

The Ferret Nervous System

Learn all about what the ferret nervous system is and what it does.

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A ferret's senses collect information and send it along the nervous system to the brain.

Socks would escape investigation and car keys would remain unstashed if ferrets couldn't see them and make decisions about how to investigate, stash and store them. These tasks require sensing, thinking (using the information gathered by the sensors) and coordinating movements to act — and all of those use the nervous system to transmit and process the necessary signals.

The nervous system is one of the most complicated structures on this earth. Trying to comprehend how it's put together and how it works can be overwhelming. For a ferret owner, it might seem like magic, and understanding why things happen or how things can go wrong can be very difficult.

Building The Ferret Nervous System

The structure of a ferret's nervous system is very similar to a human's. At its most basic level, it is comprised of individual nerve cells called neurons. A tremendously large number (billions!) of them exist, as well as an even greater number of other cells whose job it is to support, to nourish and to facilitate the action of the neuron.

Each neuron has a main cell body. This is where most of the cellular machinery is kept, including the nucleus with its DNA, the blueprints for everything the cell makes and does; and ribosomes, the factories that produce most of the various complex molecules necessary for cell life functions. Extending out from the cell body is a long, thin projection called an axon. This is the wire that conducts the electric signal from one cell to the next. A set of specialized projections called dendrites are found at each end of the neuron. These act as the connection points between neurons and between a neuron and a muscle or gland cell. The connection point is called a synapse.

To begin to appreciate just how complex the system is, consider that each neuron can have a great number of dendrite projections on its surface. This means that a single nerve could be connected to thousands of inputs, with each synapse acting like a small switch that affects the next nerve in the circuit. Combine this with the billions of cells in the brain alone, and the resulting number of possible connections is staggering.

Communication And The Ferret Nervous System

Neurons are arranged in ways to allow the transmission or processing of information. Signals are sent from a ferret's body sensors to processing centers where the information is analyzed. From there, new signals are sent out to other centers for additional processing or directly out to muscles or glands. The processing centers are localized areas of interconnections called ganglia, or the biggest interconnection area of them all, the brain.

Signals from sensors in the body and head (eyes, ears, taste buds, skin) travel to the brain via bundles of neurons called nerves. In the head, these nerves are specific for each sensor — the optic nerve for the eyes, the auditory nerve for the ears. Signals from the other parts of the body travel through long axons (nerve fibers) up to the spinal cord, where they connect with other neuron axons coming down from the brain. Similarly, signals from the brain travel out to the muscles and organs via other nerve fibers. Phew, no wonder we all make those jokes about brain surgery!

Some nerves attach to glands and directly stimulate secretion of things like tears and saliva. The nervous system also uses a system where nerves go to special glands. Stimulation causes them to secrete chemicals into the bloodstream. These chemicals, called hormones, then act as chemical messages to cause actions at cells in other parts of the body.

Located within the brain is the pituitary gland. It is a "master gland." When the pituitary is stimulated from the higher centers in the brain, it releases chemical hormones that travel through the blood to glands in other parts of the body. These signaling hormones cause the various glands, such as the gonads (ovaries and testes), to produce and secrete hormones like estrogen or testosterone, which are necessary for mating and reproduction. Thus, the brain, through the pituitary gland, controls when ferrets come into heat. It is thought that loss of this close regulation is one of the causes of excess adrenal gland stimulation in ferrets, which leads to adrenal gland disease.



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