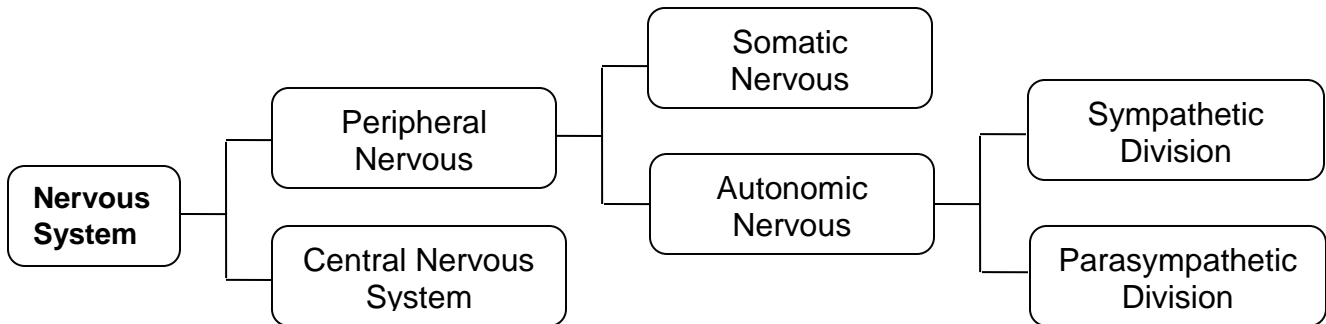




## Sympathetic vs. Parasympathetic Systems



### Differences in the autonomic nervous system:

	<b>Sympathetic Nervous System</b>	<b>Parasympathetic Nervous System</b>
<b>CNS Region</b>	Thoracolumbar	Craniosacral
<b>Location of peripheral ganglion</b>	Close to spinal cord	Close to target organ
<b>Preganglionic fibers</b>	Short	Long
<b>Postganglionic fibers</b>	Long	Short
<b>Ganglionic synapse response</b>	ACh on nicotinic receptor	ACh on nicotinic receptor
<b>Neuron-target synapse response</b>	NE on $\alpha$ - or $\beta$ -adrenergic receptor	ACh on muscarinic receptor
<b>Neural divergence</b>	Extensive	Minimal
<b>Inactivation of neurotransmitter at synapse</b>	Uptake into varicosity, diffusion	Enzymatic, diffusion
<b>Systemic effect</b>	Alarm: "fight or flight"	Homeostasis: "rest and digest"

**Responses of major organs to autonomic nerve impulses:**

<b>Organ</b>	<b>Sympathetic Stimulation (Alarm; Fight or Flight)</b>	<b>Parasympathetic Stimulation (Homeostasis; Rest &amp; Digest)</b>
Heart	<ul style="list-style-type: none"> <li>- Dilation of coronary arteries</li> <li>- Increased heart rate</li> <li>- Increased force of contraction</li> <li>- Increased rate of pacemaker conduction</li> </ul>	<ul style="list-style-type: none"> <li>- Constriction of coronary arteries</li> <li>- Slows heart rate</li> <li>- reduces contraction and conduction</li> </ul>
Arteries	Constrict	Dilate
Lungs	Dilate tracheal and bronchial passageways	<ul style="list-style-type: none"> <li>- Constrict tracheal and bronchial passageways</li> <li>- Increased bronchial gland secretions</li> </ul>
Liver	<ul style="list-style-type: none"> <li>- Increased glycogen breakdown</li> <li>- Glucose synthesis and release</li> </ul>	<ul style="list-style-type: none"> <li>- Increased glycogen storage</li> <li>- Glycogen synthesis</li> </ul>
Gall Bladder	Relaxation	Contraction
G.I. Tract	<ul style="list-style-type: none"> <li>- Vasoconstriction</li> <li>- Inhibition of peristalsis and secretion</li> <li>- Constrict sphincters</li> </ul>	<ul style="list-style-type: none"> <li>- Peristalsis</li> <li>- Secretion</li> <li>- Dilate sphincters</li> </ul>
Kidney	Constriction, leading to decreased urine production	Dilate
Bladder	Decreased need to urinate	Increased need to urinate
Eye	<ul style="list-style-type: none"> <li>- Dilation of the pupils</li> <li>- Allows far vision</li> </ul>	<ul style="list-style-type: none"> <li>- Constriction of the pupils</li> <li>- Stimulates tear secretion</li> <li>- Allows for near vision</li> </ul>
Salivary Glands	Viscous salivary secretions containing enzymes	Lots of watery salivary secretions
Sweat Glands	Increased sweat excretion	None
Pancreas	Decreased insulin secretion	Increased insulin secretion
Adipose Tissue	<ul style="list-style-type: none"> <li>- Lipolysis</li> <li>- Fatty acid release</li> </ul>	
Skeletal Muscles	<ul style="list-style-type: none"> <li>- Increased force of contraction</li> <li>- Glycogen breakdown</li> <li>- Facilitation of ACh release at the neuromuscular junction</li> </ul>	None