Jagat R Kanwar, J Vaccines Vaccin 2015, 6:3
http://dx.doi.org/10.4172/2157-7560.S1.026

OMICS International
conferenceseries.com

6th Euro Global Summit and Expo on
Vaccines & Vaccination

August 17-19, 2015 Birmingham, UK

Jagat R Kanwar

Deakin University, Australia

Targeted nano-bullets vaccines against cancer and microbial infections for real-time delivery and imaging

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 are 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 nano-formulation of a novel alginate enclosed, chitosan coated Fe-bLf loaded ceramic nanocarriers. Uptakes of these NCs *in vitro* in human intestinal epithelial $CaCO_2$ 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. This study aimed to evaluate the potential antimicrobial efficacy of alginate gel-encapsulated ceramic nanocarriers loaded with iron-saturated bovine lactoferrin (Fe-bLf) nanocarriers/nanocapsules (AEC-CP-Fe-bLf NCs). The study revealed that native bLf is more effective in combating infection than the conventional drug ciprofloxacin (0.4 mg/ml). The efficacy of the drug was also revealed *in vivo* when BALB/c mice that, after being challenged with *Salmonella typhimurium* (200 µl of 10(8) CFU/ml suspension), were fed orally with a nanoformulated bLf diet and the infection was observed to be eliminated. However, chronic infection developed in the group of infected mice that did not receive any drug treatment, as well as the mice treated with ciprofloxacin. The immune response to bacterial infection and to various drug treatments thereafter was studied in the mice. The study concludes that bLf and nanoformulated Fe-bLf are more effective in the treatment of Salmonella-infected mice than ciprofloxacin.

Biography

Jagat R Kanwar is the Head of the Nanomedicine and Laboratory of Immunology and Molecular Biomedical Research and has an international reputation in investigating fundamental and applied molecular aspects of cancer and chronic inflammation. He also vested the molecular diagnosis including role of a non-invasive exosomes in blood, inflammatory sites and cancer tissues. His research focused on cancer and inflammatory autoimmune diseases aims to investigate the underlying mechanisms involved in apoptosis, autophagy and inflammation by targeting the production of cytokines, chemokines, oxygen radicals and matrix metalloproteinase. His research also aims to investigate the nanotherapeutics encapsulating peptides, LNA modified aptamers/miRNAs/siRNA *in vivo* models. He has made significant progress in field of ocular drug delivery and microfluidic and Lab-on-a-Chip devices techniques for cancer cells as well as stem cell capture, disease specific biomarkers and exosomes. His publications are more than 150 research papers and have added to the body of knowledge in the fields of nanobiotechnology, cancer gene therapy, cell biology and immunology. His research work has generated a total of 12 patent/PCTs. He is the member of various scientific committees and societies.

jagat.kanwar@deakin.edu.au