

# Osmosis is the learning platform that brings faculty and students back together.

Built on a foundation of evidence-based learning science research, Osmosis's study tools and comprehensive materials help students:

- **Stay organized**
- **Study more efficiently**
- **Retain information longer**

With Osmosis, you can augment your curricular resources to **better engage your students** in learning how to become clinicians. Improve learning outcomes with **educational tools that support flipped classrooms, increase collaboration, and promote adaptive, self-guided study.**

Start a conversation to learn how Osmosis can support your institution's goals: [partnerships@osmosis.org](mailto:partnerships@osmosis.org)

**SPINOCEREBELLAR TRACT**

IPSI LATERAL CEREBELLAR CORTEX

SYNAPSE ON NEURONS IN CEREBELLAR CORTEX

DORSAL SPINO-CEREBELLAR TRACT

DORSAL ROOT GANGLION

1<sup>ST</sup> ORDER NEURONS

APSE

VENTRAL SPINO-CEREBELLAR TRACT

SUPERIOR CEREBELLAR PEDUNCLE

INFERIOR CEREBELLAR PEDUNCLE

**NOTES**

**AUTONOMIC NERVOUS SYSTEM**

- Part of peripheral nervous system
- ENS regulates basic visceral processes necessary to homeostasis
- Autonomic nervous system (ANS) affects visceral organs, glands, involuntary muscles
- regulates heart rate, respiratory rate, digestion, urination, salivation, sexual arousal, etc.
- Divided into two systems
  - Sympathetic, parasympathetic
- Unlike somatic nervous system, ANS
  - Neurotransmitters synthesized, stored, released in varicosities (paravertebral or presynaptic nerve terminals in somatic nervous system)
  - Target organ's tissue can be innervated by multiple postganglionic neurons
  - Postsynaptic receptors widely scattered on target organ

**NEURONS**

- Two neuron types in both sympathetic, parasympathetic systems
- Preganglionic, postganglionic

**SYMPATHETIC NERVOUS SYSTEM**

[osmosis.com/sympathetic-nervous-system](https://osmosis.com/sympathetic-nervous-system)

- ANS component, controls visceral functions requiring fast responses (e.g., fight or flight)
- Ganglia close to spinal cord → short preganglionic fibers, long postganglionic fibers

**Preganglionic neurons**

- Located thoracic/lumbar spinal cord's intermediate horn (T1-L2)
- Cholinergic neurons → release ACh

**Postganglionic neurons**

- Located close to spinal cord
  - Paravertebral ganglia (cervical, thoracic, lumbar, sacral, sacral, pelvic ganglia)
  - Prevertebral ganglia (aortic, sacrocervical, superior mesenteric, inferior mesenteric ganglia)
  - Chromaffin cells of adrenal medulla (modified sympathetic ganglia)

**Preganglionic neurons**

- Preganglionic neurons → preganglionic fibers → synapse with autonomic ganglia (postganglionic neurons) → postganglionic fibers → target organ

**Postganglionic neurons**

- General visceral efferent (GVE) neurons
- Located in central nervous system (CNS) (spinal cord)
- Release acetylcholine (ACh)

**Postganglionic neurons**

- GVE, general visceral efferent (GVA) neurons
- Located outside central nervous system
- Release acetylcholine/norepinephrine/neuropeptides

**Autonomic ganglia**

- Contain neuron cell body clusters (postganglionic neurons)
- Synapse points between preganglionic fibers, postganglionic fibers

It is thought that the neurotransmitter \_\_\_\_\_ is increased during a migraine aura which causes vasoconstriction, and then its levels fall just before the migraine headache.

A 68-year-old man comes to the clinic because of tremor at rest, slowed movement, stooped posture, and a shuffling gait. These symptoms have been getting progressively worse over the past 18 months. Which of the following amino acids is the precursor for the neurotransmitter that is deficient in this patient?

Elimination tool

A Glucosamine

B Glutamate

C Glycine

D Tryptophan

E Tyrosine

Skip →

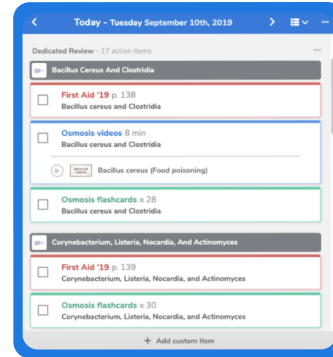
- 1700+ Videos
- 15000+ Flashcards
- 1200+ Clinical Case Questions
- 1200+ High-Yield Notes

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## 3000+ Health Topics:

### Including:

- Anatomy
- Biochemistry
- Biostatistics & Epidemiology
- Cardiology
- Cell Physiology
- Clinical Reasoning
- Dermatology
- Embryology
- Emergency Medicine
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- Gastrointestinal
- General Pharmacology
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- Hematology & Oncology
- How to Learn in the Health Professions
- Immunology
- Metabolism
- Microbiology
- Musculoskeletal
- OB/GYN
- Neurology
- Pathology
- Pediatrics
- Physiology
- Psychiatry
- Renal
- Reproductive
- Respiratory
- Surgery



## Customizable Study Tools

Osmosis helps students know exactly what and when to study for class and board exams.

The Osmosis **Quiz Builder** allows students to create quizzes using both Osmosis flashcards and questions and their own materials.

Osmosis's built-in **Spaced Repetition** feature ensures that students review content exactly when they need to for deeper understanding and long-term memorization.



## Trusted by Institutions Across the Globe

Osmosis is relied on by medical and allied health institutions **around the world**, including physician assistant programs at Wake Forest University, York College, and A.T. Still University. In addition, Osmosis videos have been watched by more than **2.9 million current and future clinicians**, and the Osmosis learning platform is used by over **3.2 + million learners worldwide**

*Osmosis teaches faculty how today's health professional students learn to become tomorrow's health professionals. If you want to remain relevant as an educator — and have fun growing while you do — then I strongly encourage you to engage fully with the teaching and learning power of the Osmosis platform.*

— Dr. Amin Azzam  
Clinical Professor at UC Berkeley, UCSF Joint Medical Program

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