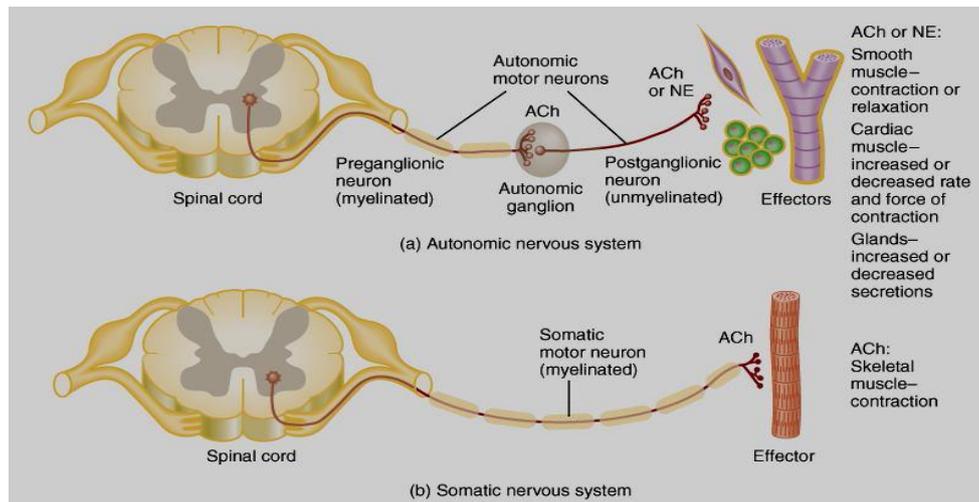


## Differences between somatic & autonomic reflex arc

	Autonomic reflex arc	Somatic reflex arc
<b>1.Receptor</b>	In the viscus or internal organ	In the skin
<b>2.Afferent</b>	Pass via a dorsal root or cranial nerve & has its cell body in the dorsal root ganglia	The same
<b>3.Center</b>	Lateral horn cells (LHCs)	Anterior horn cells
<b>4.Efferent</b>	Composed of 2 neurons: preganglionic & postganglionic in between the 2 autonomic ganglia	Composed of 1 neuron only
<b>5.Effector Organ</b>	Smooth muscle, cardiac muscle or gland	Skeletal muscle
<b>6.Velocity of Conduction</b>	Slow due to thin nerve fiber	Fast due to thick nerve fiber



### Autonomic ganglia act as distribution center:

- Each preganglionic axon diverges to an average of 8-9 postganglionic neurons → diffuse autonomic output.
- In sympathetic system: preganglionic fiber synapse & activate many postganglionic neurons → generalizing sympathetic effects.
- In parasympathetic system: preganglionic fiber synapse & activate only few postganglionic neurons → localized parasympathetic effects.

### \* Function of Sympathetic system at rest:

- The sympathetic system is continuously active.
- The basal rate of activity is called "sympathetic tone".
- The sympathetic tone is mainly to maintain arterial pressure & help in distribution of blood to the various tissues.

## Function of Sympathetic system in emergency

### (Alarm response 'stress response'):

- 1. Eye:** dilatation of the pupil more light into the eye.
- 2. Heart:** increase heart rate & force of contraction & increase blood pressure  
→ better perfusion of the vital organs & muscle.
- 3. Lung:** bronchodilatation to ensure better ventilation & more O<sub>2</sub>.
- 4. Liver:** increase glycogenolysis elevating blood glucose level
- 5. Spleen:** Contraction of Splenic capsule & squeezing of blood rich RBCs into the circulation.
- 6. Adrenal medulla:** secretion of adrenaline & noradrenaline in the blood  
potentiating sympathetic activity.
- 7. Skin:** -Vasoconstriction of blood flow limiting bleeding if wound.  
-Sweat glands: secretion of sweat increasing heat loss from the body.
- 8. Muscle:** Orbelli phenomenon: Better contraction, delayed fatigue & early recovery of skeletal muscle after fatigue.
- 9. Blood vessel:** the blood flow is shifted from peripheral & unimportant organs as skin & splanchnic areas to important areas as CNS & muscle.
- 10. Metabolism:** increase glucose & free fatty acids level supplying more energy.
- 11. CNS:** - increase mental activity.  
-activation or reticular formation: reinforcing the alert & arousal state.

### -Types of cholinesterase:

#### \*True cholinesterase:

-Present in the cell membranes of cholinergic nerve terminals.

#### \*Pseudocholinesterase:

-present in the fluid surrounding the cholinergic nerve terminals as small amount of ACh diffuse to the surrounding fluids.

#### -Value of cholinesterase:

-It's value is to keep action of ACh localized in the site of liberation, otherwise it may diffuse to the blood giving generalized effect

### 6. Role of adrenal medulla in function of sympathetic system:

-The organs are actually stimulated by 2 ways at the same time:

**\*Directly** by sympathetic nerves.

**\*Indirectly** by medullary hormones adrenaline & noradrenaline.

-Total loss of 2 adrenal medulla has a little effect on the sympathetic actions because the direct pathway can still perform all necessary functions.