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IMPACTS OF SPACE RADIATION EXPOSURE TO BIOMARKERS FOR CARCINOGENESIS RISKS

Abstract

While space is challenging, dangerous, and full of uncertainties, it is critical to understand one of the most concerning space hazards affecting astronauts' health: radiation, in order to maintain the current pace for human space exploration and future sustained presence on the Moon and Mars. In space, astronauts can be exposed to and bombarded with radiation sourced from factors such as Solar Energetic Particles (SEPs) and Galactic Cosmic Rays (GCRs). Although radiation poses numerous threats, its primary concern lies in its ability to increase the risk of carcinogenesis (cancer) through cumulative cellular damage. For this reason, there is an immense need to assess the impacts of space radiation to biomarkers specifically for carcinogenesis risks. This paper focuses on the ongoing work that NASA, industry, and the scientific community are performing to understand biomarkers, as well as the gaps that have arisen in such. Through this, potentially more effective mitigations and protection strategies are proposed and can be implemented to prepare better against the unforgiving environment of space.