

AUTONOMIC NERVOUS SYSTEM

Done by:

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Objective Summary: Quick Review

❖ Anatomy of sympathetic & parasympathetic nervous system:

SYMPATHETIC:	PARASYMPATHETIC:
<p>Ganglia Location: 1- Trunk (chain) ganglia near vertebral bodies 2-Prevertebral ganglia near large blood vessel in gut : celiac ,superior mesenteric & inferior mesenteric.</p> <p>Neurons: Short, lightly myelinated preganglionic neurons, Long, unmyelinated postganglionic neurons, Ganglia close to spinal cord.</p> <p>Origin: Thoracolumbar lateral horns of the spinal segments T1-L2. Nerve fibers originate between T1 & L2.</p>	<p>Ganglia Location: 1-Terminal ganglia 2- in the wall of organ</p> <p>Neurons: Postganglionic neurons – short, Preganglionic neurons – long, Ganglia close to or on target organs.</p> <p>Origin: Craniosacral Cell bodies of the motor nuclei of the cranial nerves III, VII, IX and X in the brainstem, Second, third and fourth [S2-S4] sacral segments of the spinal cord, nerve fibers emerge from brain & sacrum craniosacral outflow .</p>

❖ Explain physiological functions of Sympathetic & parasympathetic nerves in head & neck, chest, abdomen and pelvis:

• <u>SYMPATHETIC:</u>	• <u>PARASYMPATHETIC:</u>
<p>Iris (eye muscle): Pupil dilation. Salivary gland: Saliva production reduced. Oral/Nasal Mucosa: Mucus production reduced.</p>	<p>Iris (eye muscle): Pupil constriction. Salivary gland: Saliva production increased. Oral/Nasal Mucosa: Mucus production increased.</p>

<p>Heart: heart rate and force increased. Lung: Bronchial muscle relaxed. Stomach: Peristalsis reduced. Small intestine: motility reduced Large intestine: motility reduced Liver: Increased conversion of glycogen to glucose Kidney: Decreased urine secretion. Adrenal medulla: Norepinephrine, epinephrine secreted. Bladder: Wall relaxed Sphincter closed.</p>	<p>Heart: heart rate and force decreased. Lung: Bronchial muscle contracted. Stomach: Gastric juice secreted; motility increase. Small intestine: motility reduced Large intestine: secretion and motility increased. Liver: - Kidney: Increased urine secretion Adrenal medulla: - Bladder: Wall contracted Sphincter relaxed.</p>
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❖ Describe neurotransmitters that can release at pre and post ganglionic of Autonomic NS:

Acetylcholine: released by both pre, postganglionic neurons of parasympathetic and the preganglionic neuron of sympathetic.

Norepinephrine: Postganglionic neurons of sympathetic Neurotransmitters.

❖ Describe Autonomic NS receptors:

• <u>SYMPATHETIC:</u>	• <u>PARASYMPATHETIC:</u>
<p>Two types of receptors : α and β . Activation of α1 receptors leads to smooth muscle contraction Activation of α2 (β 2 not α 2) receptors leads to smooth muscle relaxation Activation of β 1 receptors leads to smooth muscle contraction (especially in heart).</p>	<p>muscarinic and nicotinic cholinergic receptors. 1-preganglionic nerve releases ACh at the ganglion, which acts on nicotinic receptors of the postganglionic nerve. 2-postganglionic nerve then releases ACh to stimulate the muscarinic receptors of the target organ.</p>

Check your understanding!

1- The two major division of the autonomic system are the sympathetic and parasympathetic. Where do parasympathetic fibres originate?		2- The sympathetic supply is not responsible for:	
A	The thoraco-lumbar spinal region.	A	A- Constriction of the pupil.
B	The cranial and sacral regions.	B	Erection of hair.
C	The lumbar and sacral regions.	C	Secretion of sweat glands.
D	The thoraco-sacral regions.	D	Increased conversion of glycogen to glucose.
3-Parasympathetic postganglionic cholinergic fibers innervate all the following except:		4- All preganglionic autonomic neurons secrete:	
A	Salivary gland.	A	Epinephrine.
B	Lacrimal gland.	B	Acetylcholine.
C	Sweat glands.	C	Nicotine.
D	Trigon of the urinary bladder	D	Norepinephrine.
5- The acetylcholine is secreted by the following neurons except:		6- Which one of these motor neurons have a high myelinated axon?	
A	all preganglionic nerve endings	A	The sympathetic neuron
B	the symp. Postgang. Supply to the blood vessels	B	The somatic motor system
C	the parasym. Postgang. Supply to the heart	C	The parasympathetic neuron
D	the symp. Postgang. Supply to the heart	D	The autonomic nervous system
7- One of the cranial parasympathetic division is:		8-Which of the following ganglia does not contain postganglionic parasympathetic neurons?	
A	IV	A	Celiac
B	II	B	Ciliary
C	IX	C	otic
D	VI	D	Pterygopalatine
9- The effect of parasympathetic system on the heart is reached by:		10- All of them are done by Alpha receptor except:	

A	Increase permeability of Na ⁺	A	glycogenolysis
B	Increase permeability of K ⁺	B	Iris dilation
C	Decrease permeability of Cl ⁻	C	Pilomotor contraction
D	Increase permeability of Ca ⁺⁺	D	vasoconstriction

Answers :

1- B	2- A	3- C	4- B	5- D	6- B	7- C	8- A	9- B	10- A
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