Radiation-induced increases in cancer mortality result from an earlier onset of the disease in mice and atomic bomb survivors

The carcinogenic effects of radiation are thought to be caused by radiation exposure resulting in mutations in the genes of somatic cells (cells that make up the body of living organisms) associated specifically with cancer development. On the other hand, it was recently discovered that this so-called somatic mutation theory[1] cannot explain the parallel shift of mouse survival curves (graphical representation of the decrease in proportion of surviving individuals over time) following radiation exposure in the direction of younger ages while maintaining the same shape. In this study, after analysis of cancer mortality data from selected mouse studies and from atomic bomb survivor data, how radiation exposure increases the risk of cancer's development was investigated.

The analysis suggested a rise in cancer mortality earlier in exposed populations than in unexposed populations, with the rate of increase and excess relative risk[2] trending in the direction of younger ages compared to naturally occurring cancer mortality in the unexposed. The results suggest the idea that tissue[3] damage from radiation creates a slightly inflammatory environment that could encourage the proliferation of cancer cells and the earlier onset and increased risk of most cancers.

Notes

[1] Somatic mutation theory:
This theory refers to the conventional hypothesis that only some somatic cells in organisms are affected by radiation.

[2] Excess relative risk:
The increase or decrease of a certain health risk in an exposed group compared with a control group. An excess relative risk of 0 means that radiation exposure did not affect risk. An excess relative risk of 1 in the exposed group would indicate a rate of disease that is double the rate in the unexposed, or control, group.

[3] Tissue:
Refers to a group of cells that are similar in structure and function together as a single unit.

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RERF's objective with this brief outline is to succinctly explain our research for the lay public. Much of the technical content of the original paper has been omitted. For further details about the study, please refer to the full paper published by the journal.