Medical Physics Seminar

Monday, April 2, 2018

1325 HSLC ~ 4:00 P.M.

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Adaptive Response Can Reduce ARS and Infection Risk during Long Term Manned Space Missions and Decrease Cancer Risk Post Mission

The risk of space radiation arises from exposure to chronic doses of galactic cosmic radiation (GCR) and sudden injections of high-energy particles that is referred to as solar particle events (SPE). We have previously reported that during a deep space mission, GCR may not significantly increase the risk of cancer, while large SPEs, especially when the shielding is inadequate, not only increase the risk of cancer, but also the possibility of occurrence of acute radiation syndrome (ARS). While the baseline lifetime risk of death from cancer in non-smokers are 16% for males and 12% for females, astronauts' lifetime risk of death from cancer is estimated to be around 20% after a Mars mission (solar max). Moreover, ARS can pose a large barrier to the goals of any mission. Some evidence shows that even lower doses of radiation which induce mild symptoms may cause operational risks which can affect crew health and/or prevent the completion of mission goals. This is the reason that we need effective biological protection methods. As physical shielding alone cannot solve current space radiation problems, in 2003 we introduced the adaptive response as an efficient method of biological protection. A NASA report published in 2016 has cited our early report on the importance of radioadaptive response in space missions and states that cells can be expected to be exposed to multiple hits of protons before being traversed by an HZE particle. In this presentation I will talk more thoroughly about how adaptive response can reduce the risk of ARS and infection during long term manned space missions and decrease cancer risk post mission.

1325 Health Sciences Learning Center (HSLC) 4:00 - 5:00 P.M.