

# Ultraviolet radiation (biophysics)

**Ultraviolet radiation (UV)** is an electromagnetic force with a wavelength shorter than that of visible light and longer than that of X-rays - about 400-10 nm.

UV radiation is divided into 3 bands according to wavelengths:

- near band or UV-A, whose wavelengths range from 320-380 nm
- the medium or UV-B band, in which wavelengths with a range of 280-320 nm are found
- the distant band or UV-C, where the wavelengths are shorter than 280 nm and are also referred to as the germicidal band, as it has the greatest bactericidal effects.

## Sources of UV radiation

Artificial sources are, for example, bodies heated to a high temperature, discharge lamps, and lamps filled with mercury vapor (discharge lamps must be made of quartz glass because ordinary glass absorbs UV radiation). The natural source is the Sun, and part of its radiation is the ultraviolet light of all 3 bands. The short-wave part of UV-C is absorbed by the ozone layer, thus only UV-A and UV-B reach the surface, where near-band radiation makes up 95% and mid-band radiation 5%[1] of the total (UV-C is no longer considered). At the same time, a cloudy sky proportionally reduces its intensity.

## Effects and use of UV radiation

It has a harmful effect on the visual organ, which it can cause inflammation of the conjunctiva and cornea, so it is important to protect yourself with suitable glasses. Wavelengths shorter than 300 nm when applied to the skin cause the formation of vitamin D from its precursors (UV radiation was used to prevent rickets). Ultraviolet radiation is partially scattered on the skin or reflected by the stratum corneum and, depending on the wavelength, is either absorbed in the epidermis (UV-B) or reaches the dermis (UV-A). The skin reacts to UV radiation with redness (erythema) and the subsequent formation of the pigment melanin in the pigment cells. Melanin then prevents the penetration of UV-A radiation into the deeper layers of the skin. High doses of ultraviolet radiation can cause degenerative changes in the skin (skin tumors). Its disinfecting effects are used, for example, in operating rooms, intensive care units, or laboratories (germicidal lamps, which are mercury lamps). In biochemistry, the photoluminescence effects of UV radiation are used to detect some organic substances.

## Links

### Related articles

- Ultraviolet radiation (hygiene)
- Biological effects of UV radiation, health protection

### Source

JIRÍ, Beneš – JAROSLAVA, Kyplová – FRANTIŠEK, Vítek. *Základy fyziky pro lékařské a zdravotnické obory : pro studium i praxi*. - edition. Grada Publishing, a.s., 2015. 236 pp. ISBN 9788024747125.