

# Nervous tissue

The nervous system controls and integrates the organism. The basic function is fast and accurate transfer of information. Transmitted information (excitement) is the main code of the nervous system.

Nervous tissue is adapted to receive stimuli, organize them and conduct them. In nerve centers, signals from different nerve pathways are collected and processed. One neuron can be connected to several thousand neurons thanks to synapses .

## Transmission of nerve impulse

- Electrical transmission: when spreading through a cell
- Chemical transfer : from one cell to another

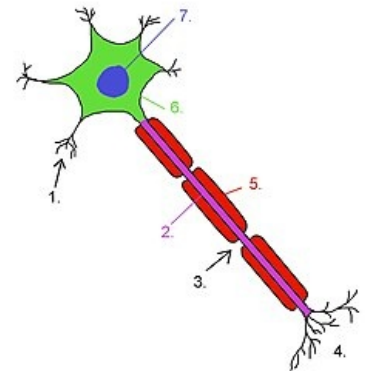
## New signals

New signals lead to executive bodies, namely:

- CNS = Brain + Spinal Cord
- PNS = Paired nerves exiting the brain and spinal cord

## Importance of Neuronal Structures

- **Dendrites**: short projections of the neuron (output + receptive field of the neuron), input membranes give rise to a local graded electrical response dependent on the intensity of the stimulus
- **Cell body (soma)**: nucleus + neuroplasm + organelles (transport and production of neurotransmitters and proteins)
- **Dendrosomatic membrane**: membrane of dendrites + soma (if it has the function of an input membrane)
- **Axon (nerve fibre, neurite)**: conducts excitation and is a conductive component of transmission, has cytoplasm and a membrane , can be covered by glial cells in the CNS and Schwann cells in the PNS, so-called myelin sheaths (axons are not covered in invertebrates)
- **Dendrites + body**: = signal input
- **Initial segment**: it is between the connection of the axon with the body and the beginning of the myelin sheath, the place where the excitation occurs is called the axon bump - the immediate transition between the body and the axon
- **Nerve endings (telodendria)**: the final, output section of the axon, specialized for the release of synaptic mediators
- **Collaterals** : lateral processes, they can branch from the axon at different places



1.dendrite, 2. axon, 3. notches of Ranvier, 4. terminal end, 5. myelin sheath, 6. cell body, 7. nucleus

## Types of neurons

1. **Afferent** (ascending, sensitive): information from receptors to the spinal cord or brain
2. **Efferent** (descending, motor): carry signals from the CNS to effectors (muscles/glands), motoneurons innervate skeletal muscles
3. **Interneurons** (association): mainly in the CNS (97%), the more complex the function, the more interneurons are involved

## A simplified CNS phylogeny procedure

1. Diffuse nervous system: small animals
2. Ganglion Nervous System: Molluscs
3. Ladder nervous system: arthropods
4. Tubular Nervous System: Vertebrates

This was followed by corticalization, i.e. the cerebral cortex developed, the multiplication, improvement and specialization of neurons took place.

## Links

## Related articles

- General structure of nervous tissue = is a reference to histology
- Synapse
- Neuron
- Pathology of tumors of the nervous system

## References

- LANGMEIER, Miloš. *Basics of medical physiology*. 1. edition. Prague : Grada Publishing, a.s, 2009. 320 pp. ISBN 978-80-247-2526-0.
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- L. Janský, I. Novotný: *Animal and human physiology*, 1981, edition. Avicenum, 1. edition, 08-085-80