AbstractID: 7332 Title: Relative biological effectiveness of 30 kV x-rays for micro-nucleated reticulocyte induction in mice, in vivo.

Purpose: To investigate the relative biological effectiveness (RBE) of low energy (30 kV) mammography x-rays, *in vivo*, by measuring the induction of micro-nucleated reticulocytes (MN-Ret) at low doses.

Method and Materials: A total of 40 mice were used in this experiment: 15 were exposed to 30 kV x-rays, 15 were exposed to 662 keV gamma rays and 10 were used as controls. The irradiated mice got either 50 or 100 mGy of their respective radiation quality. The x-ray source was a Molybdenum x-ray tube (current = 1 mA) with a 50µm Molybdenum filter and the reference gamma source was a Cs-137 source. Upon completion of irradiation, the mice were returned to their housing facility and incubated for 44 hours. They were then sacrificed and blood samples was harvested, fixed and analyzed for MN-Ret production. In the MN-Ret anaylsis, the erythrocytes were separated and the percentage of reticulocytes that were micro-nulceated was measured using a flow cytometer. The percentages were tallied and used to determine an RBE for 30kV x-rays.

Results: This investigation presented a significant dose response to low doses for MN-Ret induction for both radiation qualities. But it was the higher energy gamma rays that significantly produced more MN-Ret's than the low energy x-ray at both doses (50 and 100 mGy). The results showed an RBE of 0.802 ± 0.034 for the 30 kV x-rays.

Conclusion: This study indicates that low doses of low energy x-rays may not be more damaging than conventional photons in terms of MN-Ret induction. This is of particular interest for women who go for mammograms every two years, as this data suggests and that mammograms may not be as harmful as some have previously suggested.