

\* Effectors :- an organ that responds to neurotransmitters that are coming from certain nerves which synapses with the same organ.

\* Ganglion :- collection of neuron cell bodies.

\* Somatic Nervous system has a stimulatory effect only.

\* ANS has stimulatory or inhibitory effects.

\* Adrenal cortex secretes → Aldosterone

\* Adrenal Medulla secretes → Epinephrine (E)

↳ Norepinephrine (NE)

\* (E) and (NE) works as hormones or neurotransmitters

\* Acetylcholine → (ACh)

\* cholinergic fibers are associated with (ACh)

\* Adrenergic fibers are associated with (NE)

\* In surgeries or operations we use drugs that block cholinergic or adrenergic receptors so the patient will not feel anything in the operations.

\* Drugs may stimulate a response  $\rightarrow$  Agonist  
 $\oplus$   $\downarrow$  or action

\* Drugs may prevent a response  $\rightarrow$  Antagonist  
 $\ominus$   $\downarrow$  or action

\* Drugs that  $\oplus$  the response ~~in~~ in the sympathetic nervous system we call it  $\rightarrow$  sympathomimetics

\* Drugs that  $\ominus$  the response in sympathetic nervous system are called  $\rightarrow$  sympatholytics

\* The same goes for the parasympathetic nervous system.

\* So if we want to increase the heart rate we have to give the patient a drug that mimics the action of the sympathetic nervous system. (One of the actions of the sympathetic system is to increase the heart rate.)

\* And if we want to decrease the heart rate we have to give the patient a drug that mimics the action of the parasympathetic nervous system.

\* The drugs ~~that~~ must be similar to the neurotransmitters released from the sympathetic and parasympathetic systems to increase or decrease their actions.

$\downarrow$   
Agonist

$\downarrow$   
Antagonist

Subject: .....

\* Adrenergic receptors → very important

\* alpha receptors ( $\alpha$ ) are very sensitive to (NE)  
↳ they can respond to (E) but much less than (NE)

\* beta receptors ( $\beta$ ) are sensitive to (E)  
↳ they can respond to (NE) but less than (E)

\*  $\alpha$  receptors are found at the smooth muscles of blood vessels. if we activated them the blood vessels will constrict (vasoconstriction).

\*  $\beta_2$  receptors are also found at blood vessels. if we activate them the blood vessels will dilate (vasodilation).

\*  $\beta_1$  receptors are found at the heart and when we activate them the heart rate increases.  
↳  $\oplus$  contraction

\* so if we want to  $\oplus$  the heart rate we will give a drug that will bind to  $\beta_1$  receptors.

\* if we want to  $\ominus$  the blood pressure we will give a drug that will bind to  $\beta_2$  receptors.

\* if we gave an antagonist to  $\beta_2$  receptors what will happen to the smooth muscles of blood vessels? they will contract

\* if we gave a  $\beta_1$  antagonist what will happen to the heart muscles?  $\rightarrow$  relaxation

\* if we want to  $\ominus$  heart rate/contraction what kind of drug should we give?

①  $\beta_1$  Antagonist ✓✓✓

②  $\beta_1$  Agonist

③  $\beta_2$  Antagonist

④  $\alpha_1$  Agonist