

High molecular weight (HMW) lactoferrin from bovine colostrum have anti-cancer potentials

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For the separation and purification of biomacromolecules such as proteins from natural or recombinant sources, the development and use of chromatographic methods have remained at the forefront of progress made, during the past five decades of research in molecular biology, biotechnology and biomedicine. With the recent aim of modern medicine to develop safe, effective drugs affordable to patients, there has been an increasing interest in milk and whey, as a potentially rich natural source of bioactive compounds. In particular, due to its numerous and diverse array of emerging therapeutic potentials, 76-80 kDa single-chain iron-binding glycoprotein lactoferrin (Lf), is considered the most valuable biomedical protein present in whey. Bovine colostrum is a rich source of Lf than mature milk and among the low abundance colostrum whey proteins (representing 1% or less of the protein content of whey), Lf is found to be most abundant. By employing ultrafiltration and cation exchange chromatography, we have purified a high molecular weight (HMW) bioactive protein fraction with potent anti-cancer properties from Australian bovine colostrum. The purified 250 kDa HMW bioactive protein was further physico-chemically characterized as a trimeric bovine Lf (bLf) using SDS-PAGE, Western blotting, differential scanning calorimetry (DSC) and Fourier Transform Infrared Spectroscopy (FTIR). In order to evaluate the potential anti-cancer efficacy of HMW bLf, robust cell bioassays using human colon and breast cancer cell lines were employed. The novel findings of the study with promising results on anti-cancer efficacy will be presented in the meeting.

Biography

Associate Professor Jagat R Kanwar is the Head of Nanomedicine-Laboratory of Immunology and Molecular Biomedical Research (LIMBR). Dr. Jagat R Kanwar has received his Master's degree in Medical Biochemistry and PhD in Molecular Immunology from PGIMER, Chandigarh, India in 1992. He has an international reputation and expertise in investigating fundamental and applied molecular signalling aspects of pathogenesis of cancer, chronic inflammation and neurodegenerative diseases, thereby, leading to the development of treatment strategies from bench to bedside. He has more than 100 publications in high impact factor and peer reviewed international journals, 27 book chapters and 3 edited books. Assoc Prof Kanwar's research has generated several patents/PCTs with more than five licensed patents for commercialization to BioPharma industry. His group is currently working on drug discovery and nanomedicine for oral and systemic drug delivery of a range of biomacromolecules (proteins/peptides, siRNAs and aptamers) for targeting survivin, HIF-1 α and other apoptotic and inflammatory cell signalling molecules in cancer, chronic inflammation and neurodegenerative disorders.

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