

RADIOPROTECTIVE AND IMMUNOMODULATORY ROLE OF CERTAIN HERBAL EXTRACTS (*Podophyllum hexandrum* etc.) IN EXPERIMENTAL MODEL SYSTEM

Scholar

Hridayesh Prakash

Supervisor

Prof. Arif Ali

Department of

Biosciences

Jamia Millia Islamia

Co-Supervisor

Dr. H. C. Goel

Radiation Biology

Division,

INMAS, Delhi

Ionizing radiations having low linear energy transfer (LET), are known to cause bone marrow suppression and depletion of peripheral blood lymphocytes thereby leading to immuno-suppression. The exposed animals therefore, become susceptible to opportunistic pathogens and some of these infections could be lethal. One of the most important events after the radiation exposure is infections, which are manifested by immunosuppression, and abrupt inflammatory responses, ultimately culminating to radiation, induced death. The loss of immunity is associated with the depletion of immunocompetent cells and striking reduction in the replenishment of such cells by proliferation of stem cells. For recovery from radiation damage enhancement of immunocompetence is necessary. Recently in our laboratory pre-irradiation administration of *Podophyllum hexandrum* and *Hippophae rhamnoides* rendered 82 % (Goel et al.2000) and 80% (Goel et al.2001) radioprotection respectively in mice against lethal (10Gy) gamma radiation. If these herbal preparations have yielded such impressive survival after whole body lethal irradiation it is rational to presume that these agents must have also upregulated immunocompetence thereby augmenting radioprotection. In view of this it became interesting to investigate immunomodulatory role of these herbal radioprotectors. Effect of *Podophyllum hexandrum* and *Hippophae rhamnoides* herbal extract was evaluated on whole body survival of Balb/c mice, peritoneal macrophage and splenocyte, CD4/CD8 ratio, pro-inflammatory & hemopoietic cytokines, nitric oxide (NO) free radicals, antigen presentation, cell survival, proliferation. In an other study, Anti-inflammatory potential of *Podophyllum hexandrum* herbal extract was also unraveled by using endotoxin (LPS) induced shock model in Balb/c mice in vivo and various pro-inflammatory parameters in peritoneal macrophage ex vivo model system.

The extract of *Podophyllum hexandrum* and *Hippophae rhamnoides* studies here countered radiation induced immunosuppression manifestation like decrease in macrophage, splenocytes counts, CD4+ and CD8+ T cell population and their inter se ratio, splenocytes proliferation, cytokine secretion, splenic weight and total protein content and serum IgG's titres. These extracts have also revealed antioxidant activity by

reducing the gamma radiation and LPS induced NO free radical generation in peritoneal macrophages cell culture supernatants. Enhancement of whole body survival against lethal endotoxin shock and inhibition of Lipopolysaccharide induced generation of pro-inflammatory mediators (TNF- α , IFN- γ , IL-6 and NO) in peritoneal macrophage cultures by *Podophyllum hexandrum* in female Balb/c mice revealed it's anti-inflammatory potential.

Conclusion:

These studies indicates that these herbal extracts could be useful not merely for radioprotection but also in the management of several other diseases where immunomodulation may be an paramount requirement.