Assessment of Time-course Exposures in BALB/c Mice Following ^{137}Cs Gamma Irradiation.

K.M. Holmes[1], A.D. Brown[2], J.K. Wickliffe[3] B.E. Rodgers[1].

Dept. of [1]Life, Earth, and Environmental Sciences; West Texas A&M University; Canyon, Texas, USA; Dept. of [2]Biological Sciences; Texas Tech Univ.; Lubbock, Texas, USA; Div. of [3]Environmental Toxicology; University of Texas Medical Branch; Galveston, Texas, USA.

The genetic consequences resulting from ionizing radiation have a significant impact both radiation regulatory policies and the comprehension of risks associated with radiation exposure. In previous studies examining the adaptive response, we observed a significant increase in the expression of the *Sod1* gene and a reduced cytogenetic response, as indicated by micronucleus (MN) frequencies, in exposure groups subacutely exposed to the environmental contamination near the Chernobyl Nuclear Power Plant. However, no changes in expression of *Apex1*, *Polb* (Base Excision Repair), or *Gpx1* (Reactive Oxygen Species scavenging) were observed. These results suggest that subacute, and possibly chronic exposure to the Chernobyl environment increases the expression of *Sod1*, and possibly, the encoded radical scavenging enzyme. To further examine this hypothesis, we examined the time point at which *Sod1* expression and micronuclei frequencies peaked following irradiation. Male BALB/c mice were administered 2.3 Gy gamma radiation via a ^{137}Cs source. The dose was administered at a rate of 17cGy/minute for 13.64 minutes. Vital tissues were harvested and peripheral blood samples were obtained at 1, 2, 4, 8, 16, and 24 hours post-exposure. In addition to the experimental groups (N=5), control groups (N=5) were sham-irradiated and sampled at identical time points as the irradiated groups. Peripheral blood samples were analyzed via flow cytometric analysis. Micronucleated reticulocyte frequencies were subjected to an ANOVA statistical test, followed by Tukey's multiple comparison test. Each irradiated group was compared to its corresponding sham-irradiated group. No significant difference was found in any of these comparisons, except in the group sampled at 24 hours post-exposure. All possible comparisons were made among the irradiated groups. The irradiated group that was sampled 24 hours post-exposure was significantly different ($P<0.05$) from all other irradiated time points. There was one significant comparison in the 16 hour irradiated vs. the 2 hour irradiated group. All other comparisons were not significantly different. Analysis of mRNA isolated from liver and muscle tissue is currently underway, using quantitative real-time polymerase chain reaction (QRT-PCR) to determine expression in *Sod1* at these various time points.