Susceptibility of porcine peripheral blood to ionizing radiation in vivo and in vitro experiments.

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Absolute counts of porcine peripheral blood cells were quantified by flow cytometry as a marker of radiosensitivity. Irradiated human organism responds to irradiation among others by declining haemopoiesis and inducing an apoptosis of radiosensitive cells, especially lymphocytes. However can be changes of counts of human peripheral blood cells well examinated within a model in vitro, in vivo model is not obtainable in adequate range of doses. The experimental model of one month old large white pig was used to compare effects in these two systems. Young piglets were whole-body-irradiated and assessed in dependence on time upon irradiation. For the dose-response analyses doses 0-2-4-6 and 10 Gy were applied at 0,4 Gy/min (60Co gamma-rays). Beside that heparin-treated peripheral blood was irradiated apart and analysed at the same time frequency. Absolute counts of leukocyte populations were analysed by CytoCountTM technique (DakoCytomation) applying a suspension of fluorescent microspheres as a reference population for enumeration of lymphocytes, granulocytes and monocytes which were identificated using a flow cytometry through gating within forward scatter versus side scatter. Counts of cells were expressed as a ratio of individual population with regard to nonirradiated negative control sample. The estimated decrease of lymphocytes manifested more intensive within in vivo experoments than in vitro. The maximum downtrend of both was marked during eight hours after irradiation. Decrease of granulocytes was very low with no distinct response to irradiation within system in vitro whereas analyses in vivo documented intensive release of granulocytes from body reserves into peripheral blood as a typical inflammation reaction. Populations of monocytes were hardly detectable and were not included in our study. Nevertheless variance in absolute counts found out in system in vivo versus in vitro after irradiation showed irretrievability of using in vivo system within radiosensitivity studies. This work was supported by grant of Ministry of Defence No. OPUOFVZ200604 and by grant of Ministry of Education, Youth and Sports No.2B08028.