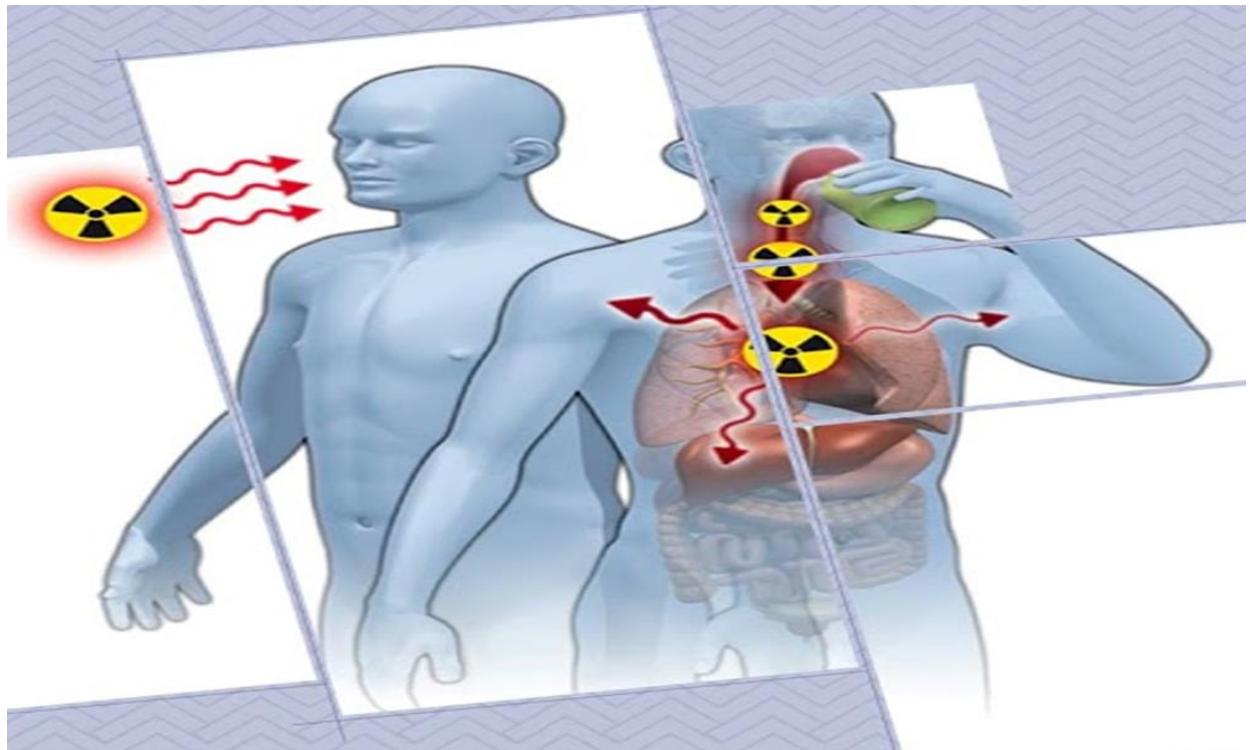


Local Tissue Effects on Gonads

8th Lecture





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3rd year, 1st course

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1. Local Tissue Effects on Gonads

These are deterministic effects (they have a threshold dose).

In Males (Testes):

- 0.1 – 0.2 Gy: Temporary reduction in sperm count.
- 0.5 – 1 Gy: Temporary sterility (several months).
- > 3.5 – 6 Gy: Permanent sterility.

In Females (Ovaries):

- 0.5–2 Gy: Reduction in ovarian follicles.
- > 2–3 Gy: Permanent infertility possible.
- Females are more radiosensitive because they are born with a fixed number of oocytes.

2. Life Span Shortening

- A stochastic effect, meaning no threshold.
- Radiation increases the probability of cancer and other late effects → can reduce life expectancy.
- It doesn't shorten life directly; it increases long-term disease risk.

3. Effect on Fertility

Depends on:

- Dose
- Type of germ cells
- Age

In Males:

- Lower doses → temporary infertility.
- Higher doses → permanent infertility.
- Mature sperm cells are less sensitive than spermatogonia.



In Females:

- Ovaries are highly sensitive.
- Increasing age = increasing sensitivity.
- Doses above ~2–3 Gy can cause permanent sterility.

4. In Utero Effects (Effects on the Embryo/Fetus)

Strongly dose- and age-dependent.

0–2 weeks (Pre-implantation):

- All-or-none effect: death or no effect.
- Malformations rarely occur in this stage.

2–8 weeks (Organogenesis):

- Highest risk of structural congenital malformations (heart, limbs, CNS).

8–15 weeks:

- Highest risk of severe mental retardation and brain growth problems.

15–25 weeks:

- Lower but still present risk of mental retardation.
- Increased risk of childhood cancers.

> 25 weeks:

- Malformation risk is low.
- Cancer risk remains.

5. Genetic Effects (Hereditary Effects)

- Result from DNA damage in germ cells.
- Effects appear in future generations, not the exposed individual.
- Include:
 - Genetic mutations
 - Heritable diseases



Proven in animals, but no confirmed hereditary radiation effects in humans so far.