



SEMINAIRE ISMO

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RADIOBIOLOGICAL RESEARCH USING SYNCHROTRON RADIATION MONOCHROMATIC X-RAY MICROBEAM

Risk evaluation of low dose or low dose rate irradiation has been great concern for human societies utilizing nuclear energy. Due to the recent reports, “Bystander effect” (radiation effect in cells which have not accepted radiation, but situated nearby irradiated cells) has been revealed to play an important role in the biological effect by low dose radiation.

New irradiation systems with which radiation can be delivered to each cell individually are necessary in order to study the cellular response such as bystander effects. From this motivation, we have developed a microbeam irradiation system using monochromatic synchrotron X-rays. This system, installed at BL-27B in the Photon Factory, Institute of Materials Structure Science, High Energy Accelerator Research Organization (KEK) in Tsukuba, Japan, is composed of three parts; i) the first part is to produce a X-ray microbeam, ii) the second is an epi-fluorescent microscope equipped with a precise motorized stage onto which the sample dish is fixed and irradiated with the X-ray microbeam, iii) the third part is a fluorescence image analyzer (computer) with a sensitive CCD camera which recognizes the target cells and their positions. The installed software controls irradiation of X-ray beam to the target cells, one by one, automatically.

This system can irradiate 1000 cells per hour in order to keep the cells in a good physiological condition during the irradiation process. Recent results obtained using this system concerning bystander effects will be presented.

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Mardi 8 novembre 2011 à 11 h 00
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