

## GUIDELINES

### Students' independent work during preparation to practical lesson

Academic discipline	HUMAN ANATOMY
Topic	AUTONOMOUS PART OF THE PERIPHERAL NERVOUS SYSTEM

#### **1. The relevance of the topic**

The autonomic nervous system regulates the functional activity of the body. Therefore, the knowledge of anatomy of the autonomic nervous system is important for further study of physiology, neurology and other disciplines for physicians of all specialities.

#### **2. Specific objectives**

- give definition of an autonomous part of the peripheral nervous system (autonomic nervous system), specify its parts, features, features of innervation.
- know morphological differences between the sympathetic and parasympathetic part of the autonomic nervous system.
- identify and demonstrate central parasympathetic division of the ANS on the preparations of the brain.
- demonstrate sympathetic trunk on the preparations and models.
- determine the composition of the fibres of the cranial and spinal nerves.
- draw a diagram of a simple reflex arc of the autonomic nervous system.
- interpret the differences between grey and white communicating branches.

**3. Basic level of preparation includes** classification of neurons by the structure and function, understanding of parts of the nervous system, knowledge of twelve pairs of cranial nerves and their functional significance, understanding of the structure and function of formations of white and grey matter of the spinal cord and of the brain.

#### **4. Tasks for independent work during preparation for classes**

*4.1. The list of key terms, parameters, characteristics which the student has to assimilate while preparing for classes*

Term	Definition
SYMPATHETIC PART OF THE AUTONOMIC NERVOUS SYSTEM	The part of the ANS that enhances trophic processes in a human body ("flight or fight" state).
PARASYMPATHETIC PART OF THE AUTONOMIC NERVOUS SYSTEM	The part of the ANS that enhances accumulative processes in a human body.
AUTONOMOUS GANGLIA	They are peripheral nerve centers responsible for multiplication of impulses and their transformation from fast to slow.
AUTONOMIC REFLEX	The path of impulse from receptor to effector (working organ). The reflex is a chain of nerve cells, conducting nerve impulses from the receptor of sensory neuron to effector endings in the working organs.

#### **4.2. Theoretical questions for the class**

1. Autonomic nervous system: parts, features, objects of innervation.
2. Differences between the somatic nervous system and autonomic nervous system.
3. Morphological features of autonomic reflex arc of the autonomic nervous system.
4. Morphological differences between the sympathetic and parasympathetic parts of the

autonomic nervous system.

5. The central part of the ANS, its classification and formation.
6. Peripheral part of the autonomic nervous system.
7. Vegetative ganglia: classification, structure, differences from sensory ganglia.
8. The sympathetic trunk: branches, ganglia and their connections.
9. White communicating branches: formation and topography.
10. Grey communicating branches: formation and topography.
11. Objects of parasympathetic innervation of the cranial part of the autonomic nervous system.
12. Objects of parasympathetic innervation of sacral part of the autonomic nervous system.
13. The cervical department of sympathetic trunk: superior cervical ganglion, sources of preganglionic fibres, branches, areas of innervation.
14. Middle cervical ganglion: sources of preganglionic fibres, branches, areas of innervation.
15. Inferior cervical ganglion: sources of preganglionic fibres, branches, areas of innervation.
16. Thoracic sympathetic trunk: ganglia, branches, areas of innervation.
17. Lumbar department of sympathetic trunk: ganglia, branches, areas of innervation.
18. Sacral department of sympathetic trunk: ganglia, key sources of fibres, branches, areas of innervation.
19. How preganglionic sympathetic fibres reach the sympathetic trunk?
20. How and where do postganglionic sympathetic fibres go?
21. Describe the way of nerve fibres that come from accessory oculomotor nuclei.
22. Describe the way of nerve fibres that come from superior salivatory nuclei.
23. Describe the way of nerve fibres that come from inferior salivatory nuclei.
24. Describe the way of nerve fibres that come from dorsal vagal nuclei.
25. What vagal branches do separate from the nerve to the internal organs and forming plexus around them?

#### 4.3. The list of standardized practical skills

- Sympathetic trunk
- Ganglia of sympathetic trunk
- Interganglionic branches of sympathetic trunk
- Greater splanchnic nerve
- Lesser splanchnic nerve
- Abdominal plexus and ganglia

## 5. Sources

<b>Anatomy international nomenclature</b>	<a href="http://anatom.ua/anatomical-terminology/">http://anatom.ua/anatomical-terminology/</a>
<b>LECTURE</b>	<a href="https://anatom.ua/basis/english/lectures/">https://anatom.ua/basis/english/lectures/</a>
<b>Textbook 'Human anatomy'</b>	PP. 292-301 <a href="http://anatom.ua/basis/english/online-book-in-english/">http://anatom.ua/basis/english/online-book-in-english/</a>
<b>Work Book (Coloring book)</b>	PP. 103-104
<b>Atlas of human anatomy (Sobotta)</b>	PP. 104, 112-114, 125-129
<b>QUIZES</b>	<a href="https://anatom.ua/basis/english/tests/">https://anatom.ua/basis/english/tests/</a>
<b>VIDEO</b>	<a href="https://anatom.ua/basis/video/">https://anatom.ua/basis/video/</a>

## **6. Materials for self-control**

1. What is a location of superior cervical ganglion?
  - A. posteriorly to the carotid artery
  - B. anteriorly to the carotid artery
  - C. laterally to the carotid artery
  - D. inferiorly to the carotid artery
  
2. Which cervical ganglion is associated with the innervation of the superior tarsal muscle?
  - A. Inferior cervical ganglion
  - B. Middle cervical ganglion
  - C. Superior cervical ganglion
  - D. All of the above
  
3. What nerve does innervate common carotid artery?
  - A. Internal carotid nerve
  - B. External carotid nerve
  - C. Gray rami communicantes
  - D. Thyroid branches
  - E. Cardiac nerve
  
4. Choose organs innervated by the celiac ganglion.
  - A. The stomach, liver, pancreas
  - B. The small intestine
  - C. The duodenum
  - D. The descending colon, sigmoid colon, rectum
  - E. The urinary bladder and genital organs
  
5. Choose the correct list of the central part of parasympathetic division.
  - A. Accessory oculomotor nucleus, superior and inferior salivary nuclei, solitary nucleus, dorsal nucleus of vagus, nuclei of LII-SV segments
  - B. Accessory oculomotor nucleus, superior and inferior salivary nuclei, dorsal nucleus of vagus, nuclei of SII-SIV segments
  - C. Superior and inferior salivary nuclei, solitary nucleus, dorsal nucleus of vagus, nuclei of SI-SV segments
  - D. Yakubovych-Edinger-Westphal nucleus, superior and inferior salivary nuclei, solitary nucleus, dorsal nucleus of vagus
  
6. Submandibular ganglion receives innervation from...
  - A. Accessory oculomotor nucleus
  - B. Superior salivary nucleus
  - C. Inferior salivary nucleus
  - D. Dorsal nucleus
  
7. Name the parasympathetic nerve that forms a numerous of intramural ganglia.
  - A. Oculomotor
  - B. Trigeminal
  - C. Facial
  - D. Glossopharyngeal
  - E. Vagus
  
8. Which artery is most associated with the postganglionic fibres of the middle cervical ganglion?

- A. Common carotid
- B. Inferior thyroid
- C. Subclavian
- D. Vertebral

9. What is the origin of the external carotid nerve?

- A. The nerves originate from the superior cervical ganglion
- B. The nerves originate from the middle cervical ganglion
- C. The nerves originate from the inferior cervical ganglion
- D. The nerves originate from the thoracic sympathetic ganglia
- E. The nerves originate from the celiac ganglion

10. Where is the superior cervical ganglion located accordingly the vertebrae?

- A. anteriorly to the C1-4 vertebrae
- B. posteriorly to the C1-4 vertebrae
- C. anteriorly to the C6 vertebra
- D. posteriorly to the C6 vertebra
- E. anteriorly to the C7 vertebra

11. Which of the following is NOT a parasympathetic ganglion of the head?

- A. Parotid ganglion
- B. Otic ganglion
- C. Submandibular ganglion
- D. Ciliary ganglion

12. What parasympathetic ganglion is located near the optic nerve?

- A. Ciliary ganglion
- B. Pterygopalatine ganglion
- C. Submandibular ganglion
- D. Sublingual ganglion
- E. Otic ganglion

13. What are the originations of the splanchnic nerves for the inferior mesenteric plexus?

- A. Inferior cervical ganglia
- B. Thoracic sympathetic ganglia
- C. Lower lumbar sympathetic ganglia
- D. Lower lumbar, upper sacral sympathetic ganglia
- E. Sacral sympathetic ganglia

14. Where are the preganglionic fibres of the otic ganglion located?

- A. Vidian nerve
- B. Deep petrosal nerve
- C. Chorda tympani
- D. Lesser petrosal nerve

15. What structures are innervated by the nerves from the internal carotid plexus?

- A. the eye
- B. the larynx
- C. the pterygopalatine artery
- D. the internal carotid artery
- E. the external carotid artery

16. Choose organs innervated by the superior mesenteric ganglion.

- A. The stomach
- B. The duodenum
- C. The small intestine
- D. The descending colon
- E. The rectum

17. Which cranial nerve is associated with the superior salivatory nucleus?

- A. Glossopharyngeal nerve
- B. Facial nerve
- C. Vagus nerve
- D. Oculomotor nerve
- E. Trigeminal nerve

18. Where are the preganglionic fibres of the pterygopalatine ganglion located?

- A. Vidian nerve
- B. Deep petrosal nerve
- C. Chorda tympani
- D. Lesser petrosal nerve
- E. Vagus

19. What branches (rami) of the spinal nerves do contain the sympathetic nerves?

- A. the ventral branches (rami)
- B. the dorsal branches (rami)
- C. rami communicantes
- D. sympathetic trunk

20. What sympathetic ganglion does give postganglionic fibres to larynx, trachea, pharynx and upper oesophagus?

- A. The superior cervical ganglion
- B. The middle cervical ganglion
- C. The inferior cervical ganglion
- D. The superior and middle cervical ganglia
- E. The thoracic sympathetic ganglia

**ANSWERS:**

<b>1</b>	<b>A</b>
<b>2</b>	<b>C</b>
<b>3</b>	<b>B</b>
<b>4</b>	<b>A, C</b>
<b>5</b>	<b>B</b>
<b>6</b>	<b>B</b>
<b>7</b>	<b>E</b>
<b>8</b>	<b>B</b>
<b>9</b>	<b>A</b>
<b>10</b>	<b>A</b>
<b>11</b>	<b>A</b>
<b>12</b>	<b>A</b>
<b>13</b>	<b>D</b>
<b>14</b>	<b>D</b>
<b>15</b>	<b>A, C, D</b>
<b>16</b>	<b>C</b>
<b>17</b>	<b>B</b>
<b>18</b>	<b>A</b>
<b>19</b>	<b>A</b>
<b>20</b>	<b>B</b>