

## CNS-7 Identification of the elements of CNS pathways

<b>OBJECTIVES OF THE CLASS:</b>
THEORETICAL
1. to know the course and elements of particular neuronal pathways (sensory, motor, special senses); 2. to know whether a pathway is crossed (decussated) and be able to identify the site of a decussation; 3. to know basic symptoms resulting from lesions affecting a pathway at different levels;
THEORETICAL and PRACTICAL
4. to be able to recognize and give names of the elements of particular pathways (sensory, motor, special senses).

A student should be prepared theoretically for the lab class.

The information may be found in the chapters 3 and 4 (*Clinical neuroanatomy* by Snell) and in the lectures 5, 6 and 7.

<b>DURING THE SEMINAR:</b>
– no seminar is scheduled for this lab class.

<b>DURING THE PRACTICAL CLASS A STUDENT SHOULD RECOGNIZE AND IDENTIFY:</b>
– the macroscopic elements of particular neuronal pathways (sensory, motor, special senses); – the sites or levels of eventual decussation for particular pathways. The student should use the list attached below as a reference for demanded structures.

<b>AFTER THE CLASS A STUDENT:</b>
– should know the course and elements of particular pathways with detailed assessment of the origin, destination, the number of neurons included, the course of particular neurons, the sites of synaptic junctions between the neurons and eventual decussation of the pathway; – should know basic symptoms resulting from lesions affecting a pathway at different levels; – should be able to and give names of the elements of particular pathways; – pathways to be recognized and described: superficial sensation (anterolateral spinothalamic system), deep sensation (dorsomedial system), trigeminothalamic tract, visual, auditory, gustatory, olfactory, vestibular, pyramidal tract (anterior and lateral corticospinal tracts).

At the end of the class a student should participate in the credit consisting of 6 MCQ and 4 pins in order to confirm the presence at the class and collect the points if successful.

<b>EXAMPLE QUESTIONS (choose <u>one</u> correct answer):</b>	
Auditory cortex is mainly located in:  A. transverse temporal gyri B. calcarine sulcus C. precentral gyrus D. insula E. hippocampus	Left-sided hemianopia may result from the lesion in:  A. right optic nerve B. left optic nerve C. optic chiasm D. right optic tract E. left optic tract

## **CNS-7 Identification of the elements of CNS pathways**

List of the structures to be practically identified and recognized by the student:

### **ANTEROLATERAL SYSTEM**

*(Nondiscriminative sensation pathway)*

Spinal nerve (in the model)  
Spinal ganglion = Posterior root ganglion (model)  
Dorsal horn of spinal grey matter (model)  
Ant. commissure of the spinal cord (model)  
Ant./Lat. white column (funiculus) (model)  
Thalamus (VPL)  
Somatosensory cortex

### **DORSOMEDIAL SYSTEM**

*(Discriminative sensation pathway)*

Spinal nerve (in the model)  
Spinal ganglion = Posterior root ganglion (model)  
Fasciculus gracilis and fasciculus cuneatus  
Tuberculum gracile and tuberculum cuneatum  
Thalamus (VPL)  
Somatosensory cortex

### **TRIGEMINOTHALAMIC TRACT**

Cranial nerves (CN 5, 7, 9, 10)  
Sensory nuclei of CN 5, 7, 9, 10 (in the model)  
Thalamus (VPM)  
Somatosensory cortex

### **VISUAL PATHWAY**

Optic nerve  
Optic chiasm  
Optic tract  
Lateral geniculate body  
Optic radiation  
Visual cortex

### **AUDITORY PATHWAY**

Vestibulocochlear nerve  
Cochlear nuclei (in the model)  
Inferior colliculus  
Medial geniculate body  
Acoustic radiation  
Auditory cortex

### **OLFACTORY PATHWAY**

Olfactory bulb  
Olfactory tract  
Olfactory trigone  
Uncus

### **GUSTATORY PATHWAY**

Cranial nerves (CN 7, 9, 10)  
Solitary nucleus (in the model)  
Thalamus (VPM)  
Gustatory cortex

### **VESTIBULAR PATHWAY**

Vestibulocochlear nerve  
Vestibular nuclei (in the model)  
Thalamus (VPI)  
Vestibular cortex

### **CORTICOSPINAL TRACT**

Motor cortex  
Corona radiata  
Internal capsule  
Crus cerebri  
Longitudinal fascicles of pons  
Pyramis of medulla oblongata  
Pyramidal decussation  
Lateral funiculus of the spinal cord  
(Lateral white column) (model)  
Anterior funiculus of the spinal cord  
(Anterior white matter) (model)  
Anterior commissure of the spinal cord (model)  
Ventral horn of spinal grey matter (model)  
Spinal nerve (model)

### **CORTICONUCLEAR TRACT**

Motor cortex  
Corona radiata  
Internal capsule  
Crus cerebri  
Longitudinal fascicles of pons  
Tegmentum  
Motor nuclei of cranial nerves (model)  
Cranial nerves

### **EXTRAPYRAMIDAL CENTERS**

Premotor cortex  
Corpus striatum  
Thalamus (VA, VL)  
Subthalamic nucleus  
Substantia nigra  
Red nucleus  
Reticular formation of the brainstem  
Cerebellar nuclei