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Cross talk between apoptosis, autophagy and necrosis-pathways involved in treatment of neuroblastoma, an *in-vitro* study

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Immunology ranks as one of the most rapidly expanding areas of biomedical science, covering topics from cancer and vaccine research to immune deficiencies and autoimmunity. Neuroblastoma and solid extracranial cancer of childhood with an annual incidence of ~ 9.1 cases per million children is reported. Standard treatments include radiation along with chemotherapy, however results in side effects to children due its acute toxicity. Advances in technology has allowed for search of new nontoxic drugs to be used as a single or multidrug therapy in natural products with almost 60% of drugs approved for cancer treatment being from natural origin. Apoptosis, defined as a controlled suicide program to remove defective cells, without damage to neighboring cells, acts via death receptor (extrinsic) and the mitochondrial (intrinsic) pathway. The mitochondrial pathway, involving loss of mitochondrial membrane potential ($\Delta\psi m$), is regulated through a highly intricate cross-talk, includes caspases 8, 9 and 3 situated at pivotal points of the signaling process. Caspase-8 studies represent a yet unknown pro-apoptotic pathway activated by cytotoxic drugs, and further, it was identified as an important p53 target gene in drug-induced death of cancerous cells. Autophagy, type-II cell death, a catabolic process, is phenotypically characterized by formation of large intracellular vacuoles, termed autophagosomes. It includes sequestration of cellular proteins and organelles in a specific sequence prior to the destruction of the nucleus and has been recognized in various cancer cell types as a response to anticancer therapies. Induction of autophagy, results in post-translational processing of cytosolic-associated microtubule-associated protein-1A/1B light chain 3 (LC3-I; ~17kDa), to autophagosome membrane-bound LC3-phosphatidylethanolamine conjugate (LC3-II; ~19 kDa), leading to formation of autophagosomes. p-coumaric acid (p-CA), a ubiquitous plant phenolic acid, has been proven to render protection against pathological conditions. Studies on p-CA as evaluated for its capacity to induce cytotoxic effect to neuroblastoma, N2a, cells and possible mechanism of its action will be discussed.

Biography

Shailasree Sekhar received her PhD from the CSIR Institute, Central Food Technological Research Institute at Mysore, Karnataka, India, in 2000. The thrust area under the Institution of Excellence was identified the biodiversity of Western Ghats medicinal plants (MP), with immunological affections and cancer prevention properties, due to location advantage of this hot spot to the University. She has been actively involved in compilation of their scientific data as reviews. Recently, she has brought out a database on medicinal plants of Western Ghats in an efficient way. Screening of MP with immunological affections used by tribes has resulted in identification of several of them with inflammation/cancer inhibiting property. Fingerprinting their metabolites has been her priority. She has published more than 30 papers in peer-reviewed journals, has 2 patents and is an adhoc reviewer of various journals. She has to her credit grants from National scientific agencies under Government of India.

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