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NK cells and their response to ionizing irradiation

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Natural killer cells (NK cells) belong to white blood cells which care for anti-tumour and anti-viral control in organism. They can be distinguished from other lymphocyte subpopulations by specific surface markers detection. Our study is aimed at a sensitivity of NK cells to ionizing gamma irradiation. Generally, lymphocytes induce cell apoptosis in a consequence of gamma irradiation. Nevertheless individual lymphocyte subpopulations and subsets differ a lot in their sensitivity to irradiation. It has been published data describing peripheral blood NK cells as a radiosensitive subpopulation with can be used as a good ex vivo biodosimetric marker within human lymphocytes (Vokurkova et al., 2006). Contrary to ex vivo design, the in vivo results indicate human NK cells less sensitive than other lymphocytes I peripheral blood (Chambers et al., 1998; Louagie et al., 1999).

To understand this discrepancy we studied changes in peripheral blood NK cells after ionizing irradiation with the aim to compare in vivo (whole-body irradiated experimental animals) and ex vivo (irradiation of isolated peripheral blood) experimental designs of a large mammalian swine model and small rodent model of Wistar rats. NK cells were identified by specific monoclonal antibodies and their relative representation in blood was analysed by multicolour flow cytometry. Our results indicate that porcine as so as rat NK cells respond to irradiation as the most relatively radioresistant population. They changed in vivo similarly to ex vivo nevertheless processes in vivo manifested in significantly shorter time-frame. Obtained results will be useful for a retrospective biodosimetry and back estimate of absorbed dose of ionizing irradiation. This work was supported by Ministry of Defence of the Czech Republic (The institutional support for a long-term organization development plan 1011, project No. OVUOFVZ200806 and project No. OVUOFVZ200809).

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