Abstract

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Role of chromosome instability in long term effect of manned-space missions.

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BACKGROUND: Astronauts are exposed to heavy ions during space missions and heavy ion induced-chromosome damages have been observed in their lymphocytes. This raises the problem of the consequence of longer space flights.

DISCUSSION: Recent studies show that some alterations can appear many cell generations after the initial radiation exposure as a delayed genomic instability. This delayed instability is characterized by the accumulation of cell alterations leading to cell transformation, delayed cell death and mutations. Chromosome instability was shown in vitro in different model systems (Sabatier et al., 1992; Marder and Morgan, 1993, Kadhim et al., 1994 and Holmberg et al., 1993, 1995). All types of radiation used induce a chromosome instability, however, heavy ions cause the most damage.

CONCLUSIONS: The period of chromosome instability followed by the formation of clones with unbalanced karyotypes seems to be shared by cancer cells. The shortening of telomere sequences leading to the formation of telomere fusions is an important factor in the appearance of this chromosome instability.

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