

## International Nuclear Information System

META

[Modeling of immunological ageing with radiation and its modulation by an herbal composition hemohim](#)

[Jo, Sung-Kee](#) (Radiation Research Division for Biotechnology, Korea Atomic Energy Research Institute, Jeongeup-si, Jeonbuk-do 580-185 (Korea, Republic of)); [Park, Hae-Ran](#) (Radiation Research Division for Biotechnology, Korea Atomic Energy Research Institute, Jeongeup-si, Jeonbuk-do 580-185 (Korea, Republic of)); [Jung, Uhee](#) (Radiation Research Division for Biotechnology, Korea Atomic Energy Research Institute, Jeongeup-si, Jeonbuk-do 580-185 (Korea, Republic of))  
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Abstract

[en] Although aging is one of the several chronic effects of ionizing radiation (IR), there have been no experimental data on radiation-induced immunological aging. The most interesting aging-related change in immune system is the imbalance of helper T (Th) 1- and Th2-related immune responses that are associated with many diseases. We investigated chronic effects on immune responses after IR exposure (5Gy) in mice in comparison with those of old mice. At 6 months after irradiation, the proliferation of spleen lymphocytes which was known as the most important issue in an aging process was declined similarly to that of 18-months-old mice. IFN- $\gamma$  and IgG2a levels (Th1-related response) were lower in irradiated mice than in normal mice of same age, showing similar levels to those of old normal mice. In contrast, IL-4, IL-5, IgG1 and IgE levels (Th2-related response) were increased in irradiated mice when compared with the same-aged normal mice. Also, the low expression of IL-12p70 and its receptors in irradiated and old mice was detected. The level of phosphorylated STAT4 was lower in the irradiated mice. In addition, the decrease of NK cell activity was intensified in the irradiated mice, showing lower values than those of old mice. Interestingly, the absolute numbers and the percentages of NK cells was extremely decreased in irradiated mice, whereas the absolute numbers of Th cells and Tc cells were significantly decreased in old mice. Taken together, however, our results showed that 8-month-old irradiated mice exhibited immunological changes similar to 18-month-old normal mice and it can be suggested that IR can induce the rapid immunological aging.

In our lab, HemoHIM, a new herbal composition, had been previously developed to protect the self-renewal tissues and promote the recovery of immune system against acute IR. Our recent data showed that HemoHIM can ameliorate the immunological imbalance that persisted long-term in fractionated-IR exposed mice by regulating IL-12p70/IL-12 receptor/pSTAT4/SOCS3 signaling pathway. So, HemoHIM could be a good recommendation for the alleviation of long-term complications after radiotherapy, and also could be an immunomoulator for elderly-weak people. (Nuclear R and D Program of Ministry of Education, Science and Technology of Korea (Grant No. 2007-2000091)). (author)

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