

**NERVOUS TISSUE**

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**Introduction**

The nervous system is the coordinating and controlling system of the body, responsible for transmitting signals between various organs and tissues. It has a complex morphological and functional structure, with its main components being nerve cells (neurons) and neuroglial cells. Neurons are responsible for receiving, transmitting, and processing signals, while glial cells play a crucial role in supporting, nourishing, and protecting neurons.

The microscopic study of nervous tissue is one of the primary directions in histology, helping to understand the morphological features of neurons, the structure of dendrites and axons, as well as the neural impulses that occur through synapses. Studying nervous tissue is essential not only for identifying normal physiological processes but also for the diagnosis and treatment of neurodegenerative diseases, injuries, and other pathological conditions.

**Main Part**

The nervous system is the coordinating and controlling system of the body, consisting of the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS, composed of the brain and spinal cord, is responsible for processing and coordinating impulses, while the PNS connects various organs and tissues to the CNS, ensuring the rapid transmission of signals.

Nervous tissue mainly consists of neurons and neuroglial cells. Neurons are responsible for receiving, transmitting, and processing signals. Each neuron has three main components: dendrites, soma (cell body), and axon. Dendrites receive signals from other neurons, the soma acts as the metabolic center supporting neuronal activity, and the axon transmits impulses to other neurons or effector organs. In many cases, axons are surrounded by a myelin sheath, which significantly increases the speed of impulse transmission. Nodes of Ranvier allow impulses to be transmitted in a “jumping” manner, known as saltatory conduction.

Neuroglial cells provide protection and support for neurons. Astrocytes nourish neurons and strengthen the blood-brain barrier, oligodendrocytes myelinate axons in the CNS, and Schwann cells myelinate axons in the PNS. Microglial cells perform immune surveillance and eliminate damaged or pathogenic cells.

Communication between neurons occurs at synapses, which can be chemical or electrical. In chemical synapses, neurotransmitters transmit impulses, enabling the body to respond flexibly and rapidly to stimuli. Proper synaptic function is critical for reflexes and complex coordination processes.

The CNS and PNS tissues also differ morphologically. The CNS is rich in neurons and glial cells, responsible for processing and controlling impulses, while the PNS contains axons and Schwann cells, facilitating rapid and efficient signal transmission. Thus, the complex structure and coordinated function of nervous tissue ensure the body’s adaptability and rapid response to various conditions.

### **Conclusion**

Nervous tissue constitutes a fundamental component of the body's control and coordinating system. Studies show that neurons and neuroglial cells work together to ensure the processes of receiving, transmitting, and processing impulses. The dendrites, soma, and axon of neurons, along with the signal transmission through synapses, guarantee rapid and efficient responses of the organism.

Neuroglial cells—including astrocytes, oligodendrocytes, Schwann cells, and microglia—play a crucial role in nourishing and protecting neurons, as well as in the effective conduction of nerve impulses. Differences between central and peripheral nervous system tissues reflect their functional specialization: the CNS ensures impulse processing and coordination, while the PNS facilitates rapid signal transmission.

Moreover, studying nervous tissue at the microscopic level is essential not only for understanding normal physiological processes but also for diagnosing and treating neurodegenerative diseases, injuries, and other pathological conditions. The complex structure and coordinated function of nervous tissue provide the body with a flexible and responsive system, which holds significant theoretical and practical importance for the fields of biology and medicine.