Autonomic Nervous System

The autonomic nervous system (ANS) is part of the peripheral nervous system that is under involuntary control. The ANS is a two neuron system, with a preganglionic neuron and postganglionic neuron. It contains the sympathetic nervous system and the parasympathetic nervous system. The sympathetic nervous system controls the fight-or-flight response, which is a physiological response to an apparent threat. Blood flow increases to the heart and skeletal muscle, while blood flow decreases to the GI tract and kidneys. Additionally, breathing and heart rates increase to meet oxygen demands of physical stress, and pupils dilate to maintain clear vision. All preganglionic neurons in the ANS use acetylcholine, but sympathetic postganglionic neurons release norepinephrine. The sympathetic nervous system has antagonistic effects to the parasympathetic nervous system.The parasympathetic nervous system is responsible for the rest-and-digest response. Instead of responding to a threat, the body's physiology responds to the need to eat and relax. Thus, blood flow to digestive and excretory organs increases, while blood flow to the heart and skeletal muscle decreases. Ventilation and heart rates decreases. Innervation occurs primarily via the vagus nerve. In the parasympathetic system, postganglionic neurons release acetylcholine rather than norepinephrine.

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Characteristics

Sympathetic Nervous System
Symba-lion
The sympathetic nervous system is constantly active to maintain homeostasis in the body, but has a very specific response mechanism against perceived threats.

Fight or Flight
Fighter Plane
The fight or flight response to perceived threats enables humans to either fight off the threat or run away quickly. Blood flow increases to the heart and skeletal muscle, while blood flow decreases to the GI tract and kidneys. Additionally, breathing and heart rates increase to meet oxygen demands of physical stress, and pupils dilate to maintain clear vision.

All Preganglionic Neurons Release Acetylcholine
Priest-gangster-lion shooting Seagull-cola
In the autonomic nervous system, all preganglionic neurons use acetylcholine as a neurotransmitter.

Sympathetic Postganglionic Neurons Release Norepinephrine
Post-gangster-lions dropping North-epi-pens
Sympathetic postganglionic neurons release norepinephrine as a neurotransmitter to excite or inhibit other cells.

Antagonistic Effects of Sympathetic and Parasympathetic Nervous Systems
Ant-toga attached to Symba-lion and Parachute-Symba-lion
The sympathetic and parasympathetic nervous systems have antagonistic effects to each other, so only one can be active at the same time.

Parasympathetic Nervous System
Parachute-Symba
The parasympathetic nervous system involves stimulating excretory and digestive organs and has antagonistic effects to the sympathetic nervous system. Innervation occurs primarily via the vagus nerve.

Rest and Digest
Gang-lion Eating and Resting
The rest and digest response of the parasympathetic nervous system stimulates organs that help the body eat and relax. Blood flow to digestive and excretory organs increases, while blood flow to the heart and skeletal muscle decreases. Ventilation and heart rates decreases.

Parasympathetic Postganglionic Neurons Release Acetylcholine
Parachute-Symba with Post-gang-lion Neurons Releasing A-seagull-cola
The parasympathetic postganglionic neurons use acetylcholine as a neurotransmitter rather than norepinephrine. Thus, in the parasympathetic system, the primary neurotransmitter used for all neurons is acetylcholine.