

What is the Parasympathetic Division?

Worksheet

The parasympathetic division is the autonomic branch that arises from cranial nerves (especially the vagus nerve) and sacral spinal segments (S2-S4), promoting rest, digestion, and energy conservation.

Questions

1. The parasympathetic division's preganglionic neurons arise from which regions?
 - A) Thoracic and lumbar only
 - B) Cranial nerves and sacral spinal cord
 - C) Cervical spinal cord only
 - D) Sympathetic chain ganglia
2. Which nerve carries most parasympathetic output to the heart and digestive organs?
 - A) Vagus nerve
 - B) Sciatic nerve
 - C) Phrenic nerve
 - D) Femoral nerve
3. Where do most parasympathetic ganglia synapse?
 - A) In the sympathetic chain
 - B) Near or within the target organ
 - C) In the spinal cord itself
 - D) In the adrenal medulla
4. Which of these is a typical parasympathetic effect?
 - A) Increased heart rate
 - B) Pupil dilation
 - C) Stimulated salivation
 - D) Adrenaline release
5. After finishing a stressful exam, a student sits down and their heart rate gradually drops. Which parasympathetic structure is mainly responsible?
6. During a relaxed dinner, saliva production increases and the stomach begins churning food. Explain the parasympathetic pathway involved.
7. A patient with damage to the sacral spinal cord (S2-S4) has difficulty with bladder emptying. Why does this specific region matter?
8. Define: Where do parasympathetic preganglionic neurons originate?
9. Define: What is the main neurotransmitter used throughout the parasympathetic pathway?
10. Define: Which cranial nerve carries the most parasympathetic fibers?

Answer Key

1. B) Cranial nerves and sacral spinal cord - Parasympathetic outflow is called 'craniosacral' because it comes from cranial nerves and sacral segments S2-S4.
2. A) Vagus nerve - The vagus nerve (cranial nerve X) supplies parasympathetic fibers to the heart, lungs, and most of the gut.
3. B) Near or within the target organ - Parasympathetic preganglionic fibers travel far, synapsing in terminal ganglia close to or inside the target organ.
4. C) Stimulated salivation - The parasympathetic division stimulates salivary glands as part of the rest-and-digest response.
5. The vagus nerve (cranial nerve X) carries parasympathetic fibers to the heart Acetylcholine released at the sinoatrial node slows the heart's pacemaker activity Heart rate decreases as the body shifts to a calmer state This is the parasympathetic 'rest' effect taking over from sympathetic dominance
6. Parasympathetic fibers from cranial nerves VII and IX stimulate salivary glands Vagal fibers (cranial nerve X) stimulate stomach motility and acid secretion Acetylcholine released near the target organs activates digestive activity This reflects the 'digest' half of rest-and-digest
7. Sacral segments S2-S4 provide parasympathetic outflow to the bladder and reproductive organs Damage here disrupts preganglionic fibers that normally trigger detrusor muscle contraction Without this signal, the bladder cannot contract effectively to empty This illustrates the craniosacral (not just cranial) origin of parasympathetic fibers
8. From cranial nerves III, VII, IX, and X, and from sacral spinal segments S2-S4 (craniosacral outflow).
9. Acetylcholine, released by both preganglionic and postganglionic neurons.
10. The vagus nerve (cranial nerve X), which supplies the heart, lungs, and most abdominal organs.

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