The autonomic nervous system : (A.N.S) المحاضرة الثالثة عشـــر

This system is control the involuntary functions of the body . It is consist of :

1. **Sympathetic division**
2. **Parasympathetic division**

The difference between these two divisions is depend on :

1// Anatomic distribution of the nerve fibers .

2// Types of neurotransmitters that secreted at nerve ending .

3// Stimulatory effect of two divisions on the affected organs are always antagonistic .

1// Anatomically the A.N.S is consist of several neurons as :

afferent neuron , efferent neuron & other neurons that is composed the reflex arc . The A.N.S is characterized by ganglia specially in the sympathetic division .

- **The sympathetic nervous system originates from thoracolumbar region of spinal cord (all thoracic + 1st. , 2nd. & 3rd. lumbar segments) . The medulla of adrenal gland is also sympathetic ganglia .**

- **The parasympathetic division is originate from cranio-sacral regions as :**
  a. **Brain mainly tenth cranial nerve (X or vagus nerve) which is supply fibers to the heart , lung & most organ of the abdomen . Other cranial nerves as : III , VII & IX**

  b. **Sacral regions of the spinal cord 2 , 3 & 4 segments .**

2// The principle transmitters agents are **:**

A// Acetylcholine ((Ach)) , that is secreted at :

a. **All preganglionic neurons of A.N.S ((sympathetic & parasympathetic divisions))**
b. **All postganglionic parasympathetic neurons .**
c. **Some of postganglionic sympathetic neurons that innervate sweat glands , blood vessels of skeletal muscles .**

The neurons that release Ach are called cholinergic neurons .

B// Norepinephrine ((Noradrenalin)) :

Secrete at most postganglionic sympathetic divisions of A.N.S & medulla of adrenal gland . The neurons that secrete these substances are called noradrenergic or adrenergic neurons . These substances act on two types of receptors found in the tissues are :

1. **α-receptors ((α1 & α2))**
2. **β-receptors ((β1 & β2))**

3// Most organ of the body are :

receive innervation from both divisions of A.N.S . The main function of A.N.S is protection of the cellular environment (internal environment) within person . The maintenance of internal environment at relatively constant composition is called *homeostasis* .

When a sever stress is applied , the activity of sympathetic division is increased markedly , such response is referred to *fight or flight responses* . Most of these responses are aimed toward mobilization of energy & shunting of the blood & nutrients to organs having a vital functions in fight or flight situations

The function of parasympathetic division is primarily for acquisition & conservation of energy & maintenance a constant internal environment .