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## **Recent Results: Radiation Effects on the Genetics of Sperm**

Ionizing radiation damages DNA, and thus causes mutations in the genetic material. It has been known for a long time that embryos in utero are particularly sensitive to radiation damage, and restrictions are placed on the exposure of pregnant women to Xrays. In general the effect of radiation has been the cause of greater concern for women.

However, it is clear that both sexes will be susceptible to radiation damage, and evidence has recently been obtained that the children of irradiated men may be genetically damaged. Recent results have indicated a possible connection between the irradiation of the male and the incidence of leukemia and stillbirth in the offspring. In a study of male workers at Sellafield, England who had been exposed to radiation, Dickinson and Parker (2002) found a statistical risk of leukemia and non-Hodgkin's lymphoma in the children of fathers who had been exposed to radiation. Parker, Pearce et al (1999) found a significant positive association between the risk of stillborn childbirth and the father's exposure to ionizing radiation.

Experiments with irradiated male mice were reported by Dubrova's group [Barber et al., 2002] They showed that elevated mutation rates extended to at least the second generation of offspring. The radiation was both fission neutrons and low energy-transfer Xrays.

These results indicate that damage to the male germ line causes genetic damage manifested in the next and subsequent generations. We note that somatic damage to the cells, e.g. to the sperm midpiece (thereby affecting motility) may not be detectable. However, genetic damage still takes place in the sperm DNA.

Since radiation effects have no minimum threshold level, elementary caution indicates that exposure of germ plasma to ionizing radiation should be minimized as much as possible.

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### **References**

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