

# Cobalt and cesium irradiators

**Cobalt and cesium irradiators** are among the irradiators used in **radiotherapy** and are a *source of gamma radiation* .

- are sources of so-called telecuria-therapy, ie irradiation with radioisotope sources from a distance
- An important parameter of radioisotope irradiators is the appropriate energy and physical half-life of radionuclides
- today, however, they are used mainly in **palliative and non-cancerous radiotherapy**, they are gradually being decommissioned



Caution, ionizing radiation

## Cobalt irradiators

The radiation source is radioactive cobalt  $^{60}\text{Co}$  (physical half-life is 5.29 years), which emits quantum gamma radiation with energies of 1.33 and 1.17 MeV with high penetration.

They are considered to be **large irradiators** (high source activity of at least 3,7,10<sup>13</sup> Bq) and are intended for **deep radiotherapy**.

## Cesium irradiators

The radiation source is radioactive cesium  $^{137}\text{Cs}$  (physical half-life is 30.4 years), which emits a quantity of radiation with an energy of 0.66 MeV. It is used to irradiate pathological deposits to a depth of **max. 5 cm**.



Cobalt therapy

### Irradiation device

The irradiation device is called a **cobalt cannon** .

- its essence is a strong lead protection box or spherical head (diameter up to 60 cm)
- the head contains a core of tungsten alloy or uranium (they have higher absorption than lead)
- the head transmits the primary gamma beam only in a narrow beam in the specified direction

### Irradiation mechanism

1. the source remains at rest, the primary beam of gamma radiation is released by a movable screen located under the outlet channel of the cover
2. the source moves, rotates, or is pushed out of the center of the head above the output channel

## Links

### related articles

- Gamma radiation in medicine
- Gamma knife
- Ionizing radiation
- Irradiation disease

### Resources

- Šlampa, P .: *Radiation Oncology*. - textbook for students 5th year. LF MU Brno. < <https://www.mou.cz/radiacni-onkologie-ucebni-text-pro-studenty-5-roc-lf-mu-brno/t2068> >

### References

- NAVRÁTIL, Leoš and Jozef ROSINA, et al. *Medical biophysics*. 1st edition. Prague: Grada, 2005. pp. 383-384. ISBN 80-247-1152-4 .