

## **Development of the sensitive assay system for tritium risk assessment using Rev1 transgenic mouse**

M. Toyoshima\*, Y. Masuda, K. Kamiya

*Research institute for Radiation Biology and Medicine, Hiroshima University, 1-2-3 Kasumi, Minami-ku, Hiroshima-city, HIROSHIMA 734-8553 Japan*

Tritium, which is a radioactive isotope of the element hydrogen, would a powerful source in fuel future nuclear fusion reactors. Tritium acts much like hydrogen and is easily disbursed in environmental and biological systems. The risk assessment of tritium is one of the major issues arising in the development of the fusion reactors.

The relative biological effectiveness (RBE) value for tritium is expected to be higher than that of ionizing radiation such as X-rays and  $\gamma$ -rays. Exposure to tritium increases the risk of developing cancer as with all ionizing radiation. Cancer risk of tritium in man must be estimated based on experimental studies alone due to lack of human epidemiological data. However the effects of tritium using mice have been described in many reports, the available information is not enough to estimate risk from tritium exactly.

To evaluate cancer risk of tritium, we developed Rev1 transgenic mice as a high radiation sensitive assay system. Rev1 has a central role in translesion DNA synthesis (TLS), which is known as error-prone DNA repair. It has been reported that absence of Rev1 sensitizes to a variety of DNA damaging agents including ionizing radiation. Overexpression of Rev1 enhanced chemical and radiation-induced tumor development in mice. From our data, Rev1 transgenic mouse is thought to be useful for the study of risk estimation of tritium induced cancers.