

Interaction Between Age and Exposure to ^{56}Fe Particles on Behavior and Neurochemistry

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Previous research has shown that exposure to HZE particles and protons, which will be encountered on long-term space missions, can adversely affect the ability of rats to perform a variety of behavioral tasks. This outcome has implications for an astronaut's ability to successfully complete requirements associated with these missions. It has also been found that irradiation can lead to increases in oxidative stress, similar to that seen in the aging brain. Given that astronauts are often middle-aged or older it is important to determine if their age puts them at higher risk for the potentially hazardous effects of exposure to HZE particles. Therefore, we exposed young and old rats to either 1 or 2Gy of ^{56}Fe irradiation and evaluated performance in a spatial learning and memory task in addition to examining levels of dopamine (DA) release from superfused striatal slices. Results indicated that exposure to ^{56}Fe particles can produce alterations in behavior and signaling and that these alterations may be more apparent in older organisms, which suggests that the aging brain may be more susceptible to the deleterious effects of irradiation on performance. Therefore age may be a factor for consideration in planning long-term missions into space.

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