Effects of ionizing radiation on murine gene expression in skin and bone

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ABSTRACT

Long duration spaceflight causes a negative calcium balance and reduces bone density in astronauts. The potential for exposure to space radiation to contribute to loss of bone mineral density in astronauts is not yet understood. Sustained changes to bone mass have a relatively long latency for development, however skin is a target organ for changes in skin gene expression. In this study, we evaluated gene expression changes in skin in response to ionizing radiation (IR) by using quantitative real-time PCR (qPCR) in both control and IR-exposed mouse skin. Skin from mouse femora and tibiae was collected 1 day and 11 days post-IR. The analysis showed a significantly increased expression of FGF18 in mouse skin post-IR. The percentage of FGF18+ hair follicles decreased at one day post-IR and returned to basal levels at 11 days post-IR. These changes in gene expression occurred early after IR.

INTRODUCTION

Animal:
- Male C57BL/6 mice (Jackson Laboratory, Bar Harbor, ME), 16 weeks of age
- Experimental group:
  - Control (Cont)
  - IR: 8.78x10^2 Gy at 10 MeV/n (Cont: n=5/group)

METHODS

Gene expression in skin

Gene expression in bone: MCP-1

PILOT RESULTS

Gene expression in bone (femur)

Correlation plot

CONCLUSIONS

FGF18 expression in skin and bone

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REFERENCES