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CANCER SCIENCE AND TARGETED THERAPIES

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Development of a peptide-functionalised drug delivery system for targeted therapy of advanced colon cancer

Colorectal cancer is the third most frequent cancer in the Western world {Jemal, 2005 #3160}. In patients diagnosed at an early stage of colorectal cancer, surgical excision followed by adjuvant radiation or chemotherapy leads to a high degree of response and improves the survival rates. However, therapeutic options for advanced or disseminated cases are limited, and the responses to treatment are generally temporary. Thus there is an urgent need for the development of new, more efficient and targeted therapeutic modalities. High levels of the luteinizing hormone-releasing hormone (LHRH) receptors have been demonstrated in sex steroid-dependent tumors such as breast and prostate cancers, and also in malignancies that are not directly influenced by the pituitary-gonadal axis like colon cancer. We have taken advantage of this differential receptor expression by attaching a new derivative of the LHRH peptide to the outer surface of novel polymer nanoparticles. These nanoparticles are loaded with curcumin as the model drug, a non-toxic plant extract that has recently attracted much attention in medicine due to its remarkable therapeutical actions. It is called the "next generation multi-purpose drug" and is the active constituent of the Indian spice turmeric. However, it suffers from a very poor metabolic stability and bioavailability due to low water solubility. In this study, we have demonstrated that our advanced formulation strategy has overcome many of the hurdles associated with poorly soluble drug molecules like curcumin. This drug delivery system has shown promising potentials to be effectively used as a medication and also target anticancer agents specifically to the colon cancer cells.

Biography

Pegah Varamini is a lecturer and group leader in Cancer Theme within the Faculty of Pharmacy. She is the leader of Cancer Targeting-Drug Delivery Group. She was awarded the prestigious National Breast Cancer Foundation (NBCF) fellowship in Jan 2016. She completed her PhD degree in Medicinal Chemistry and Pharmacology in December 2012 (UQ, Australia). She also has a professional Doctorate degree in Pharmacy (PharmD). She won Dean's Award for Research Higher Degree Excellence in 2013. Her work was selected by the Australian Academy of Science in August 2016, resulting in her personal presentation at the inaugural Falling Walls Lab in Canberra (a gathering of 25 selected Australian and New Zealand researchers, entrepreneurs, engineers and innovators). She has been the Collaboration Award Finalist at Sydney University in 2017.

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