

# Receptor potential

It is a slow action, graded according to intensity and speed (if there is also a dynamic component), which, unlike action potential, does not work according to the slogan "all or nothing". It spreads electrotonically to the site of action potentials.<sup>[1]</sup>

We distinguish between two types of receptor potentials - tonic and phasic. A **tonic** receptor potential occurs continuously, while a **phasic** one occurs only briefly and an action potential occurs only at its onset and termination.

Therefore, the receptor potential has a tonic meaning static component and a phasic meaning dynamic component. After the end of the stimulus, the so-called **off-effect** can occur (i.e. the receptor potential is "zeroed").

1. Receptors that respond only with the slow phase of the receptor potential are **proportional regulators**.
2. Receptors that only respond with the fast phase of the receptor potential are **differential (derivative) regulators**.
3. Receptors that respond with mixed phases of the receptor potential are proportional **differential (derivative) regulators**.

The character of the receptor potential is in most cases depolarizing, i.e. conditioned by the entry of Na<sup>+</sup> ions into the cell. In hair cells, the depolarization character is dependent on the entry of K<sup>+</sup> ions and Ca<sup>2+</sup> ions into the cell.

## Depolarizing and hyperpolarizing receptor potential

A depolarizing receptor potential leads to the generation of an action potential after reaching a threshold value. This depolarizing receptor potential has similar properties as the excitatory postsynaptic potential (EPSP) and can also be a so-called generator potential. However, this is only true if the receptor body is connected to the primary sensory neuron. If this is not the case, and the receptor is connected to a secondary sensory neuron, the generator potential arises with associated excitatory activity only postsynaptically.

Vertebrate retinal photoreceptors exhibit hyperpolarizing receptor potentials.<sup>[1]</sup>

## Links

### Related Articles

- Receptors
- Receptor potential, adaptation
- Adaptation

### Reference

- 1.

### Used literature

TROJAN, Stanislav, et al. *Lékařská fyziologie*. 4., přeprac. a uprav edition. Praha : Grada Publishing, a.s, 2003. 772 pp. ISBN 80-247-0512-5.