The Annual NASA Space Radiation Summer School
2010 Slide Competition
For The Health Risks of Extraterrestrial Environments (THREE)

First Place

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Submission on

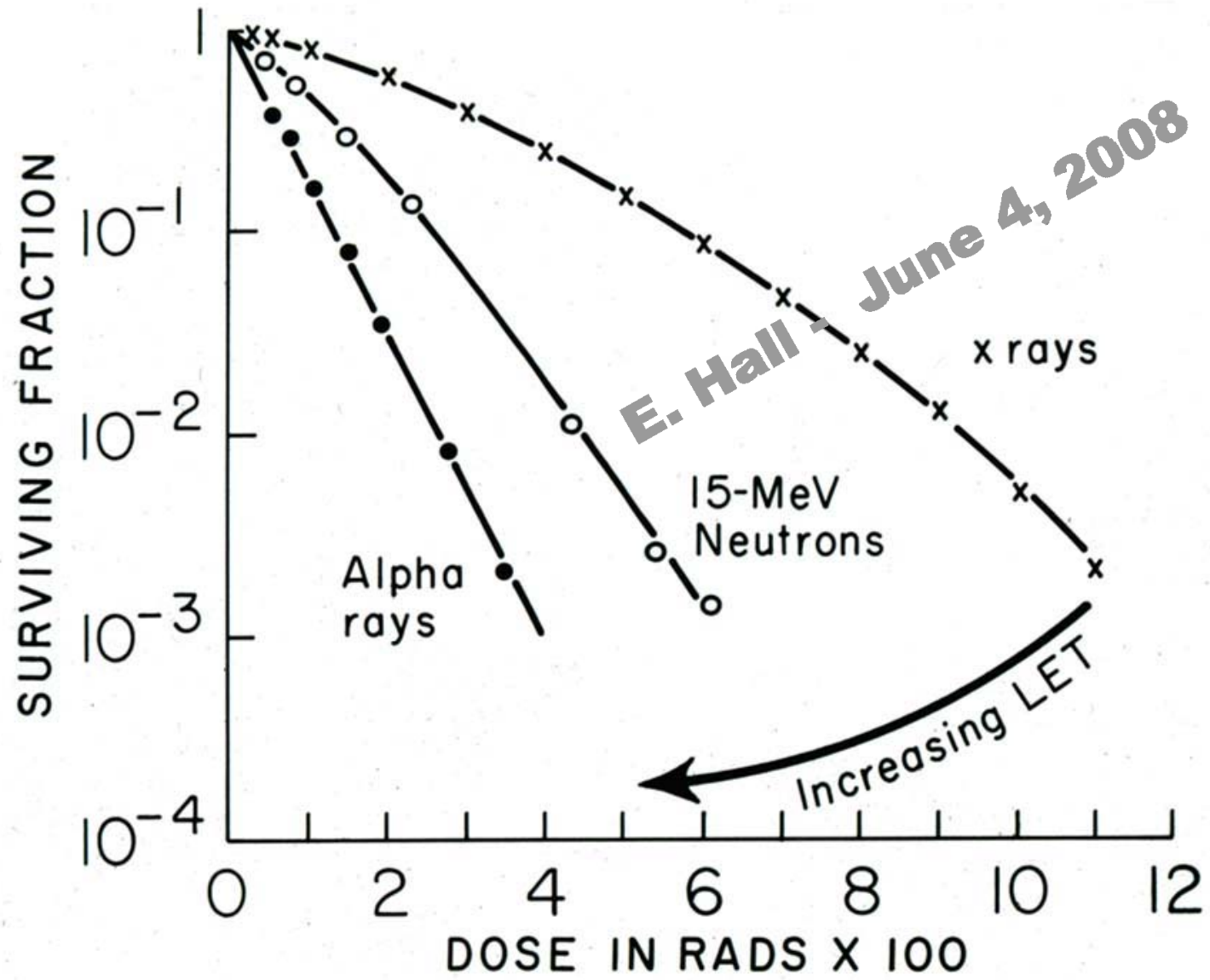
Relative Biological Effectiveness

from

Eric Hall (2008)

Cellular Radiobiology: Biological Responses to High LET Radiation

NASA Space Radiation Summer School



Equal doses of different types of radiation do not produce equal biological effects!

Let's take for example a **survival curve**, that represents the relationship between the radiation dose and the proportion of cells that survive to the exposure, for cells in culture exposed to radiation of different LET (250-kVp X rays or γ rays are used as the reference radiation).

As the LET of the radiation increases (i.e. from sparsely ionizing X rays to densely ionizing α particles) two aspects of the survival curve change:

- The *slope* gets steeper. (This might indicate that, given a certain dose, fewer cells survive to the exposure.)
- The size of the initial *shoulder* gets smaller. (This might indicate that the cells are less able to repair the damage induced by the exposure.)

The qualitative interpretations of the shape and shoulder of a survival curve given above might be an oversimplification!

Many theories and biophysical models have been proposed to describe the shape of a survival curve with the aim of explaining biological observations in mathematical terms.