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Nanotechnology for improving response to cancer chemo and immunotherapy

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Cancer is the number one cause of death in Canada, surpassing cardiovascular disease. Despite significant strides in understanding the mechanisms behind cancer, efficient and curative therapies are still missing. Chemotherapy is the treatment of choice in many cancers. However, it rarely cures cancer and mostly becomes ineffective by drug resistance. Moreover, emergence of intolerable toxicities by chemotherapeutic agents lowers the quality of life significantly, in cancer patients. Immunotherapy is the more recent and unconventional form therapy for cancer. Recent research has provided a strong case for the potential benefit of combined immuno and chemotherapy in the eradication of cancer. In both cases achieving high therapeutic efficacy requires targeted delivery -to cancer cells and its microenvironment in case of chemotherapy and to antigen presenting cells in case of cancer vaccines. The objective of our research is to design targeted vaccine and drug nano-delivery systems that can enhance the efficacy and reduce the toxicity of immunotherapy and chemotherapy in cancer. In this presentation, a brief update on the progress made by our research group in the design and development of engineered block-copolymer micelles as targeted nano-therapeutics that can enhance efficacy and reduce toxicity of chemotherapeuty in sensitive and resistant cancer phenotypes will be described. Development of nanoparticlulate delivery systems that can enhance immune responses against cancer leading to the rejection of established tumors in animal models by body's defense mechanism will also be described.

Biography

Afsaneh Lavasanifar is a Professor at the Faculty of Pharmacy and Pharmaceutical Sciences of the University of Alberta. She has a cross appointment with the Department of Chemical and Medical Engineering at the Faculty of Engineering in the same university. She is the Scientific Chief Officer and Vice President of Meros Pharma, a spin-off company established based on the technology developed her lab. Her research is focused on the design and development of polymer based delivery systems that can increase solubility, modify the pharmacokinetic pattern, reduce toxicity and increase the efficacy of different therapeutic agents. She has more than 90 peer reviewed published/in press manuscripts in highly ranked journals in pharmaceutical sciences, 3 book chapters, several abstracts and numerous conference presentations. She is an inventor in 5 patent/patent applications on novel polymer based formulations for drug and siRNA delivery. She has been the recipient of the 2007 GlaxoSmithKline/CSPS Early Career Award and the 2009 Sanofi Aventis/AFPC award in recognition of outstanding research in Pharmacy as a new investigator. She has an active teaching program in both undergraduate and graduate levels in the area of pharmaceutics and nanotechnology for drug delivery.

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