

## Threshold Values for Various Effects

### Threshold acute absorbed doses of $\gamma$ -rays

| Disorders                             | Organs/Tissues    | Incubation period  | Threshold value (Gy)* |
|---------------------------------------|-------------------|--------------------|-----------------------|
| Temporary sterility                   | Testis            | 3 to 9 weeks       | Approx. 0.1           |
| Permanent sterility                   | Testis            | 3 weeks            | Approx. 6             |
|                                       | Ovary             | Within 1 week      | Approx. 3             |
| Deterioration of hemopoietic capacity | Bone marrow       | 3 to 7 days        | Approx. 0.5           |
| Skin rubor                            | Skin (large area) | 1 to 4 weeks       | 3 to 6 or lower       |
| Skin burn                             | Skin (large area) | 2 to 3 weeks       | 5 to 10               |
| Temporary hair loss                   | Skin              | 2 to 3 weeks       | Approx. 4             |
| Cataract (failing vision)             | Eyes              | 20 years or longer | Approx. 0.5           |

\* Threshold doses for symptoms with clear clinical abnormalities (doses causing effects on 1% of people)

Source: Prepared based on the 2007 Recommendations of the International Commission on Radiological Protection (ICRP), and ICRP Report 118 (2012)

Sensitivity to radiation differs by organ (p.92 of Vol. 1, "Radiosensitivity of Organs and Tissues").

The most sensitive organs include the testes. When the testes are exposed to  $\gamma$ -rays or other types of radiation exceeding 0.1 Gy (100 mGy) at one time, this may cause temporary sterility with a temporary decrease in the number of sperm, which is due to radiation damage to cells in the testes that create sperm.

Also if bone marrow is irradiated by more than 0.5 Gy (500 mGy) at one time, the hematopoietic function is impaired and a total number of blood cells may decrease.

Some deterministic effects (tissue reactions), such as cataract, take several years to appear.

The threshold dose for cataract had been set at 1.5 Gy, but the ICRP revised this value downward to approx. 0.5 Gy and set a new equivalent dose limit for the eye lens for occupational exposures.

Included in this reference material on March 31, 2013

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