

Wednesday, February 12, 2014
POSTER SESSION I: SPACE RADIATION — CENTRAL NERVOUS SYSTEM,
PHYSICS, AND ACUTE
4:30 p.m. Expo Hall A1-A2

Peluso M. P. Sureshkumar M. A. Chaudhary P. C. Wang Z. Wang Y. Naidu M. D.
[Fractionated Protons and HZE Radiation to Rat Spinal Cords Increases Base Excision Repair, Induces Demyelination, Neuro-Inflammation in Brain, Cognitive Deficits and Non-Targeted Tumor Induction](#) [#3001]
Increased base excision repair caused by fractionated, low-dose proton and/or HZE radiation skews GPC/spinal cord OPC cell differentiation, results in inflammation, leading to cognitive defects and non-targeted tumor formation in aged rats.

Parihar V. K. Pasha J. Tran K. K. Craver B. M. Acharya M. M. Limoli C. L.
[Persistent Changes in Neuronal Structure and Synaptic Plasticity Caused by Proton Irradiation](#) [#3007]
Protons predominate the space radiation environment, and their impact on the structure of mature neurons has not been studied. Here we describe the changes in neuronal structure and synaptic protein levels caused by low dose exposure to 250 MeV protons.

Hollerman W. A. Fontenot R. S.
[Using EUD₄TEA as the Active Element for Space-Based Radiation Sensors](#) [#3018]
Recent research investigated a new dosimeter capable of measuring low radiation levels. This concept is based on organics such as EuD₄TEA. When uranium was added to EuD₄TEA during synthesis, it was found that it takes about 335 days for the light emission to be cut in half by radiation exposure.

Rabin B. M. Carrihill-Knoll K. L. Shukitt-Hale B.
[Development of Cognitive Performance Decrements as a Function of Time Following Exposure to HZE Particles](#) [#3021]
Exposure to HZE particles produces “accelerated aging” resulting in an interaction between age and irradiation which is shown as an increased sensitivity (lower threshold) in older rats to the disruptive effects of exposure to HZE particles and protons on cognitive performance.

O'Banion M. K. Olschowka J. A. Williams J. P.
[Space Radiation Induced Neuroinflammation on Alzheimer and Parkinson Disease Pathology](#) [#3032]
We describe a series of recently initiated experiments that address the question of whether space radiation exacerbates age-associated neurodegenerative disease. Studies are being carried out in established mouse genetic models of Alzheimer's and Parkinson's disease.

Raber J. Allen A. R. Sharma S. Allen B. Rosi S. Olsen R. H. J. Davis M. J. Eiwaz M.
Fike J. R. Nelson G. A.
[Effects of Combined Proton and ⁵⁶Fe Irradiation on Hippocampal Function](#) [#3077]
Our data show that novel object recognition is sensitive to detect cognitive injury three months following proton only and combined proton and ⁵⁶Fe irradiation exposure and that newly-born activated microglia and inflammation might be involved in this injury.

Cengel K. A. Diffenderfer E. S. Schaettler M. Stowe M. Hagan S. Sanzari J. K.
McDonough J. Kennedy A. R.
[Applying Lessons Learned from Clinical Radiotherapy to Improve Biophysical Modeling of Clinical Outcomes Used to Guide Management and Countermeasures Following Acute Radiation Exposures](#) [#3149]
We have modified and evaluated the current dosimetry modeling package to assess the relative contributions to organ dose from individual variations in SPE energy/fluence profile and human anatomic variability.

Davis C. M. DeCicco-Skinner K. L. Henry G. H. Guida P. M. Hienz R. D.

[*Individual Differences in Neurobehavioral Deficits Following Proton Irradiation are Related to Differential Brain Protein and Cytokine Expression*](#) [#3177]

Fischer 344 and Lewis rats were trained to perform the rPVT and exposed to 0, 25, or 100 cGy head-only proton radiation. Dopaminergic protein levels and cytokine protein levels in different brain regions were examined.

Davis C. M. Roma P. G. Guida P. M. Hienz R. D.

[*Effects of \$^{28}\text{Si}\$ Radiation on Neurobehavioral Function*](#) [#3197]

The present report describes the detailed effects of ^{28}Si on neurobehavioral function and includes descriptions of deficits in performance accuracy, attention, impulsivity, and motor function (speed of reaction times).

Rudobeck E. Mehrotra S. Bellone J. A. Hartman R. E. Szucs A. Vlkolinsky R.

[*Protons and HZE Radiation Affect Hippocampal Functions in APP/PSEN1 Transgenic Mice*](#) [#3217]

Decrements in synaptic transmission have been reported in irradiated hippocampus and they are similar to those observed in Alzheimer's disease (AD). In this study we tested whether proton, ^{28}Si and ^{56}Fe radiation exacerbates the AD-like pathology in double transgenic APP/PSEN1 mice.

Kandimalla R. Tang T. Wang T. Wang H.

[*High LET Radiation Produces Sustained DNA Damage Signaling and Changes Cellular Homeostasis in Hippocampal Neuronal Cells*](#) [#3306]

Heavy ion particle induces DNA damage tracks are mitotic inheritable and persistent. Inhibition of glycogen synthase kinase 3 (GSK3) activity enhanced cell survival and synaptic activity in hippocampal neurons following irradiation.