

Mechanisms of radiation carcinogenesis: What is really induced?

Epidemiological data¹ from studies on A-bomb survivors have led to the understanding that the [relative risk](#) of cancer decreases with time since exposure, but the basic mechanisms underlying the phenomenon are as yet unclear.

RERF scientists conducted this study based on the idea that the conventional theory of mutation, which assumes that only a fraction of individuals are affected by radiation exposure, could not explain why mouse survival curves (survival curves are representation in graph form of how the percentage of surviving individuals decreases over time) all shift equally toward a shorter survival period following exposure to radiation.

Conversely, if that parallel shift in survival curves is the result of radiation exposure affecting all individuals, that could explain the decrease in relative risk of cancer among A-bomb survivors as time since exposure increases. Based on this assumption, it was hypothesized that the mechanism for the increased risk of cancer by radiation exposure is due to tissue² damage caused by the exposure and subsequent inflammation, which induces and fosters the formation of spontaneously occurring tumors³ composed of malignant cells. If that is the case, it is thought that the carcinogenic effects of radiation might be inhibited by reducing inflammation.

Notes

¹ Epidemiological data:

Refers to materials and information collected to investigate and study the causes, distribution, and prevention of diseases in a specific population.

² Tissue:

Refers to a group of cells that are similar in structure and function together as a single unit.

³ Tumor(s):

Indicates an abnormal mass of tissue that forms when cells grow and divide more than they should. Tumors can be either benign (not cancerous) or malignant (cancerous). Benign tumors may grow large but do not spread; malignant tumors can spread in uncontrolled fashion into nearby tissues or to other parts of the body through the bloodstream and lymph system.

[doi. org/org/10.1093/rpd/ncaco63](https://doi.org/10.1093/rpd/ncaco63)

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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.