EnterMedSchool.org

Sympathetic vs Parasympathetic Nervous System

Study Guide — Autonomic Nervous System

High-school/pre-med-level questions comparing the sympathetic and parasympathetic divisions of the autonomic nervous system.

29 items — Study Guide with Answers

Free & Open-Source

Generated February 20, 2026

Scan to visit online

1 **The autonomic nervous system (ANS) primarily controls:**

A Voluntary movement of skeletal muscles

B **Involuntary functions of smooth muscle, cardiac muscle and glands** ✓

C Transmission of pain from the skin only

D Conscious memory and thinking

E Reflexes of the knee jerk only

▶ **Explanation:** The ANS regulates involuntary activity of smooth and cardiac muscle and glands (heart, gut, blood vessels, etc.).

2 **Which TWO main divisions make up the autonomic nervous system?**

A Central and peripheral nervous systems

B Somatic and motor systems

C **Sympathetic and parasympathetic nervous systems** ✓

D Sensory and motor systems

E Cranial and spinal nerves

▶ **Explanation:** The ANS has two main divisions: sympathetic (SNS) and parasympathetic (PSNS).

3 **The sympathetic nervous system (SNS) is often described as the:**

A "Rest and digest" system

B **"Fight or flight" system** ✓

C "Memory and learning" system

D "Reflex only" system

E "Conscious movement" system

▶ **Explanation:** SNS prepares the body for stress, exercise, and emergencies (fight or flight).

4 **The parasympathetic nervous system (PSNS) is often described as the:**

A "Fight or flight" system

B **"Rest and digest" system** ✓

C "Pain and temperature" system

D "Posture and balance" system

E "Voluntary skeletal movement" system

▶ **Explanation:** The PSNS promotes energy storage, digestion, and body maintenance at rest.

5 **Which of the following effects is MOST characteristic of increased sympathetic activity?**

A Decreased heart rate

B **Increased heart rate and force of contraction** ✓

C Increased saliva production and watery saliva

D Increased digestive motility

E Constriction of the pupil (miosis)

▶ **Explanation:** SNS stimulation accelerates heart rate and increases contractility to deliver more blood to muscles.

6 **Which of the following effects is MOST characteristic of increased parasympathetic activity?**

A Bronchodilation and decreased mucus secretion

B **Decreased heart rate and increased digestive activity** ✓

C Increased heart rate and blood pressure

D Pupil dilation (mydriasis)

E Reduced saliva secretion

▶ **Explanation:** PSNS slows the heart and enhances digestion and glandular secretions.

7 **Which statement best describes the typical EFFECT of sympathetic stimulation on the BRONCHI of the lungs?**

A Constriction of bronchi and increased mucus

B **Dilation of bronchi to allow more airflow** ✓

C No effect on airways

D Complete closure of airways

E Only increased mucus with no diameter change

▶ **Explanation:** SNS causes bronchodilation, improving air flow during exercise or stress.

8 **Parasympathetic stimulation of the BRONCHI typically causes:**

A Bronchodilation and less mucus

B **Bronchoconstriction and increased mucus secretion** ✓

C No effect on the bronchi

D Permanent narrowing of the airways

E Airway collapse

▶ **Explanation:** PSNS narrows bronchi and increases secretions, appropriate for resting states, not intense exercise.

9 **Sympathetic activation generally causes which change in the eye?**

A Constriction of pupil (miosis)

B **Dilation of pupil (mydriasis)** ✓

C Blindness

D No change in pupil size

E Inability to focus on distant objects

▶ **Explanation:** SNS dilates pupils to let more light in and improve vision in 'fight or flight' situations.

10 **Parasympathetic activation in the eye generally causes:**

A Pupil dilation and loss of near vision

B **Pupil constriction and better near focus** ✓

C No change in pupil size or lens shape

D Permanent pupil dilation

E Blinking reflexes only

▶ **Explanation:** PSNS causes miosis and helps with near vision accommodation ('rest and read').

11 Which of the following is TRUE about the ORIGIN of sympathetic vs parasympathetic preganglionic neurons in the CNS?

A SNS is craniosacral; PSNS is thoracolumbar

B Both SNS and PSNS are craniosacral

C **SNS is thoracolumbar; PSNS is craniosacral** ✓

D Both SNS and PSNS originate only in the brain

E Only SNS has preganglionic neurons

▶ **Explanation:** Sympathetic preganglionic neurons arise from thoracic and upper lumbar spinal cord; parasympathetic from cranial nuclei and sacral spinal cord.

12 Sympathetic and parasympathetic pathways typically differ in the LENGTH of their pre- and postganglionic fibres. Which pattern is usually correct?

A **SNS: short preganglionic, long postganglionic; PSNS: long preganglionic, short postganglionic** ✓

B SNS: long preganglionic, short postganglionic; PSNS: short preganglionic, long postganglionic

C Both SNS and PSNS have only short preganglionic fibres

D Both SNS and PSNS have only long postganglionic fibres

E SNS has no ganglia, PSNS has many

▶ **Explanation:** SNS ganglia lie near the spinal cord → short pre, long post; PSNS ganglia lie near or in target organs → long pre, short post.

13 **Where are most parasympathetic ganglia located?**

A In a chain alongside the spinal cord

B **Inside or very close to the target organs** ✓

C Only in the brainstem

D Inside skeletal muscles

E In the dorsal root ganglia

▶ **Explanation:** PSNS ganglia are usually intramural (within the organ wall) or near the organ.

14 **Which neurotransmitter is released by ALL preganglionic sympathetic and parasympathetic neurons at their ganglia?**

A Noradrenaline (norepinephrine)

B Adrenaline (epinephrine)

C **Acetylcholine** ✓

D Dopamine

E Serotonin

▶ **Explanation:** Both SNS and PSNS preganglionic neurons release acetylcholine onto nicotinic receptors in autonomic ganglia.

15 **Most postganglionic sympathetic neurons release _____ at their target organs, whereas most postganglionic parasympathetic neurons release _____.**

A ACh; ACh

B ACh; noradrenaline

C **Noradrenaline; ACh** ✓

D Noradrenaline; adrenaline

E Adrenaline; dopamine

▶ **Explanation:** Typical rule (with some exceptions): SNS postganglionic fibres → noradrenaline (adrenergic); PSNS postganglionic fibres → ACh (muscarinic).

16 **Which of the following actions is MAINLY under sympathetic control (with little or no parasympathetic influence)?**

A Resting heart rate at 60 bpm

B **Sweat gland activation during exercise** ✓

C Increased digestive motility after a meal

D Pupil constriction when reading

E Urination (micturition)

▶ **Explanation:** Sweat glands and most blood vessels are mainly controlled by the SNS; PSNS has little direct effect on them.

17 **Sympathetic stimulation of most systemic blood vessels tends to cause:**

A Vasodilation and a fall in blood pressure

B **Vasoconstriction and a rise in blood pressure** ✓

C No change in vessel diameter

D Immediate vessel rupture

E Permanent blocking of blood flow

▶ **Explanation:** SNS generally constricts arterioles, increasing total peripheral resistance and raising blood pressure.

18 **Parasympathetic nerves have LITTLE direct effect on most blood vessels. Therefore, a fall in parasympathetic activity alone usually:**

A Also causes strong vasoconstriction directly

B Directly dilates all arterioles

C **Has minimal direct effect on vessel diameter (SNS is more important)** ✓

D Stops blood flow

E Makes blood vessels disappear

▶ **Explanation:** Vascular tone is mainly sympathetic; parasympathetic innervation of blood vessels is limited in most tissues.

19 **Which effect on the GASTROINTESTINAL TRACT is correctly matched?**

A SNS: increases motility and secretion

B PSNS: decreases motility and secretion

C **SNS: decreases motility and blood flow; PSNS: increases motility and secretion** ✓

D SNS: has no effect; PSNS: stops digestion completely

E Both SNS and PSNS always increase GI motility

▶ **Explanation:** SNS tends to inhibit digestion (less motility, less blood flow); PSNS stimulates digestion ('rest and digest').

20 **Sympathetic and parasympathetic systems often have opposite effects on the same organ. This is called:**

- A **Dual innervation with antagonistic effects** ✓
- B Single innervation with identical effects
- C Somatic control
- D Positive feedback
- E Reflex inhibition

▶ **Explanation:** Many organs receive both SNS and PSNS fibres whose actions oppose each other, allowing fine control.

21 **Which of the following scenarios best indicates PREDOMINANT sympathetic activation?**

- A Resting quietly after a meal, increased bowel sounds, slow heart rate
- B Sleeping deeply with slow breathing
- C **Running from danger with fast heart rate, pale skin, dilated pupils, dry mouth** ✓
- D Meditating, low heart rate, warm skin, active digestion
- E Reading calmly after lunch

▶ **Explanation:** The classic fight-or-flight pattern: increased HR, pale/clammy skin (vasoconstriction + sweating), dilated pupils, reduced GI activity.

22 **Which of the following scenarios best indicates PREDOMINANT parasympathetic activation?**

- A Sprint running with heart pounding and dry mouth

B Preparing to give a speech and feeling anxious

C Relaxing after a large meal with gurgling intestines and slower heart rate ✓

D Suddenly startled by a loud noise

E Holding your breath underwater

▶ **Explanation:** 'Rest and digest' state: calm, low HR, active GI motility and secretion.

23 Which statement about the SOMATIC motor system vs the AUTONOMIC system is correct?

A Somatic motor pathways use two neurons in series; autonomic pathways use one

B Somatic motor neurons directly innervate skeletal muscle; autonomic pathways use a pre- and postganglionic neuron to reach smooth and cardiac muscle and glands ✓

C Somatic system only controls the heart

D Autonomic system controls voluntary skeletal muscle

E Both systems innervate the same targets with the same neurotransmitters

▶ **Explanation:** Somatic: one motor neuron → skeletal muscle. Autonomic: two-neuron chain (pre- and postganglionic) → smooth/cardiac muscle, glands.

24 The adrenal medulla is functionally MOST similar to which autonomic structure?

A A parasympathetic ganglion that releases ACh into the blood

B A somatic motor neuron

C A modified sympathetic ganglion that releases adrenaline/noradrenaline into the blood ✓

D A sensory receptor

E A skeletal muscle fibre

▶ **Explanation:** Adrenal medulla cells are like postganglionic sympathetic neurons that release hormones (adrenaline and some noradrenaline) into circulation.

25 Which statement about 'basal tone' of SNS and PSNS is MOST accurate?

A At rest, only PSNS is active; SNS is completely off

B At rest, only SNS is active; PSNS is completely off

C Both divisions usually have some baseline activity, and the balance shifts depending on the situation ✓

D Neither division is active unless a person is in extreme stress

E Only one division can be active at any given time

▶ **Explanation:** SNS and PSNS both show tonic (baseline) activity; physiology depends on the relative balance between them, not a simple on/off switch.

26 Which effect on the URINARY BLADDER is MOST associated with parasympathetic stimulation?

A Relaxation of bladder wall and contraction of internal sphincter (urine retention)

B Contraction of bladder wall and relaxation of internal sphincter (promotes urination) ✓

C No effect on bladder function

D Permanent urine retention

E Direct inhibition of kidney filtration

▶ **Explanation:** PSNS promotes emptying of the bladder by contracting the detrusor muscle and relaxing the internal sphincter.

27 **Which effect on the SALIVARY GLANDS correctly compares SNS and PSNS?**

A SNS: no saliva; PSNS: no saliva

B SNS: large volume of watery saliva; PSNS: thick, sticky saliva

C **PSNS: large volume of watery saliva; SNS: smaller volume, thicker saliva** ✓

D Both SNS and PSNS always completely stop salivation

E Only SNS innervates salivary glands

▶ **Explanation:** PSNS promotes abundant watery saliva for digestion; SNS can produce a smaller, more viscous secretion (e.g. 'dry mouth' when nervous).

28 **Which of the following is NOT a typical effect of sympathetic activation?**

A Increased heart rate

B Increased blood flow to skeletal muscles

C Decreased GI motility

D **Pupil constriction** ✓

E Bronchodilation

▶ **Explanation:** SNS dilates the pupil; constriction is parasympathetic.

29 **Which of the following is NOT a typical effect of parasympathetic activation?**

A Slowing of heart rate

B Increased intestinal motility

C **Pupil dilation** ✓

D Increased glandular secretion (e.g. saliva, digestive juices)

E Promotion of urination

▶ **Explanation:** Pupil dilation (mydriasis) is sympathetic; parasympathetic causes pupil constriction.