Human Space Flight to Mars
Health Risks and Social Aspects Associated to a Long Period Trip to Mars
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Introduction
Almost fifty years after the human landing to the Moon, space organizations fight their own way to Mars. During spaceflight, astronauts are exposed to extremely harsh conditions. Apart from them, they will face other challenges related to their stay in Mars. The aim of this project is to identify and explain the health risks associated with a long-term human mission to Mars, as well as to give an insight into the social aspects of the mission.

Major hazards of the mission

1. Crew Selection. Women in Space
The aspects evaluated in crew selection are:
- Physiological adequacy
- Psychological adequacy
  - Interpersonal compatibility
Need for analogues of Mars’ conditions
Only 10% of the astronauts sent to space by NASA were females.

2. Spaceship
Spaceship conditions
- Limited resources
- Enforced interaction within crewmembers
- Time-delayed communication with the Earth
Stressful environment
- Sleep deprivation
- Hyperactivation of HPA axis
Crew response
- Mood alteration
- Cognitive detriment

3. Radiation
The radiation experienced in outer space comprises:
- Galactic Cosmic Rays (GCR)
- Solar Energetic Particles (SEP)

Such levels of radiation could have dramatic effects in:
- Cancer development ➔ DNA damage and mitochondrial dysfunction
- Neurodegeneration ➔ synapsis disorganization and decrease in dendritic density

Countermeasures and Recovery
Although some pharmacological treatments have been studied, exercise and diet are the best options available to counteract microgravity. As for radiation, spacecraft shielding is the solution. Upon return to the Earth, astronauts are likely to suffer some long-term effects. The most frequent one is postflight orthostatic intolerance.

Conclusions
Crew safety is a top priority in any space mission. The potential hazards have been identified but we lack the means to protect the crew against them. The effects of spaceflight in the human body are dangerous and seem to have irreversible consequences, such as neurodegeneration. It is important to redefine the need for such mission.

Image references: