

## **Characteristics of induced mutations in offspring derived from irradiated mouse spermatogonia and mature oocytes**

This paper describes experiments with mice to investigate the types and frequencies of induced mutations\* in offspring when either parent is exposed to radiation.

To date, no evidence has shown effects from atomic bomb radiation in children of atomic bomb survivors. With recent technological advances in next-generation sequencing of the genome\*\*, it has become possible to decode the entire genomic sequence in humans and mice. Using a next-generation sequencer, we decoded the whole genome of offspring born after either parent was exposed to radiation, and compared the results with those from control offspring born to unexposed parents. The purpose of this study was to determine and characterize the mutagenic effects of parental radiation exposure on the genome of offspring, by comparing the numbers of new mutations and the types of mutations arising in the offspring of the exposed and unexposed parental groups.

The results showed that the numbers of deletion and multisite mutations increased in the offspring of exposed fathers or exposed mothers when compared with the offspring of unexposed parents. Although these mutations naturally occur at low frequencies, our results indicated that, in mice, parental radiation exposure induced deletions and multi-site mutations in the second generation at higher frequencies. These findings may provide important information for understanding the effects of parental radiation exposure in offspring.

\*Mutation: Information (genetic information) transmitted from parent to child in an organism is determined by the base sequence alignment of four nucleic acids bases (adenine, cytosine, guanine, thymine) of deoxyribonucleic acid (DNA). A qualitative or quantitative change in this sequence is called a mutation.

\*\*Genome: The entirety of gene information in an organism. In humans, the genome is comprised of about six billion base pairs of DNA base sequences divided into 46 chromosomes.

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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.