain cancer cell lines

Anita E Livio
Western Sydney University, Australia

Protein arginine methylation is a post-translational modification involved in many cellular processes, such as, regulation of signal transduction, facilitating protein-protein interactions, RNA transport and splicing. It is becoming increasingly evident that protein arginine methylation is also an important regulator of the cell cycle and DNA damage repair pathways. Important regulatory proteins, such as cyclin D1, p53, p21, and the retinoblastoma protein are methylated or associate with protein arginine methyltransferases (PRMTs), the enzymes responsible for arginine methylation. PRMTs are often overexpressed in cancers, leading to aberrant methylation patterns correlating with poor disease prognosis. Brain cancer is one of the most aggressive types of cancer, the 5 year survival rate for patients in Australia with brain cancer is only 20%. PRMT1 forms a complex, the methylosome, to initiate methylation of H4R3 to activate transcription of glioblastoma genes, such as *EGFR, AKT3,* and *CDK6*. PRMT5 overexpression correlates with increased cell proliferation and its knockdown resulted in cell cycle arrest leading to apoptosis. My study seeks to further investigate the role of protein arginine methylation in the cell cycle of glioblastoma cells, specifically through the interaction of mortalin with p53. Mortalin is normally found in neurons only; however it has also been found in glioblastoma tissues with expression levels correlating with tumor aggresivenss. Preliminary data has shown mortalin to be methylated on an arginine within the p53-binding domain, suggesting that methylation may play a role in the localisation of mortalin or its interaction with other proteins, e.g. p53.

Biography

Anita E Livio is a 2nd year PhD candidate at Western Sydney University and is collaborating with researchers at Hawkesbury Insititute for the Environment. She completed her Bachelor of Science (Hons) in 2014, also at Western Sydney University.

A.Livio@westernsydney.edu.au

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