

# Body temperature

Body temperature is a designation for the natural temperature of a given organism, at which it normally functions. Each animal species has a different body temperature, which depends on body structure, metabolism, environment and other factors. The usual body temperature is independent of the weather, but due to rapid climatic changes it can easily fall or rise above its normal limit.

## Content

### Changes in body temperature

Body temperature depends on biorhythms. It fluctuates according to the time of **day (circadian)** - lowest during sleep, highest during activity. In women, it is also affected by the **ovarian/menstrual cycle** - lowest in the follicular phase and up to 1°C higher after ovulation.

- 36.0-36.9 °C is a **normal temperature** for a healthy person.
- Lower than 36.0 °C is a **subnormal temperature** - accompanied by shock, poisoning (alcohol, hypnotics). Targeted *hypothermia* is used during heart or brain surgery (to suppress metabolic activity).
- 37.0-37.9 °C is **subfebrile**.
- 38.0 °C and more is **febrile** (fever).

### Mechanisms of thermoregulation

Many mechanisms are used to regulate body temperature. The first reaction of the organism to a thermally uncomfortable environment is **vasomotor regulation**, when blood flow through the skin is regulated. Vasoconstriction occurs when it is necessary to reduce heat loss, while vasodilation is used for cooling. The second mechanism is the adjustment of **muscle activity** - tremors, change in tone, and if even these mechanisms cannot regulate body temperature sufficiently, **sweating** occurs.

### Thermogenesis

**Obligatory** thermogenesis is the release of heat during metabolic processes under resting conditions - during basal metabolism. Thermogenesis for the purpose of increasing temperature is referred to as **facultative**. This group includes **shivering** (change in muscle tone, shivering, increased activity), metabolic (adaptation to long-term cold leads to an increase in thyroxine secretion) and **non-shivering** thermogenesis, which occurs in newborns and children under one year who are not capable of shivering thermogenesis. There is an increased release of heat from brown fat due to the large number of mitochondria. These increase the activity of oxidative enzymes without subsequent phosphorylation to ATP. This leads to heat generation.

### Heat Exchange

- Radiation
- Conduction - only a small application
- Flow/convection - flow of ambient air
- By evaporation/evaporation

### Control circuit

The control circuit (negative feedback) regulates the body temperature value as a controlled/regulated quantity. **Thermoreceptors** are divided into **superficial** ones in the skin and deep ones in visceral organs and in the hypothalamus and spinal cord.

When a temperature deviation is recorded, there is an effort to return to the original state. In the event of the release of endo or exogenous **pyrogens** (released from bacteria or damaged tissue), the **thermoregulator** will be reset to a higher temperature, and the organism, in an attempt to balance this value, increases its temperature by **vasoconstriction** in the skin, **shivering** and increased clothing. After the acute phase of the disease subsides or the administration of antipyretics, the temperature is actively reduced by **vasodilation** and **sweating**. This will return to the original state.

In the event that there is a change in temperature for which the regulatory mechanisms are no longer sufficient, **hyperthermia** or overheating can occur.

## Links

### Source

- ŠVÍGLEROVA, Jitka. *Body temperature* [online]. Last revision 2009-09-03, [cit. 2010-11-13]. <

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