Wound Simulator: An in vitro Study of a Novel Biological Growth Factor Concentrate on Oral Mucositis

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Oral mucositis is a common and debilitating side effect of cancer treatment occurring in 90% of head and neck cancer patients undergoing radiation, 40% of patients with solid tumours receiving chemotherapy, and 76% of bone marrow transplant patients. It is relevant to India due to the high prevalence of head and neck cancer, particularly oral cancer (30% of global cases) which is intensified by lifestyle and socio-economic factors. Though treatment options like basic oral hygiene, chemoprotective agents, and cryotherapy are available, they are not uniformly effective, and not viable with 23.6% of the global population below the poverty line. In this research I aim to study the anti-inflammatory and wound healing properties of a biological growth factor concentrate in correlation to expression of gene markers like COX-2(Cyclooxygenase-2), MMP-1(Matrix Metalloproteinase-1), TIMP-1(Tissue Inhibitors of Metalloproteinases). For the study I used a biological concentrate (PLAY) as a natural and holistic intervention to treat oral mucositis. It is rich in cytokines, growth factors and bioactive modulators and shown to have anti-inflammatory properties. In my study, I observed its effect on an in-vitro chronic wound simulation: MCF-7 (breast cancer cells) treated with 5-fluorouracil (2 µg/ml) and Phorbol 12-myristate 13-acetate (3.048 ng/ml), and quantified gene expression using a semi-quantitative polymerase chain reaction. Data analysis for 4 independent sets was done using ImageJ software and normalized with GAPDH. My results concluded decreased expression of pro-inflammatory markers such as COX-2 and MMP-1 that allude to an anti-inflammatory and wound healing effect.

Awards Won:

National Anti-Vivisection Society: Awards of $3,000