

Development of a Low Dose Rate Irradiation Facility for Long Term Animal Exposures at Colorado State University

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A low dose rate irradiation facility capable of accommodating up to 250 mice in SPF conditions for months at a time has been set up at Colorado State University. The basis of the facility is a panoramic irradiator room containing a Shepherd 600 Ci ^{137}Cs irradiator. The room contains a vinyl enclosure that is maintained at positive pressure with HEPA filtered air at >20 room air changes/hour. Five movable cage racks each holding 10 cages form an arc in the enclosure. Standard ventilated cage rack cages without filter tops are held in the cage racks with their long axes perpendicular to the beam and water bottles distal to the irradiator. The dose rate delivered to the mice can be varied by the addition or removal of lead attenuators and by repositioning the cages and cage racks. We have used the facility to irradiate just over 230 male CBA/CaJ mice at 10 cGy/day over 50 days. The actual dose delivered was 0.5 cGy/hour for 20 hours/day with the remaining 4 hours/day used for husbandry. The mice were monitored until they reached 800 days of age or became moribund, and then necropsied. Overall survival of these low dose rate irradiated mice was similar to unirradiated controls and better than sex, strain and age matched mice receiving acute 3 Gy exposures. Unexpectedly, necropsy detected few, if any, mice that had developed acute myeloid leukemia, but nearly 60% of the mice had developed liver masses. Histopathological examination of tissues harvested from the mice is ongoing.

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