

## The Ferret Endocrine System

**The glands and hormones of a ferret's endocrine system play a major role in health and behavior.**

*By Jerry Murray, DVM*

Posted: July 1, 2009, 5 a.m. EDT

© Isabelle Francaise/BowTie Inc.

Two of the most common diseases in ferrets, adrenal gland disease and insulinoma, result from problems in the endocrine system.

The endocrine system is made up of several different glands that make, store and secrete hormones into the bloodstream. These hormones maintain normal body functions, which is called homeostasis. The endocrine glands include the pituitary gland, the pineal gland, the adrenal glands, the pancreas, the thyroid gland and the parathyroid glands. Two of the most common diseases of pet ferrets involve the endocrine system; therefore, understanding the endocrine system is important for ferret owners and for veterinarians.

### The Pituitary Gland

The pituitary gland is located on the undersurface of the brain and is often called the master gland because its eight major hormones control many other endocrine glands and the reproductive organs.

The pituitary gland produces: Adrenocorticotropic hormone (ACTH), which stimulates the adrenal glands to secrete cortisone; Thyroid stimulating hormone, which stimulates the thyroid gland to secrete the thyroid hormones T4 and T3; Luteinizing hormone (LH), which stimulates the ovaries, testes and adrenal glands to secrete the sex hormones; Follicle stimulating hormone (FSH), which controls the reproductive function of the ovaries and testes; Growth hormone, which promotes growth of most cells and tissues in the body; Prolactin, which stimulates the mammary glands to produce milk; Oxytocin, which contracts the uterus during the birthing process and causes milk let down after the kits are born; Antidiuretic hormone, which causes the kidneys to retain water.

### The Pineal Gland

The pineal gland is located near the center of the brain. The pineal gland secretes melatonin at night when it is dark. In seasonal breeders like ferrets, melatonin also controls the breeding season.

Melatonin directly and indirectly starts the breeding season in the early spring and terminates the breeding season in the early fall; causes seasonal weight gain in the fall and winter, and seasonal weight loss in the spring and summer; and produces the thicker hair coat in the fall and winter and the thinner hair coat in the spring and summer. Melatonin also indirectly decreases the secretion of LH from the pituitary gland.

### The Adrenal Glands

The adrenal glands are located in the abdomen just above the kidneys. They are composed of two very different sections: the inner medulla and the outer cortex.

The inner medulla secretes epinephrine (adrenaline) and norepinephrine (noradrenaline) for the "fight or flight" response.

The outer cortex is further divided into three zones. The outer zone produces aldosterone, which increases sodium in the body and increases potassium excretion in the urine. The middle zone produces cortisone, and the inner zone produces the sex hormones and adrenal androgens.

### The Pancreas

The pancreas is located in the abdomen by the stomach and the first part of the small intestines. The endocrine part of the pancreas makes two hormones: insulin and glucagon.

Insulin is secreted to lower the blood sugar level, and glucagon is secreted to raise the blood sugar level. The nonendocrine part of the pancreas makes digestive enzymes.

### The Thyroid Gland

The thyroid gland is located in the neck and secretes the thyroid hormones T4 and T3. These hormones increase the

metabolic rate in almost all cells in the body. This regulates body temperature and weight.

#### The Parathyroid Glands

The parathyroid glands are closely associated with the thyroid gland. There are usually four parathyroid glands just above the thyroid gland, but sometimes one of the parathyroid glands is not visible. The parathyroid glands produce parathyroid hormone, which regulates calcium levels in the body.

| 1 | 2 | Next»