

# Anatomy teamwork

## Lecture 5

# The autonomic nervous system

Color coding

- Very important
- notes

هذا العمل لا يعني عن المصدر الأساسي للمذاكرة

# OBJECTIVES

The background of the slide features a light, semi-transparent anatomical illustration. On the left, a human figure is shown from the back, highlighting the spine and musculature. In the center, another human figure is shown from the front, displaying the abdominal and chest muscles. On the right side, a large, detailed illustration of a human brain is visible, showing its complex structure and folds.

At the end of the lecture, students should be able to:

- *Define the autonomic nervous system.*
- *Describe the structure of autonomic nervous system*
- *Trace the preganglionic & postganglionic neurons in both sympathetic & parasympathetic nervous system.*
- *Enumerate in brief the main effects of sympathetic & parasympathetic system*

# Autonomic Nervous System

Control involuntary structures

- Visceral organs
- Smooth & cardiac muscles
- Glands

Function (along with endocrine system)

- Homeostasis of internal environment

Location

- CNS
- PNS

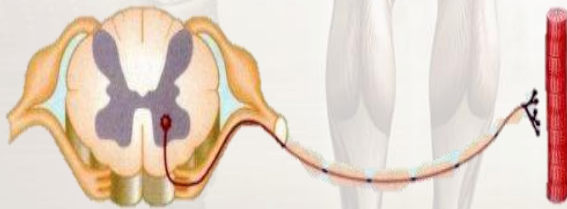
Regulated by

- Hypothalamus

Efferent Pathway "motor ناقل"

Somatic Nervous System

"1 neuron"



Autonomic Nervous System

"2 neurons"

PREganglionic

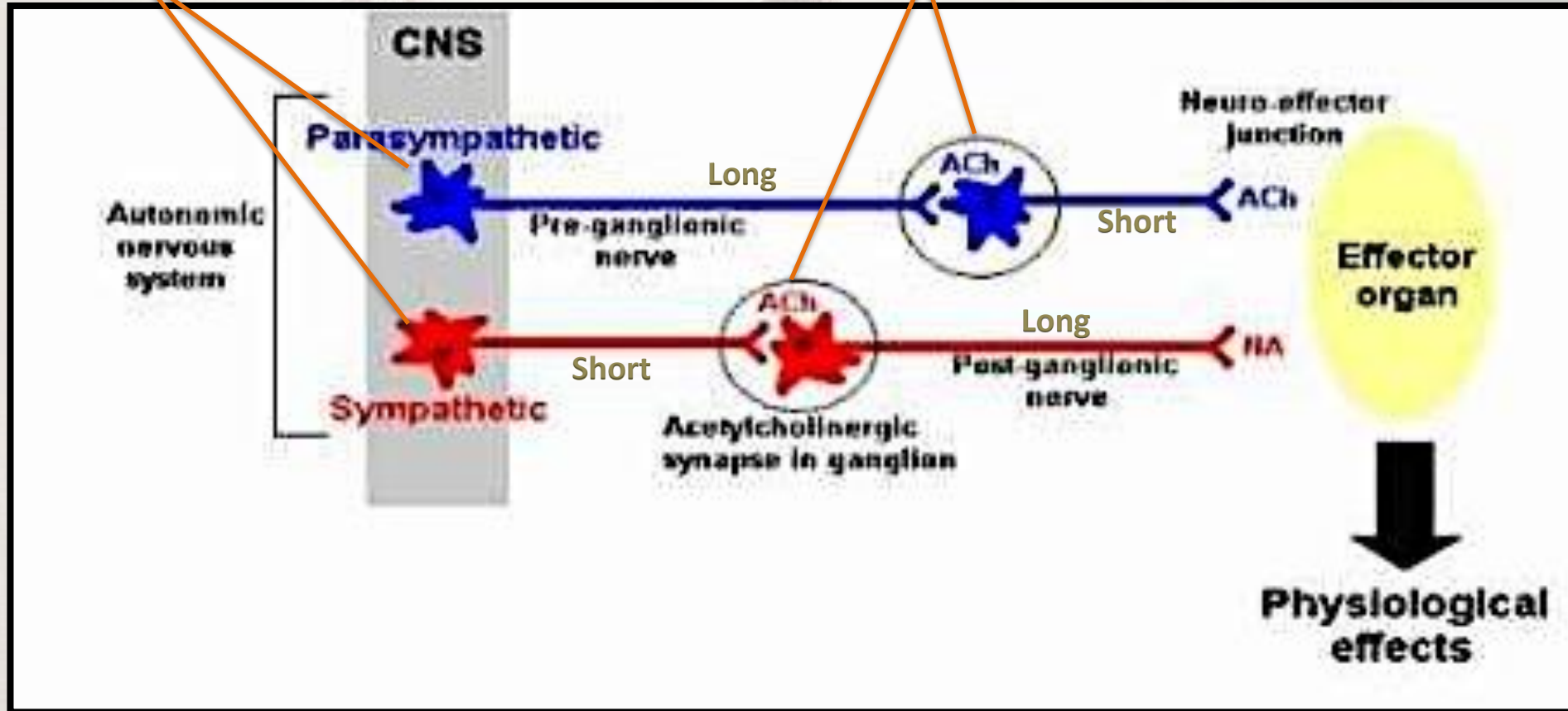
"cell bodies in brain and spinal cord"

POSTganglionic "cell bodies in the autonomic ganglia"



Preganglionic  
neuron

Postganglionic  
neuron



“both work together with antagonistic control over viscera to maintain stable internal environment”

# Sympathetic Division and Ganglia

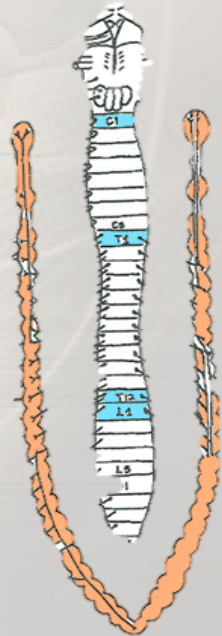
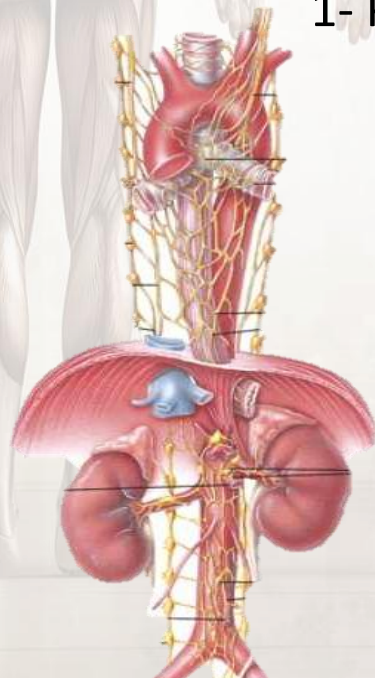
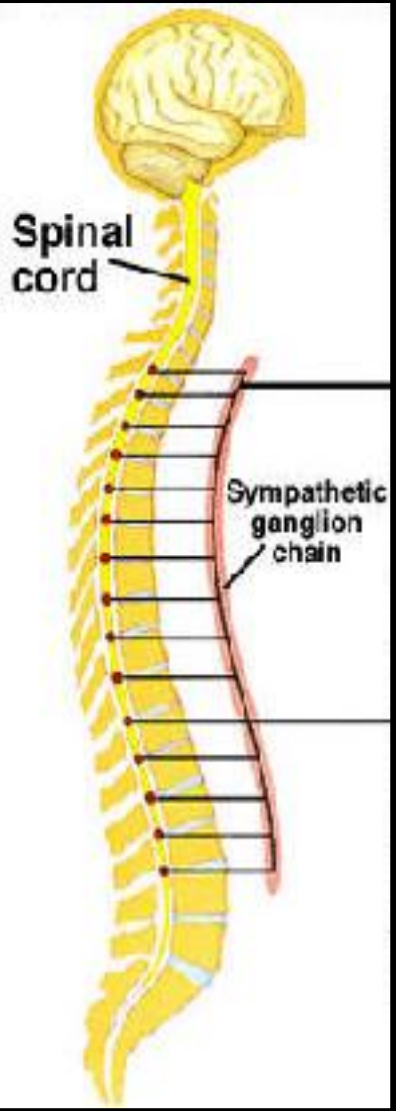
## Preganglionic Neurons:

In lateral gray horn (T1-L2) segments of spinal cord.

**“Thoracolumbar Outflow”**

## Sympathetic Ganglia “Near CNS”:

- 1- Prevertebral (Celiac & Mesenteric)
- 2- Paravertebral (Sympathetic Chain)



# Paravertebral ganglia

3 cervical

11- 12 thoracic

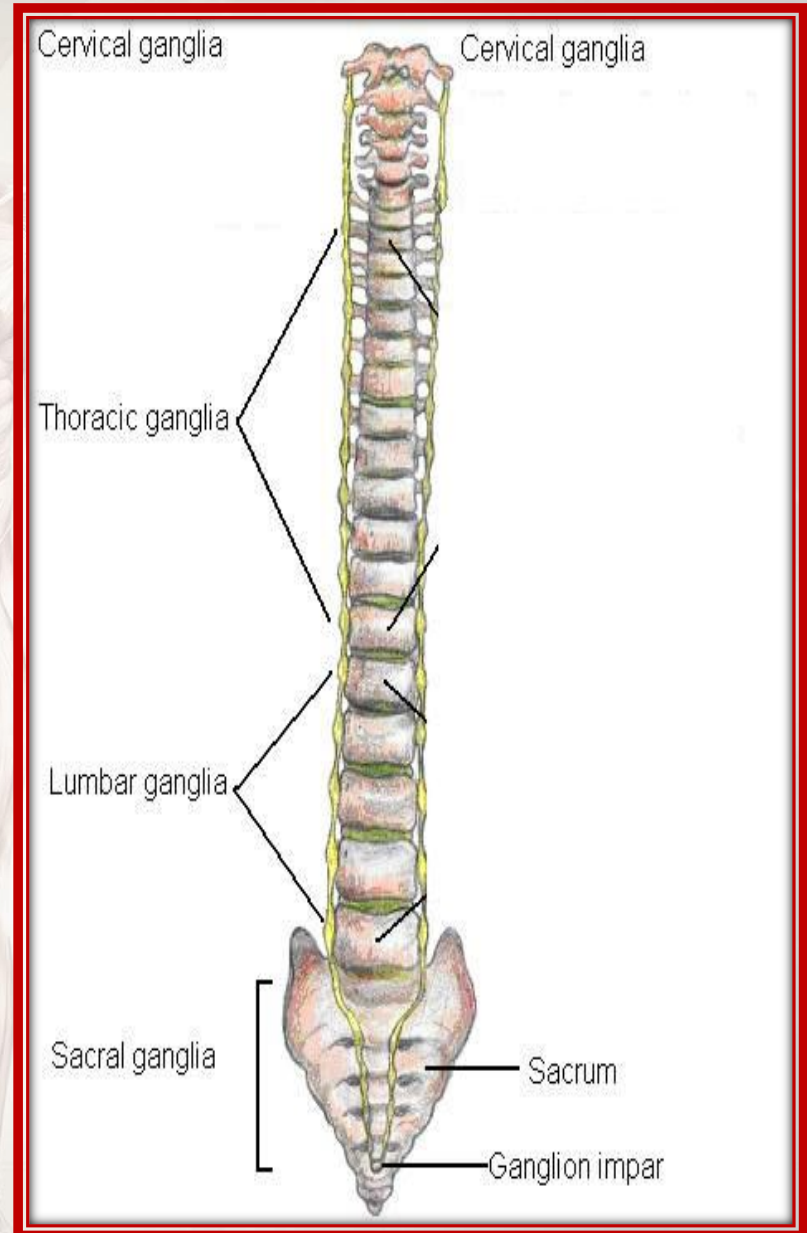
4 lumbar

4 sacral

1 in front of the coccyx

Where the chains end

(**ganglion impar** )



# Sympathetic nervous system

Preganglionic fibers	Postganglionic fibers
Run in the ventral roots of the spinal nerve	From the sympathetic chain ganglia
Travel through the <b>spinal nerve</b> , and then join the sympathetic chain via the <b>white rami communicants</b> . (WRC)	enter again into the spinal nerve through <b>grey rami communicants (GRC)</b>
Ascend, descend or remain	supply <i>structures in head &amp; thorax + blood vessels &amp; sweat glands</i>
Leave the sympathetic chain (without synapse) to reach <b>coeliac &amp; mesenteric ganglia</b> to synapse with their neurons (postganglionic).	<u>From the cells of coeliac &amp; mesenteric ganglia</u> supply <i>abdominal &amp; pelvic viscera</i>

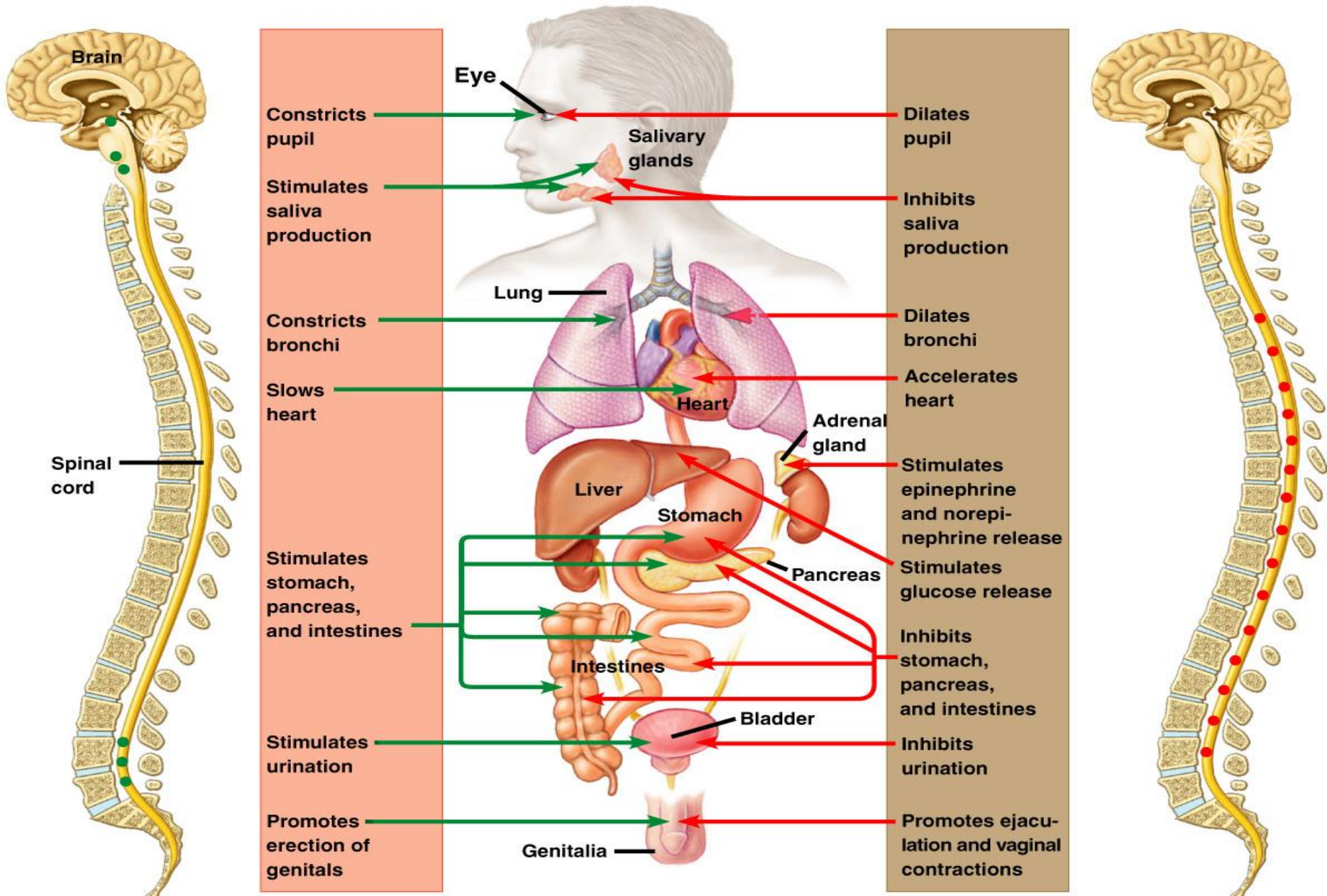
# Parasympathetic nervous system

Preganglionic neurons		Postganglionic fibers
Located in	Terminate in	innervate...
Nuclei of the 3rd, 7th, 9th & 10th cranial nerves (Cranial outflow)	ciliary, pterygopalatine, submandibular, otic & peripheral ganglia	innervate organs of the head, neck, thorax, and abdomen
The lateral gray horn of S2-S4 segments of spinal cord (Sacral outflow)	carried by pelvic splanchnic nerves to peripheral ganglia in pelvis where they synapse.	innervate organs of the pelvis and lower abdomen



Parasympathetic division

Sympathetic division



Constricts pupil

Stimulates saliva production

Constricts bronchi

Slows heart

Stimulates stomach, pancreas, and intestines

Stimulates urination

Promotes erection of genitals

Eye

Salivary glands

Lung

Heart

Adrenal gland

Liver

Stomach

Pancreas

Intestines

Bladder

Genitalia

Dilates pupil

Inhibits saliva production

Dilates bronchi

Accelerates heart

Stimulates epinephrine and norepinephrine release

Stimulates glucose release

Inhibits stomach, pancreas, and intestines

Inhibits urination

Promotes ejaculation and vaginal contractions

Spinal cord

Brain

Sympathetic

Parasympathetic

# عمل الفريق

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نهى الحميضي

مشاعل الحسين

رهام العبيدان

أمل أفراح

إلهام الغامدي

ابتهال ال مشاوي

لمياء الذوادي

محمد الرويتع

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