

THE AUTONOMIC NERVOUS SYSTEM

Of the 12 cranial and 31 spinal nerves, four cranial nerves (which emerge from the gray area of brain at upper right) and about half the spinal nerves (colored and gray segments emerging from the cord) contribute neurons to the autonomic nervous system, which innervates internal organs.

The ANS is customarily divided into two parts: the sympathetic and the parasympathetic systems. The pathways of both usually have two motor (efferent) neurons; a first (presynaptic) neuron exits from the CNS and synapses with a second (postsynaptic) neuron that innervates the target organ.

The presynaptic neurons of the sympathetic system exit from the thoracic and upper lumbar regions of the spinal cord, and synapse with the postsynaptic neurons in a series of small ganglia (circles) lying near the cord or in larger ganglia in the abdominal cavity; the postsynaptic neurons then run from the ganglia to the target organs. The presynaptic neurons of the parasympathetic system exit from the medulla of the brain and from the sacral region of the spinal cord. These are very long neurons that run all the way to the target organ, where they synapse with short postsynaptic neurons. Most internal organs are innervated by both the sympathetic and the parasympathetic system.

