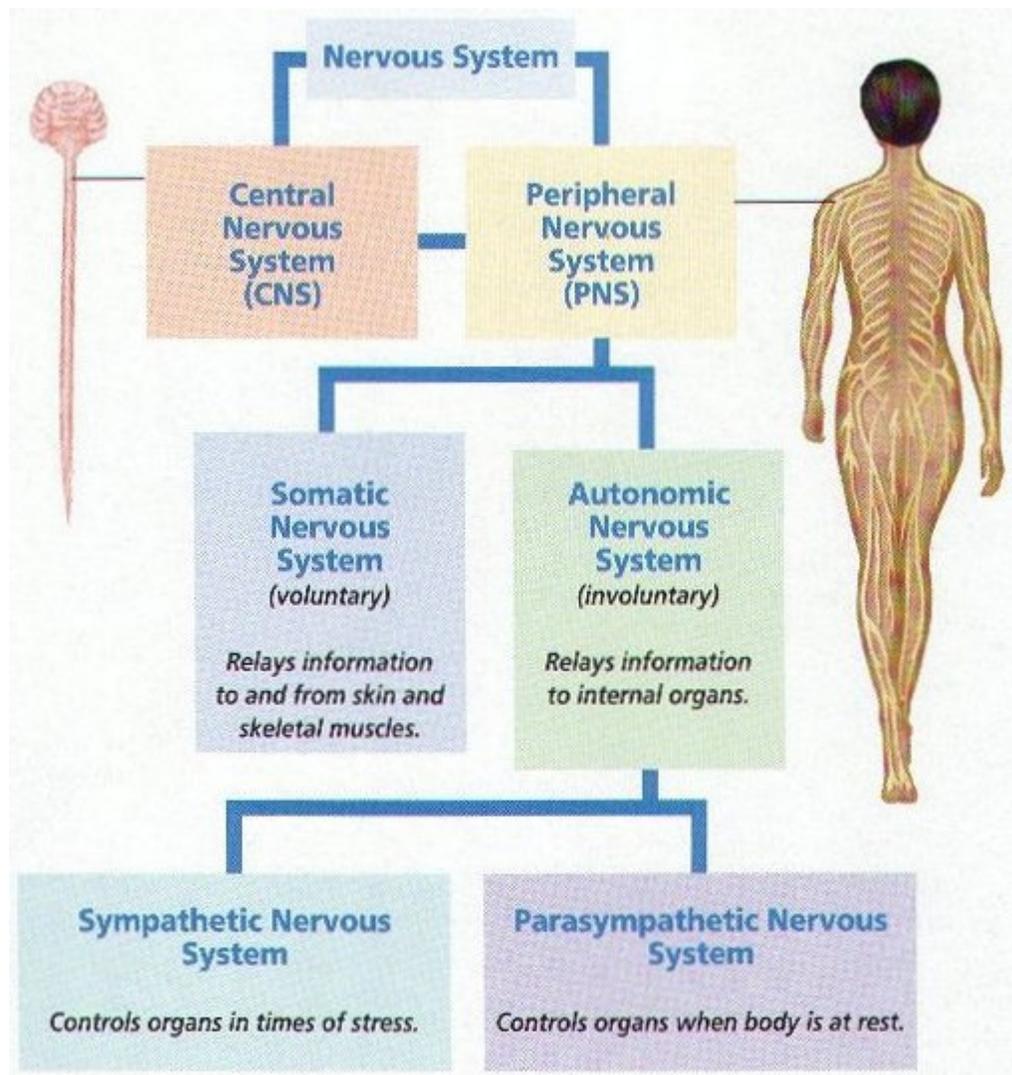


The Central Nervous System



THE CENTRAL NERVOUS SYSTEM
THE DIRECT LINK; THE NERVOUS AND SPINAL SYSTEMS

Autonomy; Self-sufficient works alone, independent, needing no one and nothing in order to function. The autonomic division of the nervous system is primarily concerned with the regulation of the beating heart; the secretion of the glands and the movement of food thru the digestive system imply that the nervous system has autonomy. And in some respects, part of it does function independently.

The division of the nervous system is

Visceral: meaning intuitive, or gut feelings, working as instinctive reactions to stimuli.

Somatic: problem solving, thinking out actions instead of reacting.

Reaction to these responses are reasons that may include influences that are both internal and external, requiring actions and changes to reactions while creating activity that may include both intuitive and problem solving processes working together.

Getting Organized

Visceral fibers.

Reflexes are initiated by nerve impulses, originating in the visceral fibers, and then transmitted to the spinal cord and the brain stem.

Concerning themselves with reflex of the heart, blood vessels, respiration, elimination, and also allow us to feel hungry nausea and pain.

Somatic fibers

Pathway, leading to the skeletal muscle

Both of these fibers are then extended to the group of ganglions [outgrowths] in the autonomic group.

Three regions are affected by these fibers.

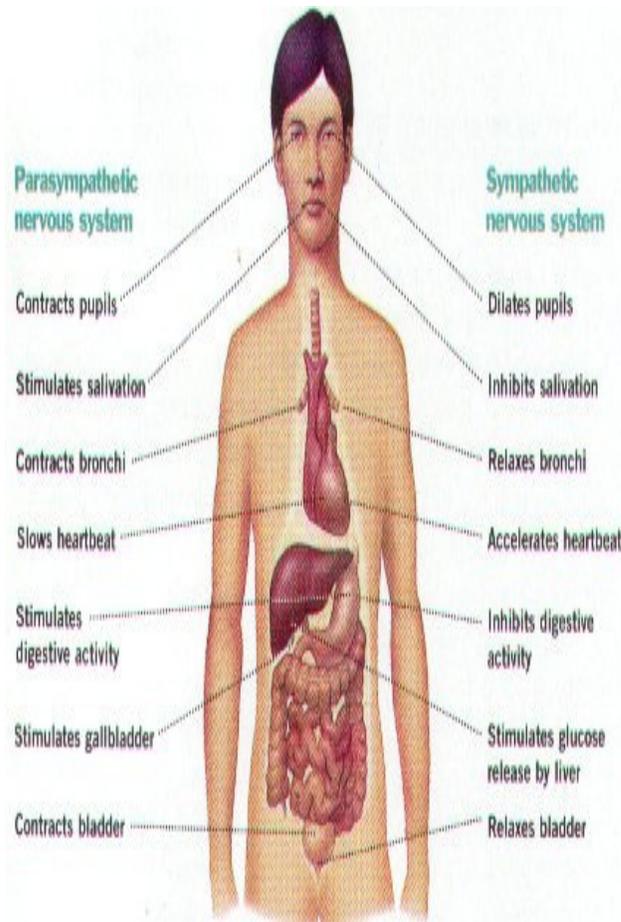
- | | |
|----------|---------------------|
| Region 1 | cranial |
| Region 2 | thoracic and lumbar |
| Region 3 | sacral. |

Autonomic ganglia: What are they?

Beadlike structures united by nervous tissue, and divided into three groups **lateral, vertebral, and terminal ganglia**. These structures form two separate chains, flowing down the neck, the thorax and the abdomen and into the coccyx.

Collateral { or Pre- vertebra; ganglia }

Ganglia also have the uncanny ability to lie on either side of the artery that rises from the abdominal aorta, thus forming the **superior and the inferior ganglia**. They follow the arteries as they extend down to the abdomen and pelvis.



Dividing the autonomic system: Sympathetic, and Parasympathetic

Divided into two paths,

1. Thoracolumbar [thora-columbar] or **sympathetic** visceral fibers. Connecting lateral, or collateral ganglia, thereby making possible the flow of impulses.
2. Craniosacral-**parasympathetic** and allowing no flow of impulses.

Autonomic Plexus:

Complicated fibers found in the thoracic, abdominal, and pelvic cavities acting as **redistribution centers for the sympathetic and parasympathetic fibers**.

The most important plexus:

Cardiac plexus located at the base of the heart, where both sympathetic and parasympathetic fibers

route to the heart and lungs, and chest.

Celiac plexus: located in the stomach and the ability to flow impulses through the abdomen.

Hypogastric plexus located in front of the 5th vertebra, and receiving fibers directed to the pelvic area.

Functions of the Para-sympathetic and the Sympathetic portion of the nervous system:

Sympathetic functions are able to stimulate the heart, while **Parasympathetic** slows the heart down. Sympathetic fibers only supply sweat glands and some smooth muscles in the blood vessels,

Sympathetic division: Known as the Emergency Response System. Or flight or fight response to stimuli.

Stimulated by the changes in the external environment, these influences respond to stimuli such as fear, anger, pain, shock and asphyxia.

Parasympathetic function: conserve and restore.

1. **Motor** causing **contractions** of the **sphincter muscle**.
Ex. Pupil of the eye getting smaller, [shielding them from excessive light] or moving air in, and out of the lungs {smooth muscle] and the urinary bladder causing it to activate.
2. **Inhibitory** function: relaxing smooth muscle of the heart, allowing it to rest.
3. **Secretory** function: impulses directed to the stomach and pancreas producing secretions that reach the salivary glands, giving the stomach the ability to digest foods, and waste products to be excreted.

Functions are illustrated by

1. **Motor**: by **contractions** of the **radial muscle**, or dilation of the pupil of the eye. The sympathetic division also can force the heart to beat faster, or constrict blood vessels.

2. **Inhibitory** relaxing the smooth muscle, affecting the blood vessels of the skeletal, and cardiac muscle producing **dilation** of these vessels. Ex. The wall of the urinary bladder, and the walls of the bronchioles expand making it easier for air to flow through the lungs.

3. **Secretory**: increases the activity of sweat glands, promoting secretion of epinephrine by the adrenal glands.

4. **Glycogenolytic** function: a source of energy effected when the impulse reaches the liver, this happens because glycogen has been broken down into glucose and is released into the blood stream. Fears become realized, and your heart beats faster, blood pressure increases, breathing becomes rapid.

Coordination

We have learned that visceral structures can have a certain amount of independence. However the body needs to be fully aware of the responses it receives in order for it to function as a whole.

Therefore, we need a master switchboard for all the information coming in, and a system to sort and group the information.

The thalamus provides the area for sorting and grouping.

The cerebral cortex is that master switchboard.

The hypothalamus assumes the responsibility for coordination of these activities.