

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Radiation Fields, Effects and Risks in Human Space Missions (5)

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TRANSGENESIS AS A MECHANISM TO PROVOKE RADIORESISTANCE

Abstract

Purpose: Cosmic radiation poses serious and irreversible threats to astronauts. This will create significant and deadly risks for interplanetary missions as current mitigation strategies focus only on ship shielding, because there are no interventions that can reverse the effects on the human body. Similarly, similar complications affect millions of humans on Earth. More than a century after radiation therapy was first given for cancer, it is surprising that it is still so unspecific, we know that it helps kill cancer cells, but it also does so with normal cells, being not 100% effective and that in addition to this are visible side effects and immunodeficiency that causes greater exposure to other diseases and makes the recovery of the patient extremely slow. As in the space environment, there are no mitigation strategies to prevent damage to normal cells, nor rehabilitation therapies to bring the effects back to normal in the body. This highlights the need to make radiation therapy only affect cancer cells, as well as to mitigate the effects of cosmic radiation on the body.

Methodology: I propose a countermeasure based on genetic engineering: a recombinant vector that will make cell repair mechanisms faster; built with *Deinococcus Radiodurans* (radioresistant microorganism) genes expressed in a vaccine. The aim of the research is for the vector to be so specific that it is capable of acting only on normal cells and does not modify cancer cells.

Results: (Research in progress). **Hypothesis:** The specific cell modification is achieved by constructing the vaccine so that it recognizes parts that only have normal cells and that do not have cancer cells. We are able to make the vaccine expression time last only as long as required in the human body.

Conclusions: The importance of this research is that astronauts will not suffer the same damage in space, thus helping the acceleration of space conquest. And when a person with cancer undergoes radiation therapy, their normal cells will have the fastest repair mechanisms, so radiation therapy will only affect cancer cells, making the treatment more specific.