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In situ detection of *Polyalthia longifolia* leaf extract in developing natural anti-cancer therapeutic agent: Optical and electron microscopy evidence

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Optical and electron microscopes are extensively employed scientific techniques, which gauge cytological changes as incur in cell cytotoxicity. The microscopic images relinquish topographical, morphological and compositional evidences that infer cell mechanism in response to anticancer agent. On that ground, this study engaged numbers of microscopy methods to detect *in situ* anticancer activity of *Polyalthia longifolia* against cervical cancer cell line, HeLa. The *P. longifolia* being the most important indigenous medicinal plants, are found throughout Malaysia and generally use by traditional healers to treat various diseases. The MTT assay results disclosed the lowest IC_{50} value of 14.181 µg/ml as *P. longifolia* leaf extract debilitate HeLa cells. The effect of this plant extract on HeLa cells were observed at 0, 6, 12, 24 and 36 hours using Light Microscope (LM), Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM) and HoloMonitor (HM). The cytological observations underlined cell shrinkage, nuclear and chromatin condensation, multinucleation, membrane blebbing, punctures, cytoplasmic extrusions and formation of apoptotic bodies, which are correlating within LM, SEM, TEM and HM images. Further biochemical tests were performed to verify this apoptosis resemblance. *P. longifolia* is deduced to effectuate distinctive morphological features of cell death in conformity to apoptosis. The findings corroborate *P. longifolia* as a potential natural therapeutic agent in combating cervical cancer, which ranks the world's second largest cause of female cancer mortality.

Biography

Soundararajan Vijayarathna is a second year Doctoral student in Molecular Medicine at Universiti Sains Malaysia (USM). She has published more than 12 papers, 5 proceedings and contributed to a book chapter. Currently, her field of research addresses the relationship of microRNAs with cancer biology and the role of natural products as anti-cancer agents. She won the most "*Excellent Paper*" award for her oral presentation at 2012 3rd International conference on Biotechnology and Food Science in Bangkok, Thailand and been nominated for Best Thesis Award by the Institute for Research in Molecular Medicine in USM for her MSc thesis.

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