



Jagat R Kanwar

Deakin University, Australia

Multifunctional targeted nano-bullets against cancer and microbial infections

Theranostics, the combination of diagnostics and therapies is a new concept in cancer management. Our published work strongly suggests that orally administered Multifunctional Targeted Nano-bullets (nanocarriers; NCs) with iron saturated bovine lactoferrin (Fe-bLf) were able to kill tumours. Here for the first time, we have developed multifunctional-targeted nanocapsules conjugated with stably modified aptamers to target and kill cancer as well as cancer stem cells. These nanocapsules labelled with biosensors, will deliver anti-cancer molecules to colon tumours and help to monitor the therapy in real-time imaging. We also developed the nanoformulation of a novel alginate enclosed, chitosan coated Fe-bLf loaded ceramic nanocarriers. Uptakes of these NCs in vitro in human intestinal epithelial CaCo2 cells were analyzed, by measuring the endocytosis and transcytosis. This study was also carried out with the aim to investigate anti-parasitic activities of Fe-bLf loaded NCs in cell based assays and in mice models of *Giardia lamblia*, a common parasite of children. Initially the experiments were carried out with native bLf, (~15% saturated with iron). The efficacy of this protein was compared with other forms of Fe-Lf (100% saturated with iron), Apo-Lf using different concentrations in comparison to anti-parasitic drug, Metronidazole. Fe-bLf loaded ACSC NCs significantly reduced parasitic load in *Giardia lamblia* infected Balb/c mice. With the promising results of our study on cancer and infections, the future potentials of the nanocapsules loaded Fe-bLf, in chemoprevention and in the treatment of human colon cancer, deserve further investigations for translational research and preclinical studies of other malignancies.

Biography

Jagat Kanwar is an immunologist and molecular biochemist. He is group leader of the Laboratory of Immunology and Molecular Biomedical Research has an international reputation in investigating fundamental and applied molecular aspects of cancer and chronic inflammation. He has extensive training and expertise in studying the molecular mechanisms and devising treatments for human diseases like cancer and chronic inflammatory diseases such as asthma, atherosclerosis, inflammatory bowel disease (IBD), arthritis and multiple sclerosis in both in vivo and in vitro models. The research approach employed monotherapy (gene therapy, immunotherapy) or combinational therapy with commercially available chemotherapeutic agents including peptides.

jagat.kanwar@deakin.edu.au