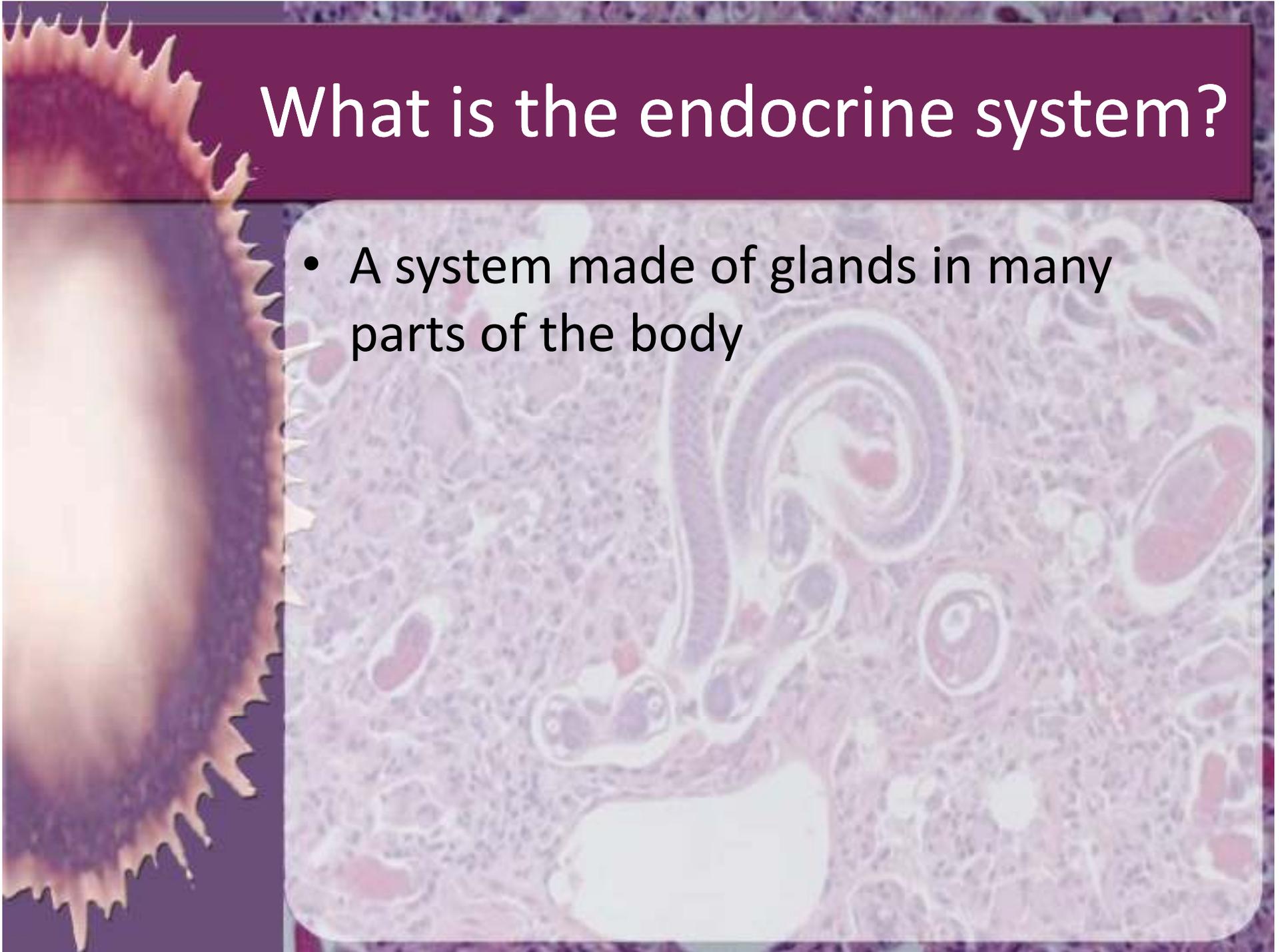


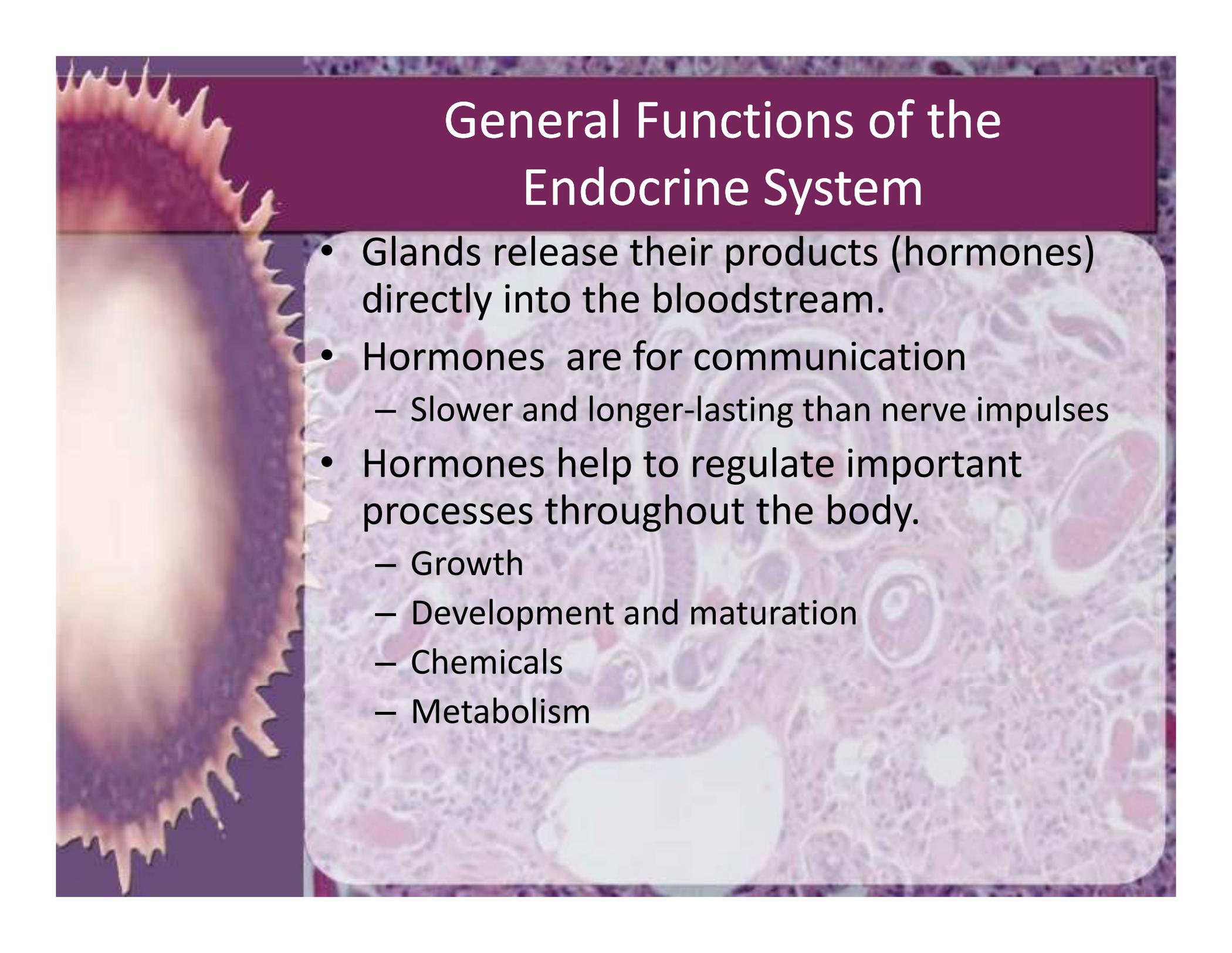
Introduction to Health Science

The Endocrine System

What is the endocrine system?

- A system made of glands in many parts of the body

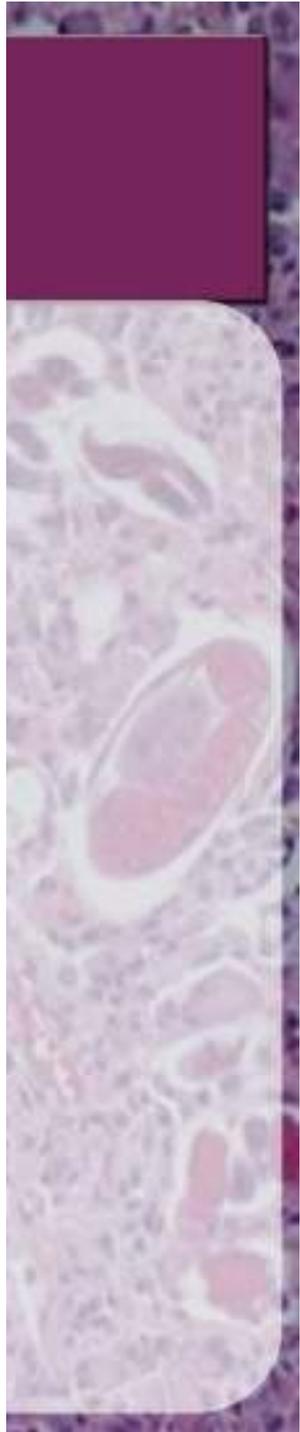
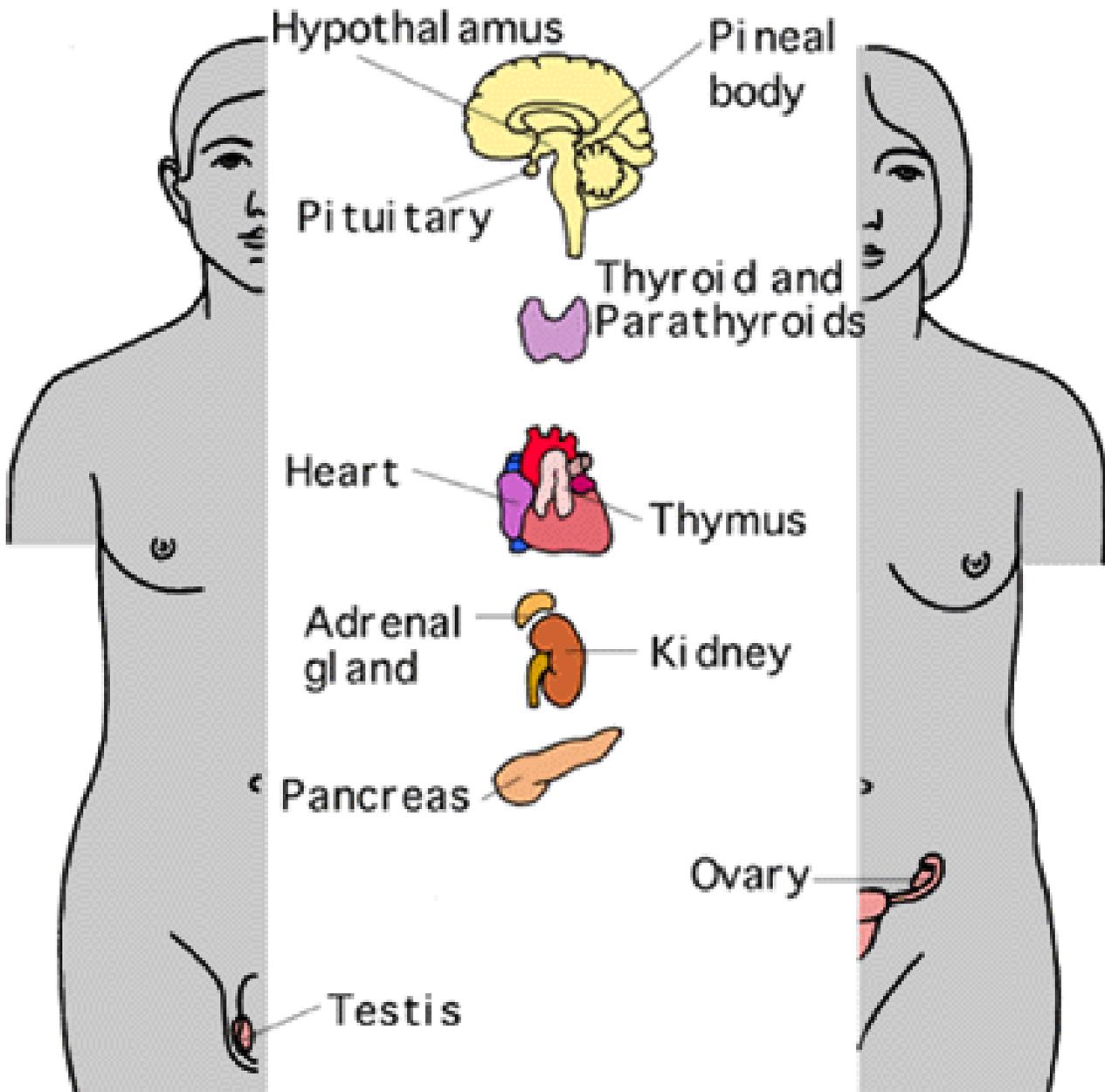


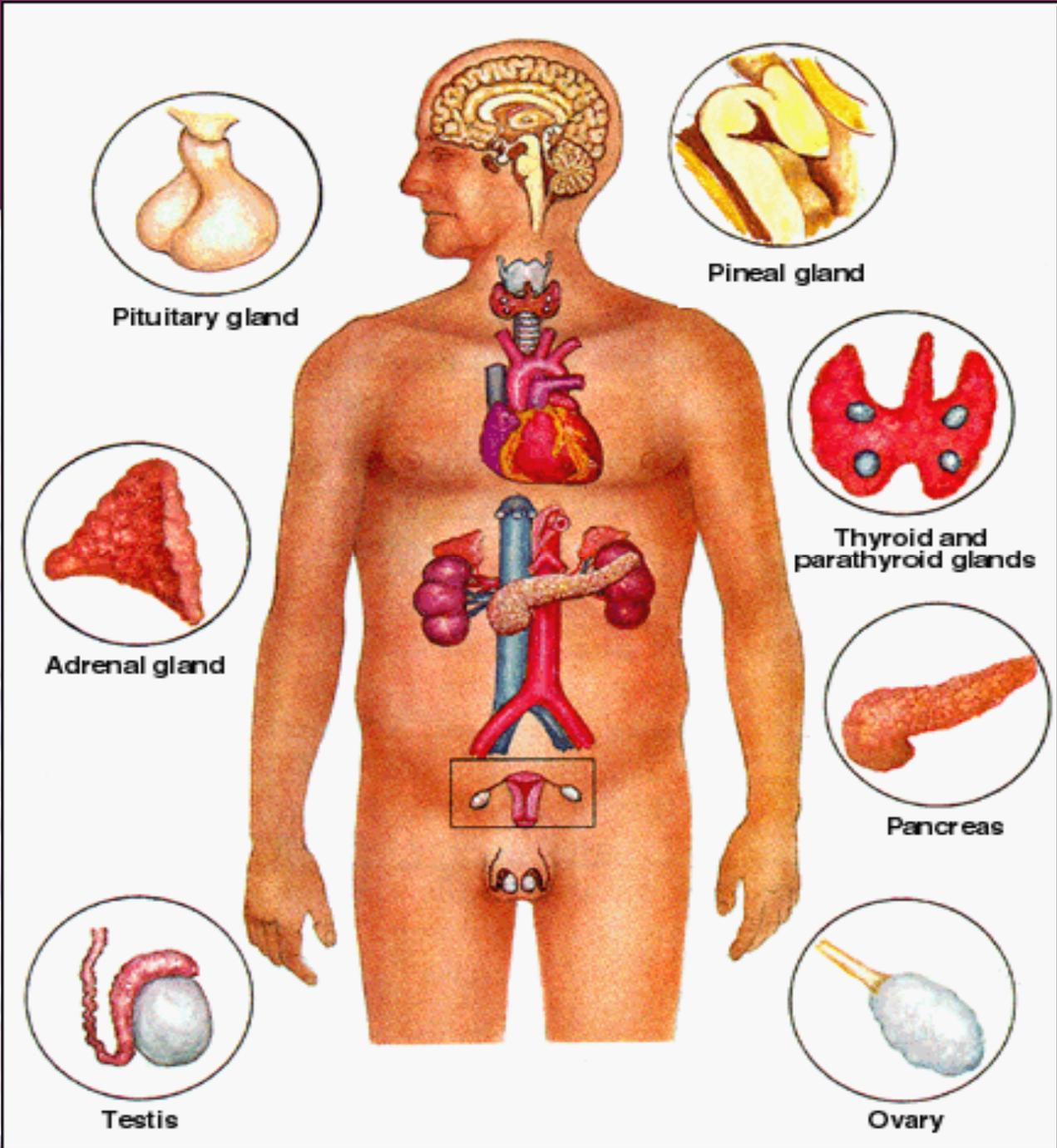
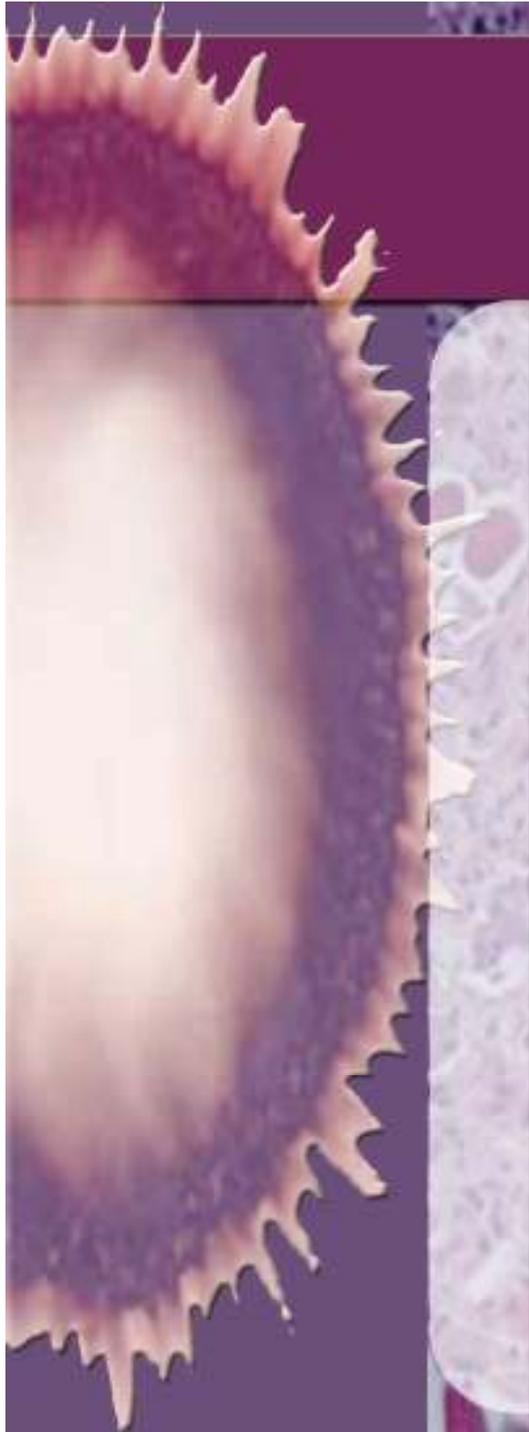


General Functions of the Endocrine System

- Glands release their products (hormones) directly into the bloodstream.
- Hormones are for communication
 - Slower and longer-lasting than nerve impulses
- Hormones help to regulate important processes throughout the body.
 - Growth
 - Development and maturation
 - Chemicals
 - Metabolism

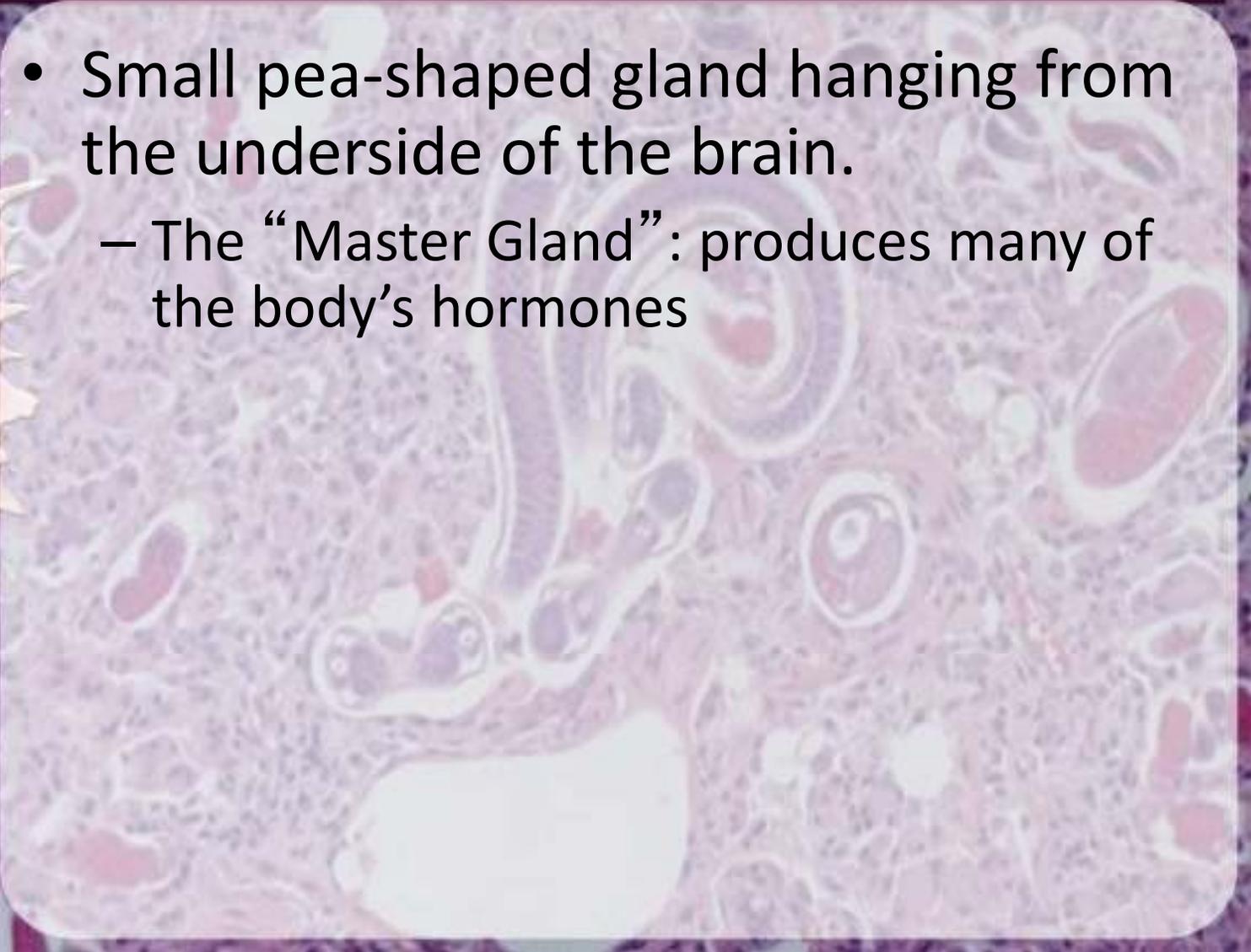
Endocrine System

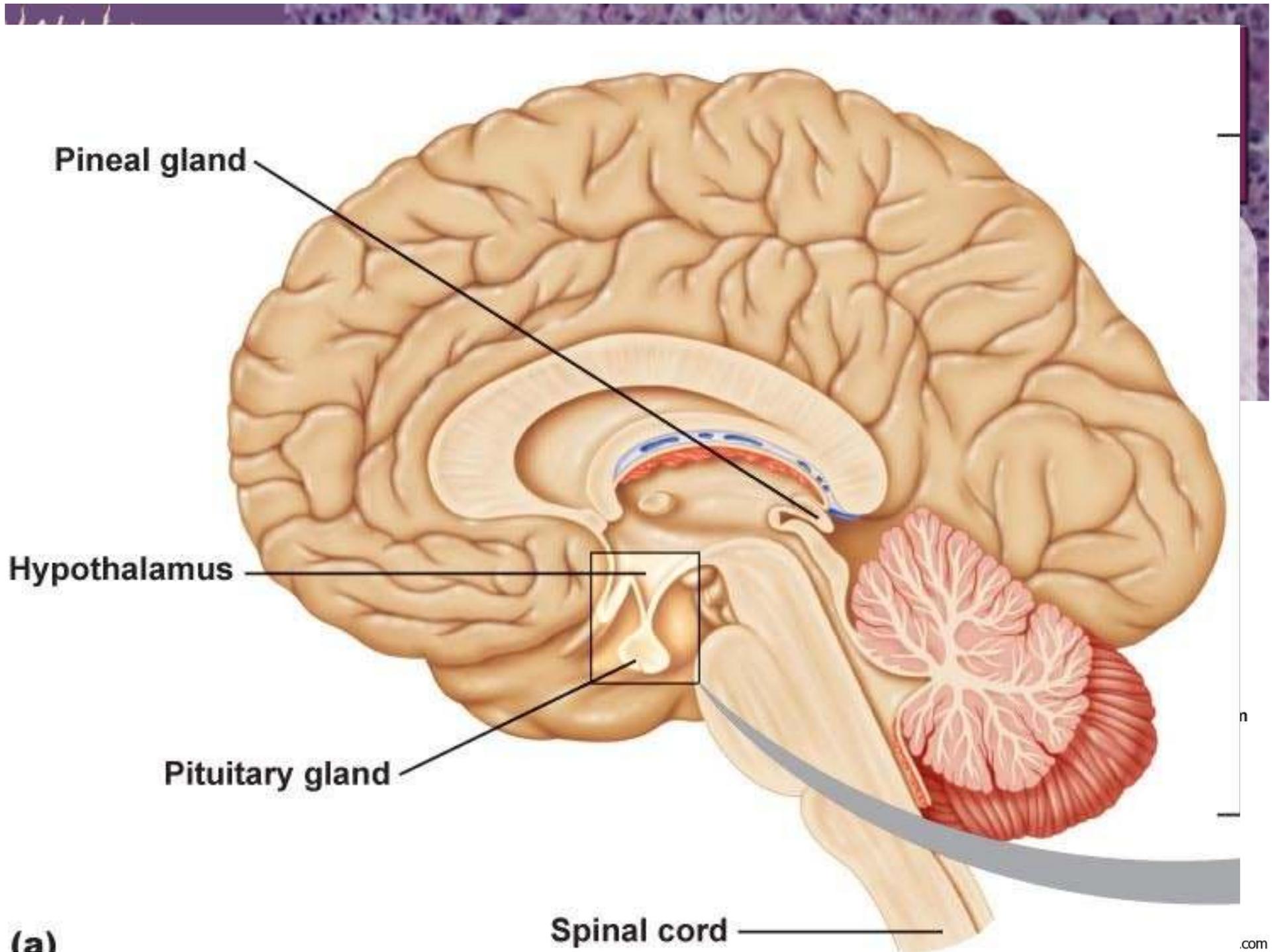


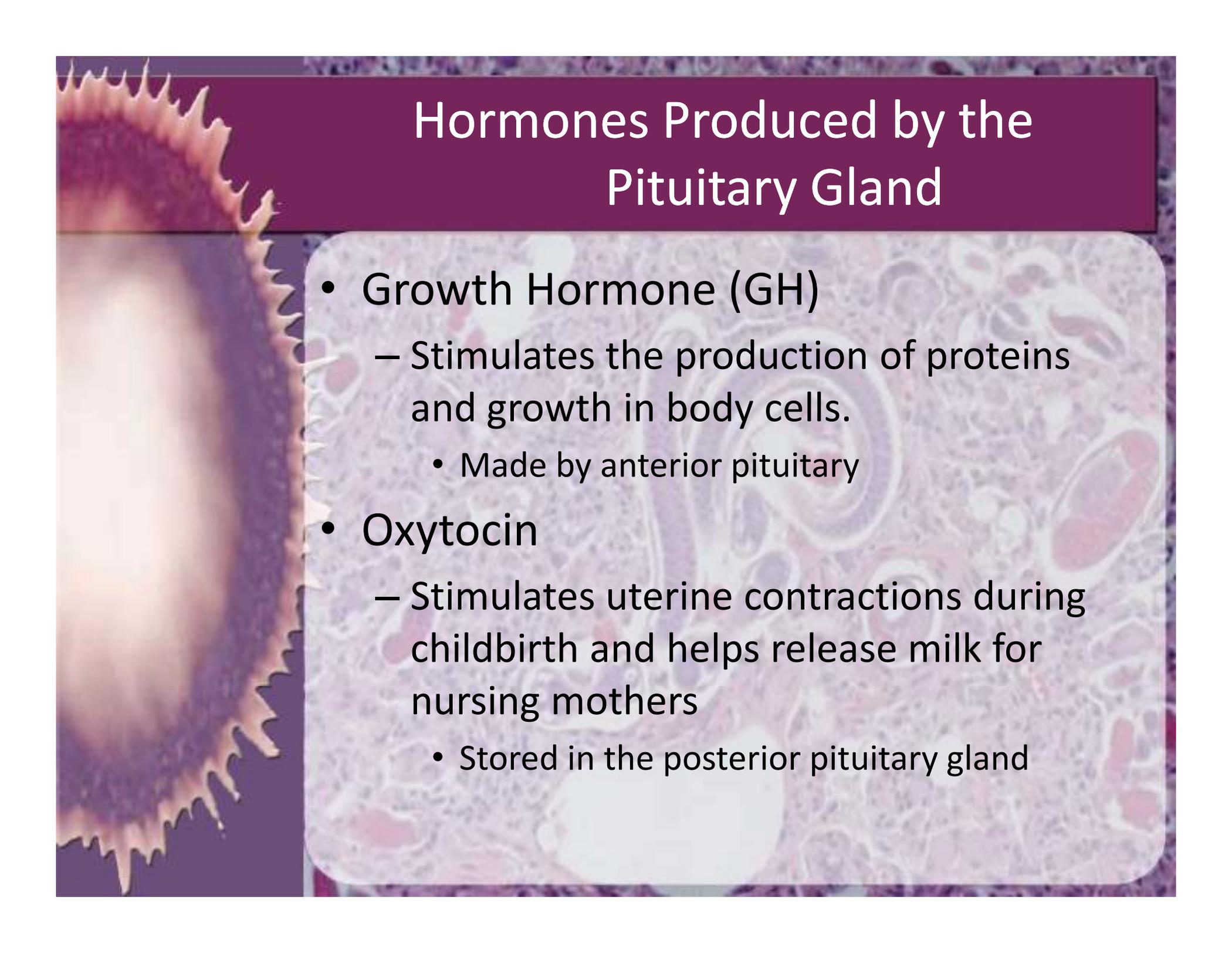


Pituitary Gland

- Small pea-shaped gland hanging from the underside of the brain.
 - The “Master Gland”: produces many of the body’s hormones





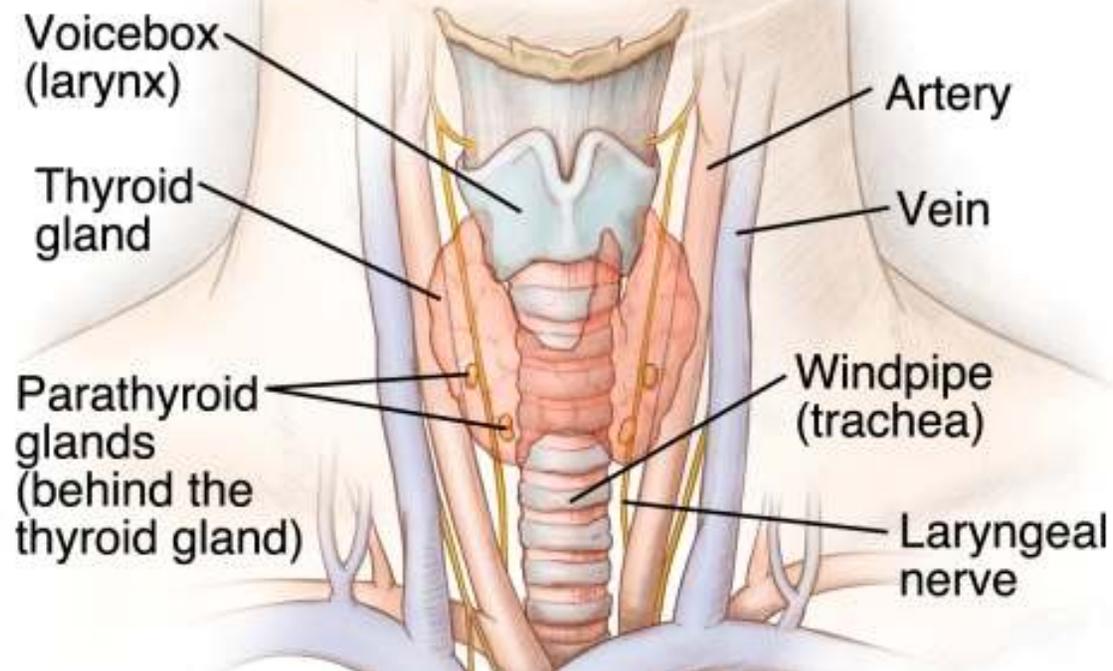


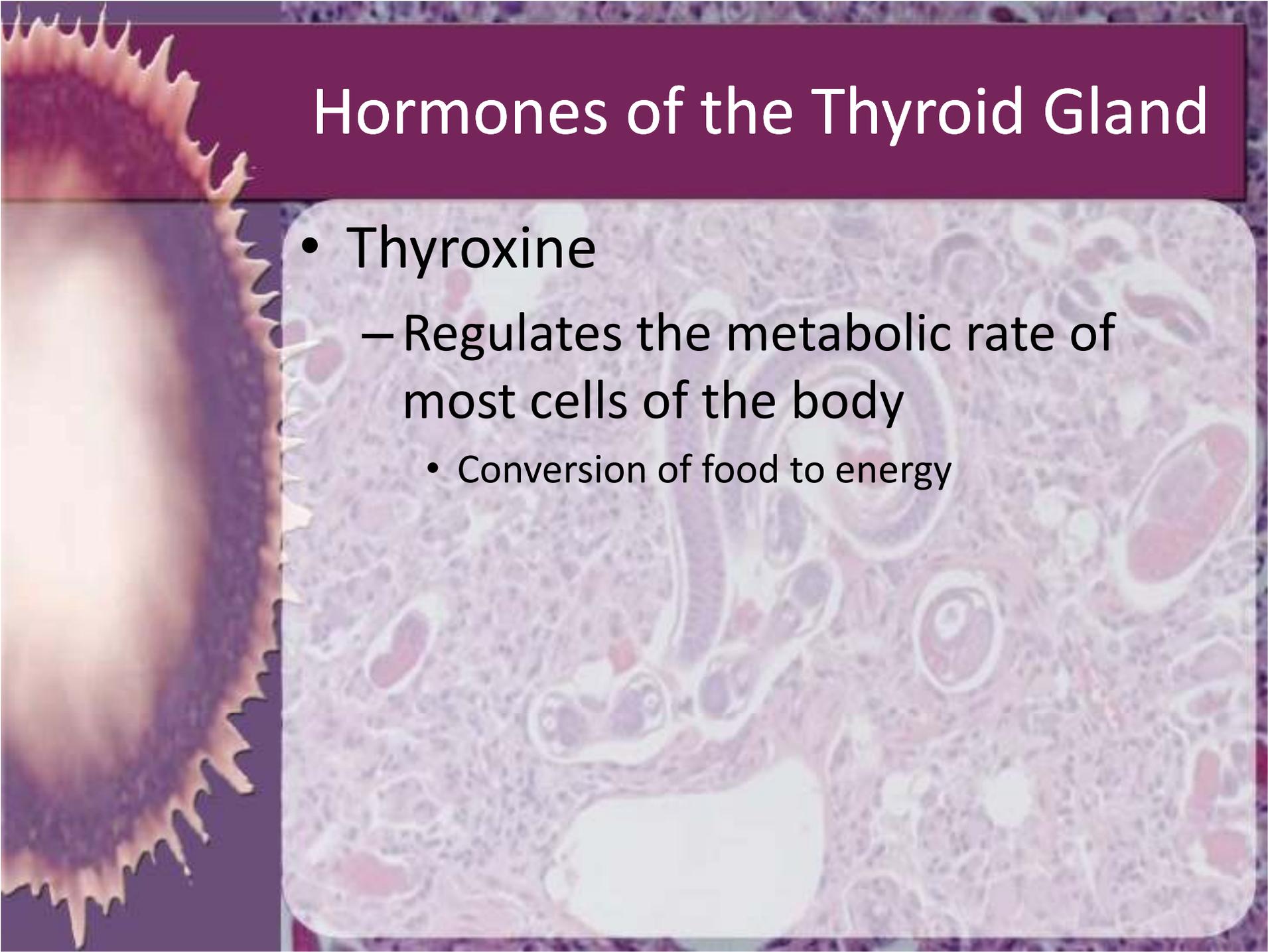
Hormones Produced by the Pituitary Gland

- Growth Hormone (GH)
 - Stimulates the production of proteins and growth in body cells.
 - Made by anterior pituitary
- Oxytocin
 - Stimulates uterine contractions during childbirth and helps release milk for nursing mothers
 - Stored in the posterior pituitary gland

Thyroid Gland

- Located in the neck just below the voice box (larynx) and around the upper part of the trachea
 - Bow-tie shaped



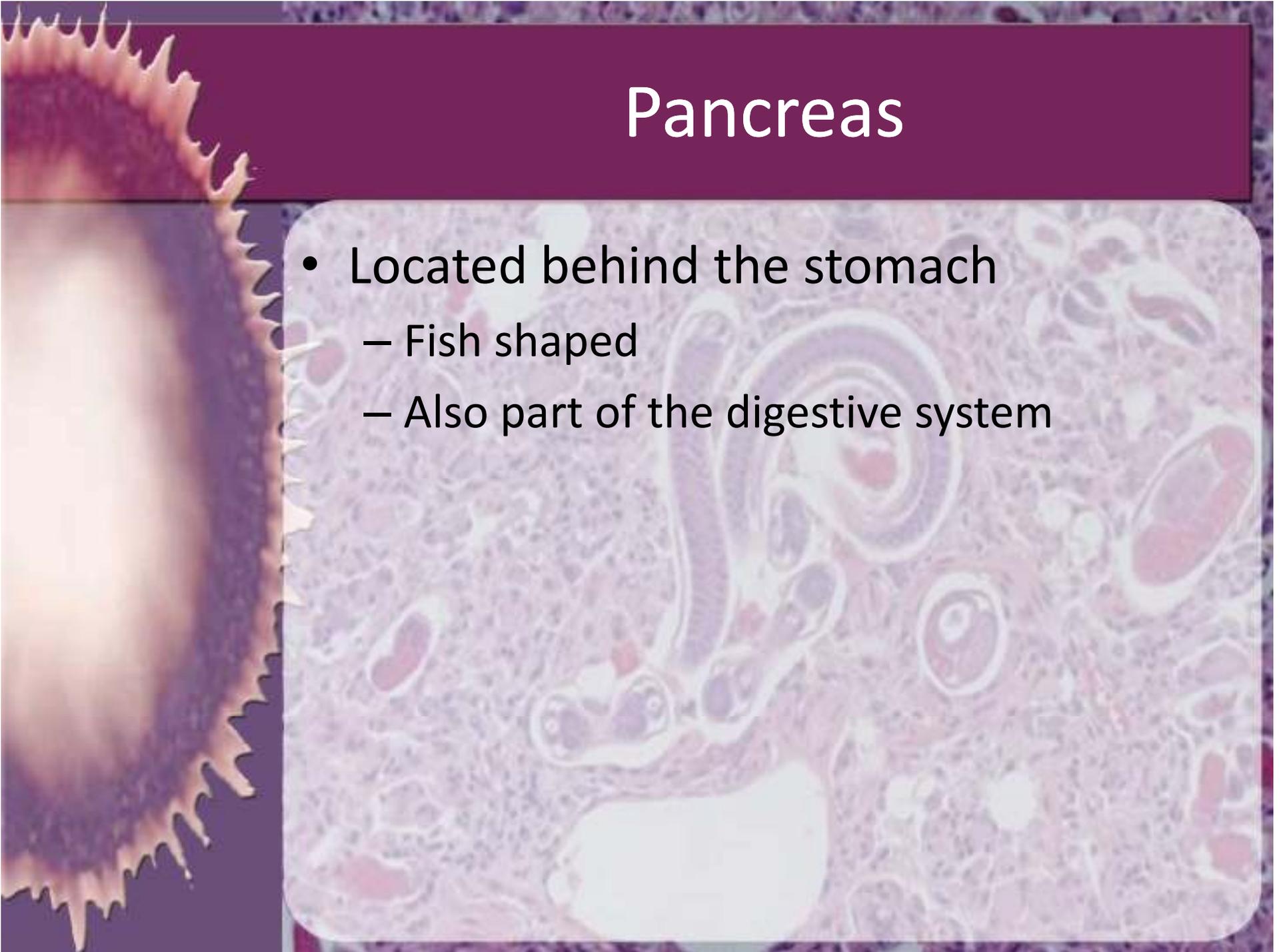
A microscopic view of thyroid tissue, showing numerous follicles of varying sizes. Each follicle is lined by a single layer of cuboidal epithelial cells. The interior of each follicle is filled with a pink-stained substance called colloid. The follicles are separated by thin layers of connective tissue containing small blood vessels and occasional lymphocytes. The overall appearance is that of a highly organized, glandular structure.

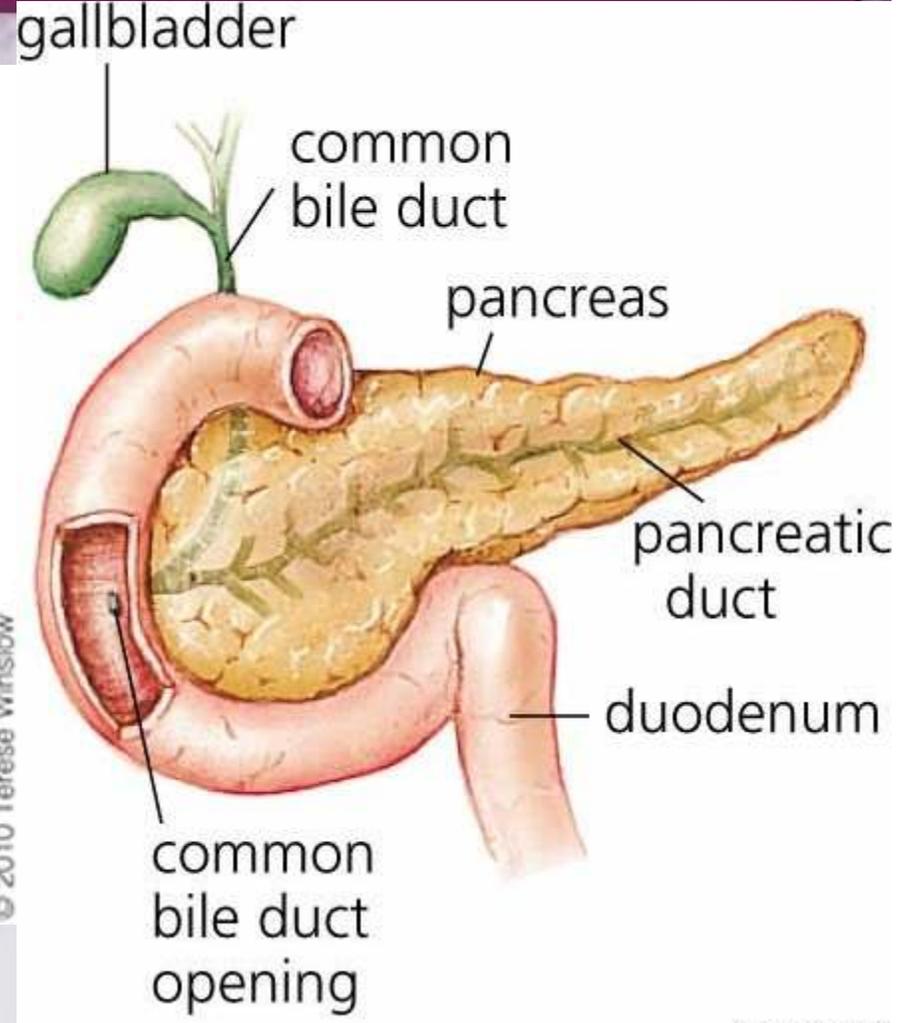
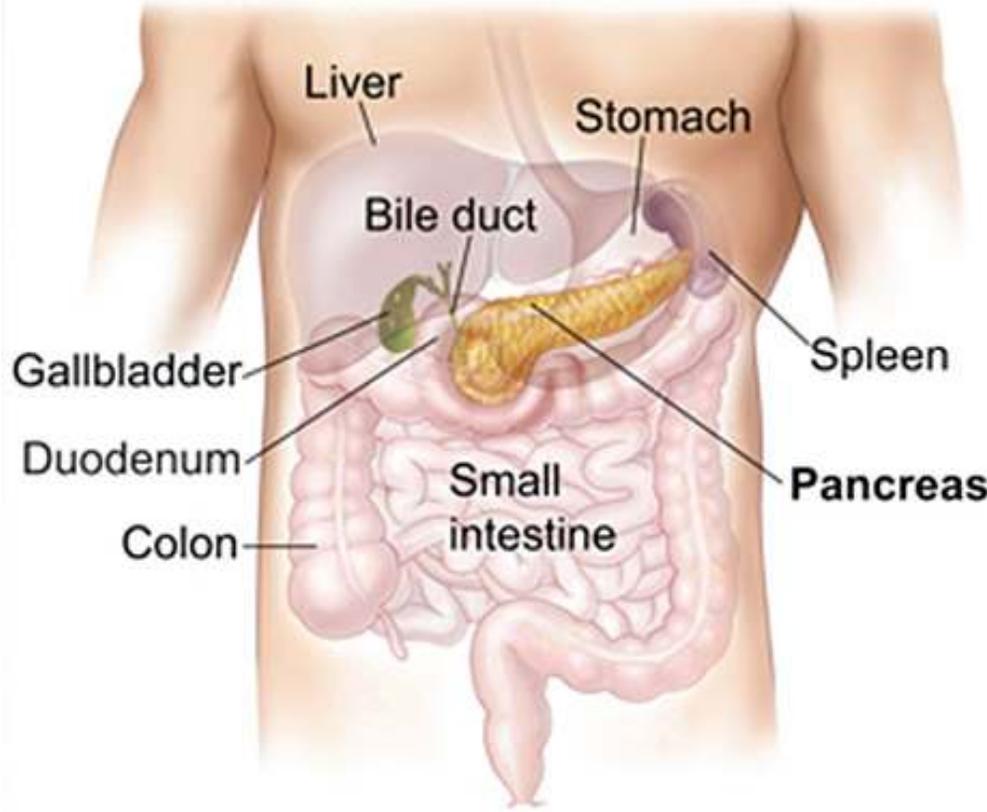
Hormones of the Thyroid Gland

- Thyroxine
 - Regulates the metabolic rate of most cells of the body
 - Conversion of food to energy

Pancreas

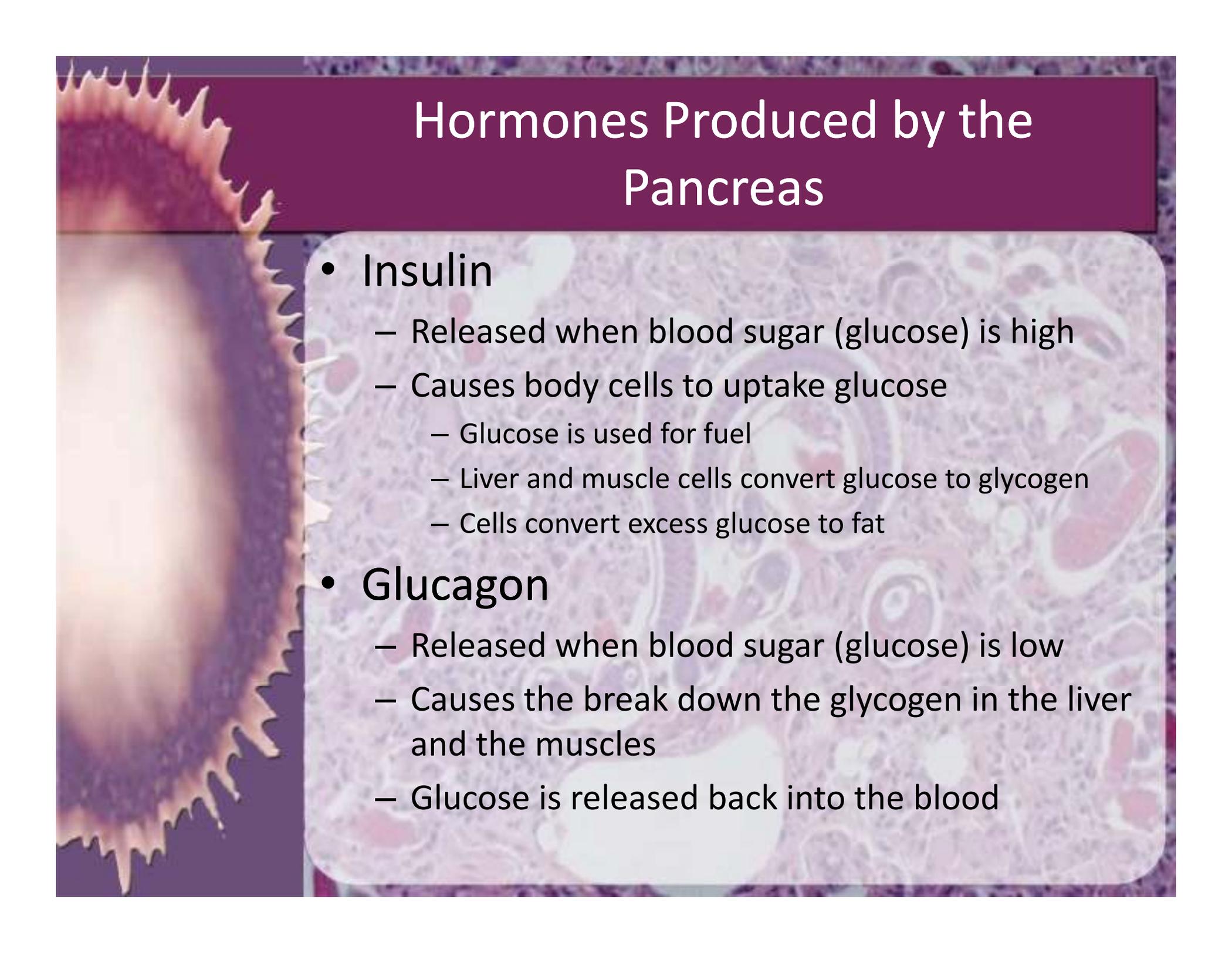
- Located behind the stomach
 - Fish shaped
 - Also part of the digestive system





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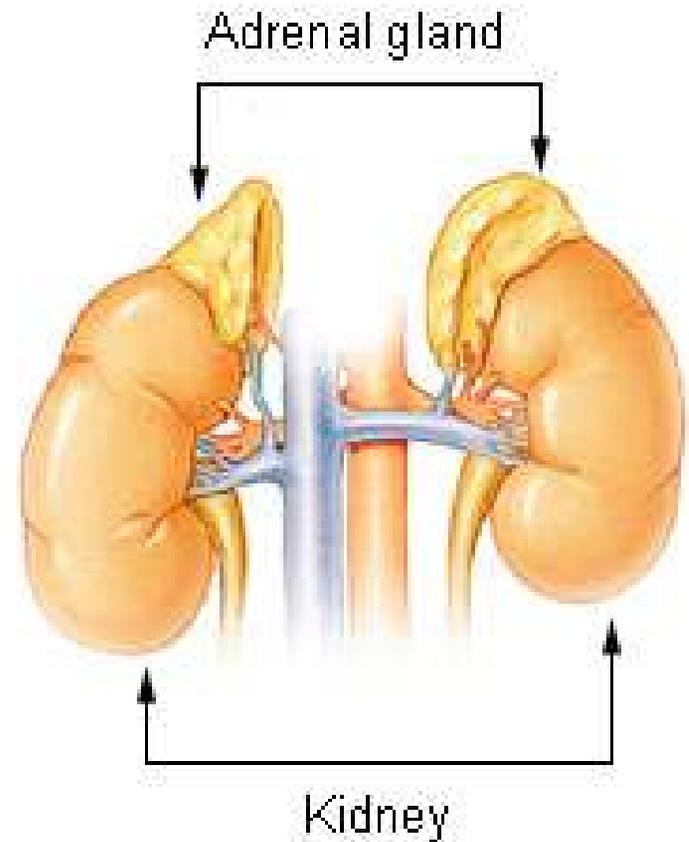


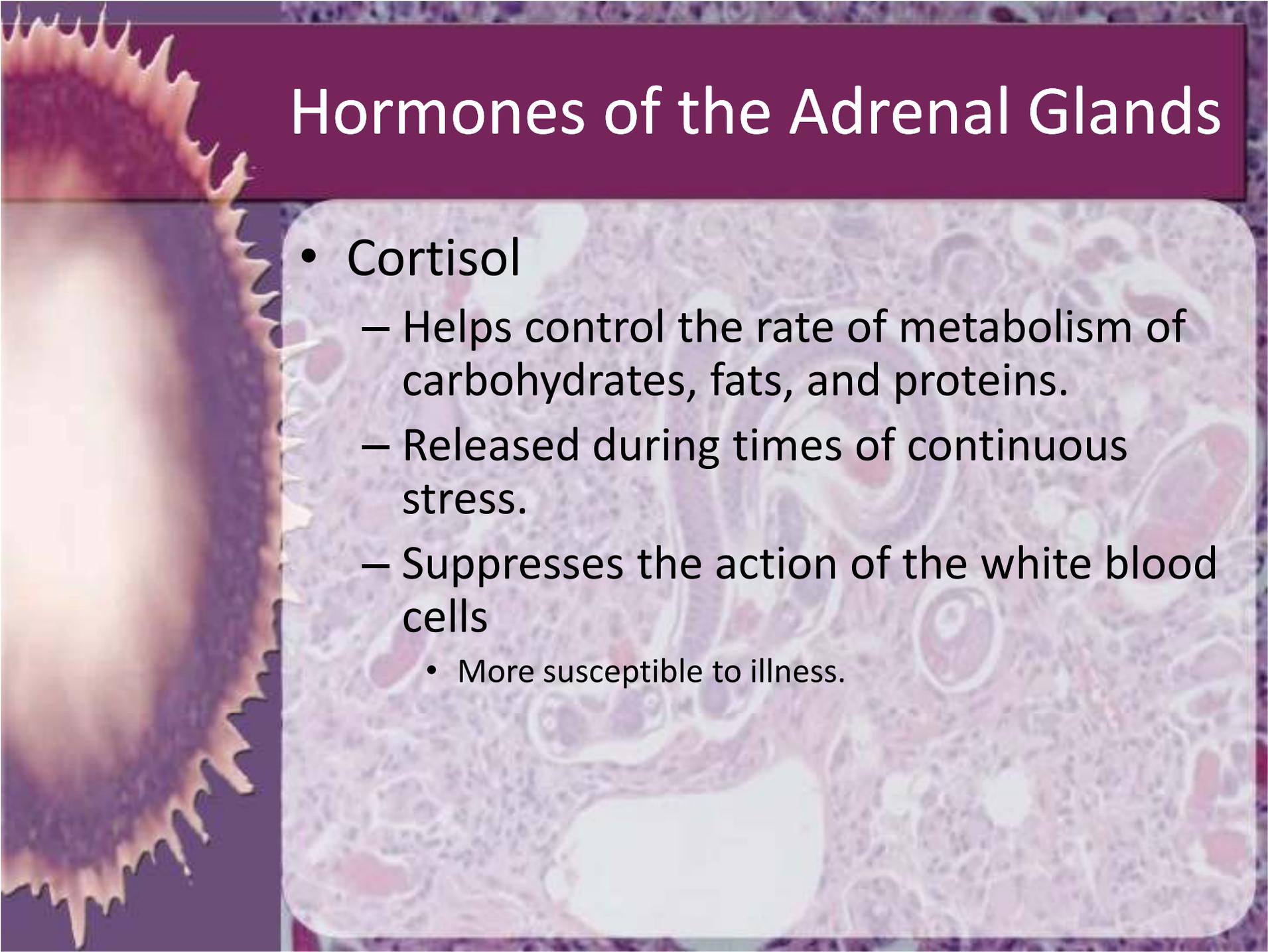
Hormones Produced by the Pancreas

- **Insulin**
 - Released when blood sugar (glucose) is high
 - Causes body cells to uptake glucose
 - Glucose is used for fuel
 - Liver and muscle cells convert glucose to glycogen
 - Cells convert excess glucose to fat
- **Glucagon**
 - Released when blood sugar (glucose) is low
 - Causes the break down the glycogen in the liver and the muscles
 - Glucose is released back into the blood

Adrenal Glands

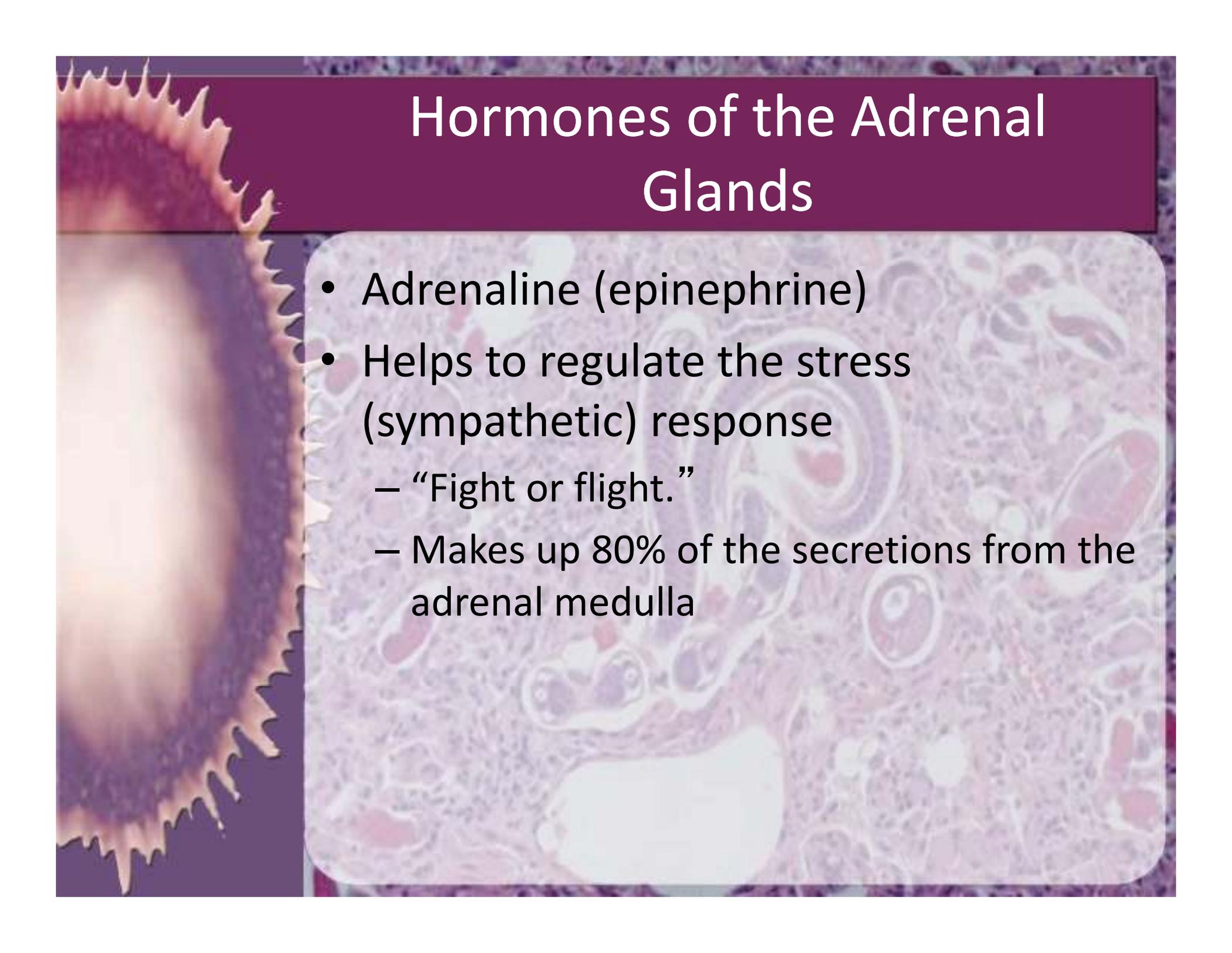
- Triangular-shaped glands that sit on top of each kidney
– 2





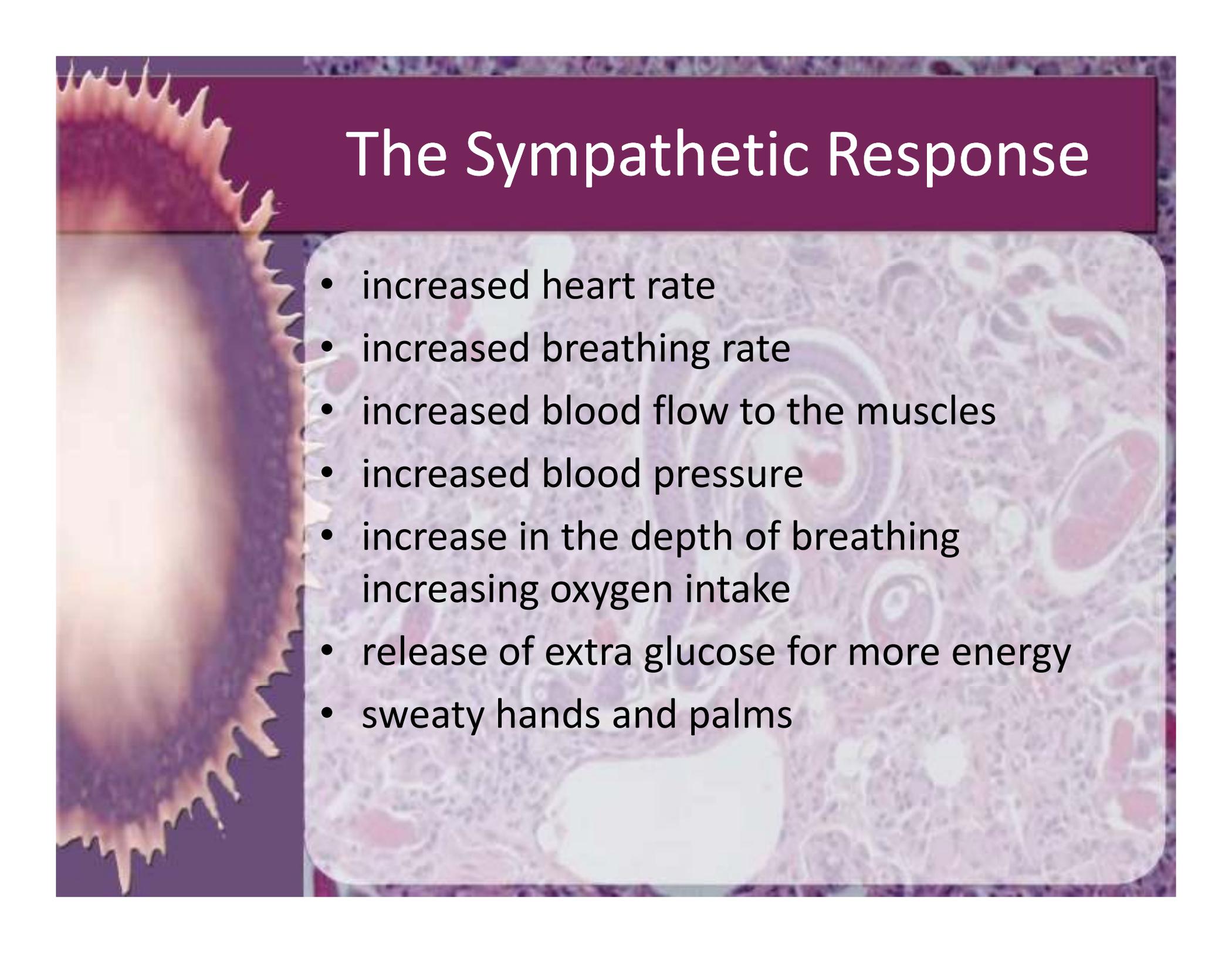
Hormones of the Adrenal Glands

- Cortisol
 - Helps control the rate of metabolism of carbohydrates, fats, and proteins.
 - Released during times of continuous stress.
 - Suppresses the action of the white blood cells
 - More susceptible to illness.



Hormones of the Adrenal Glands

- Adrenaline (epinephrine)
- Helps to regulate the stress (sympathetic) response
 - “Fight or flight.”
 - Makes up 80% of the secretions from the adrenal medulla



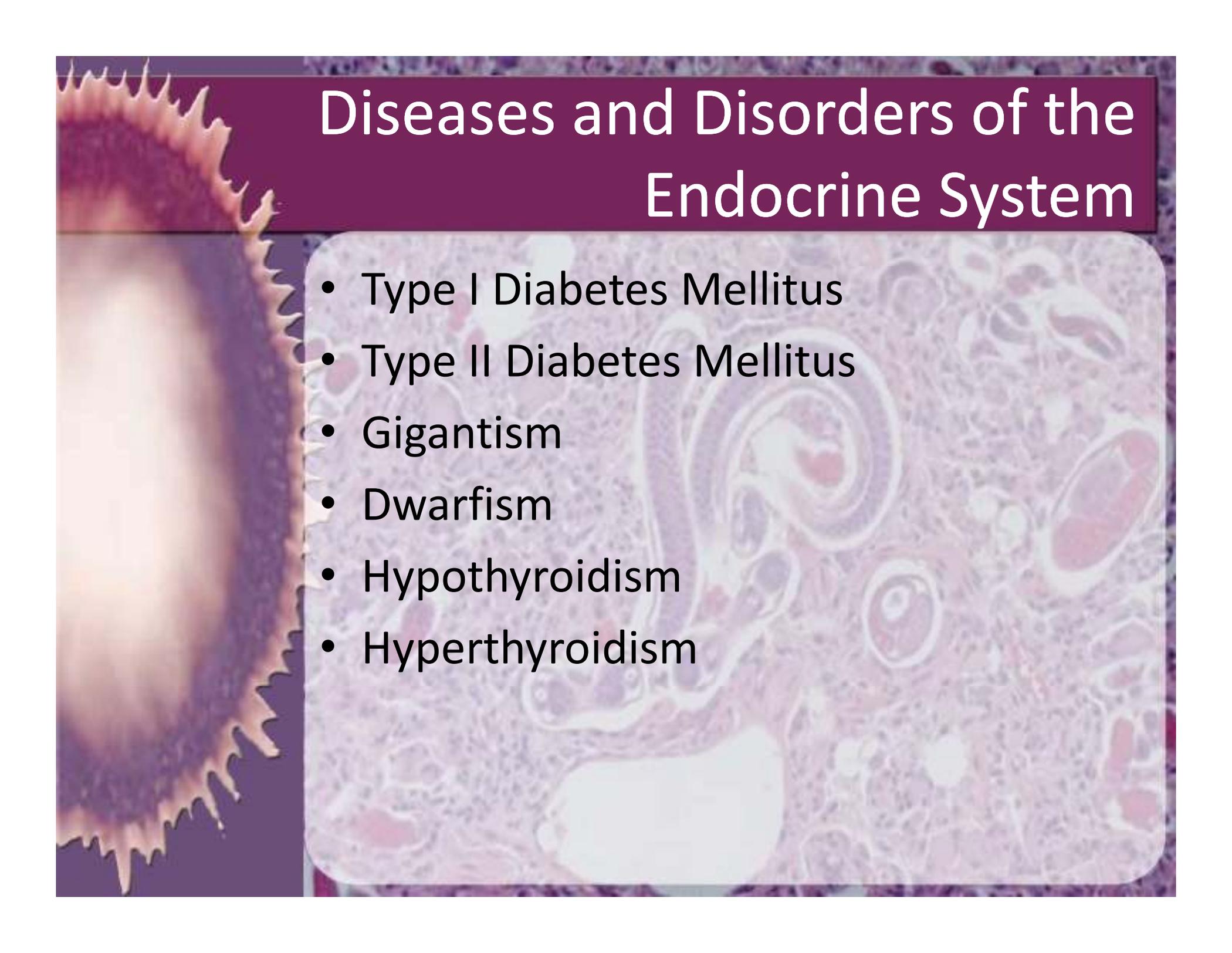
The Sympathetic Response

- increased heart rate
- increased breathing rate
- increased blood flow to the muscles
- increased blood pressure
- increase in the depth of breathing
increasing oxygen intake
- release of extra glucose for more energy
- sweaty hands and palms

Noradrenaline

- Noradrenaline (norepinephrine)
- Helps to regulate the stress (sympathetic) response
 - “Fight or Flight.”
 - Makes up 20% of the secretions from the adrenal medulla



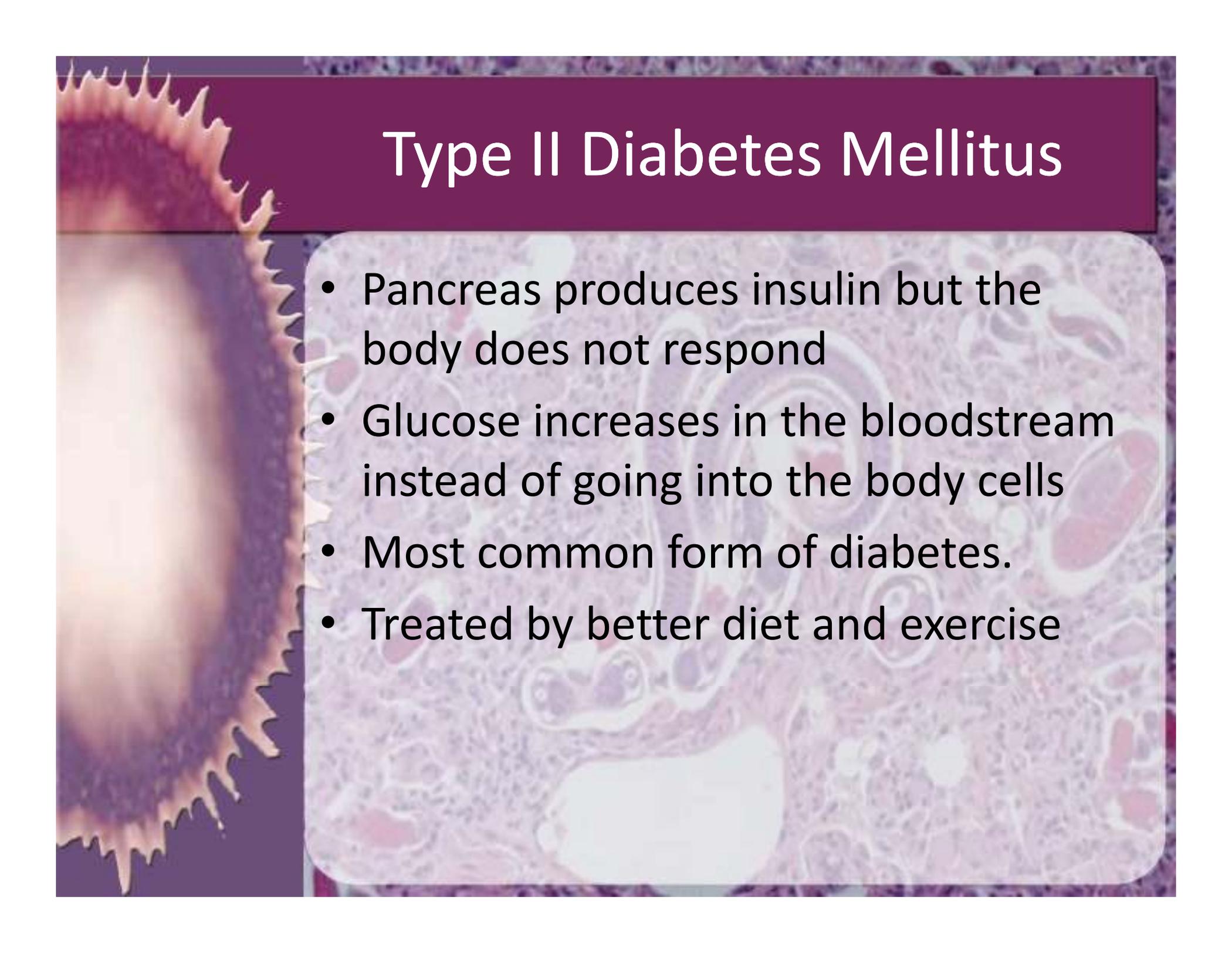


Diseases and Disorders of the Endocrine System

- Type I Diabetes Mellitus
- Type II Diabetes Mellitus
- Gigantism
- Dwarfism
- Hypothyroidism
- Hyperthyroidism

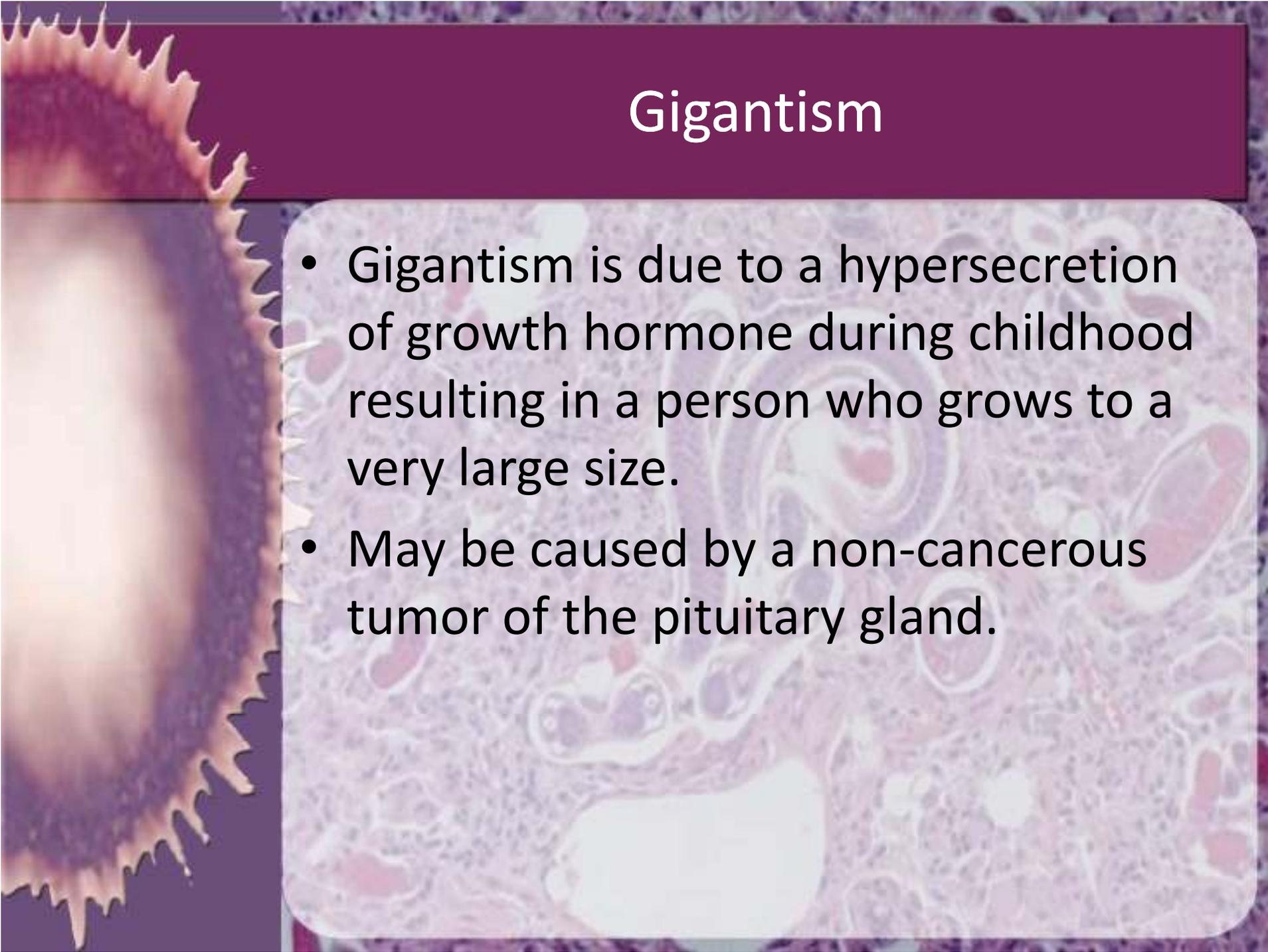
Type I Diabetes Mellitus

- Pancreas does not produce enough insulin to regulate blood sugar.
- Glucose increases in the bloodstream instead of going into the body cells
- Lifelong disease
- Requires insulin injections



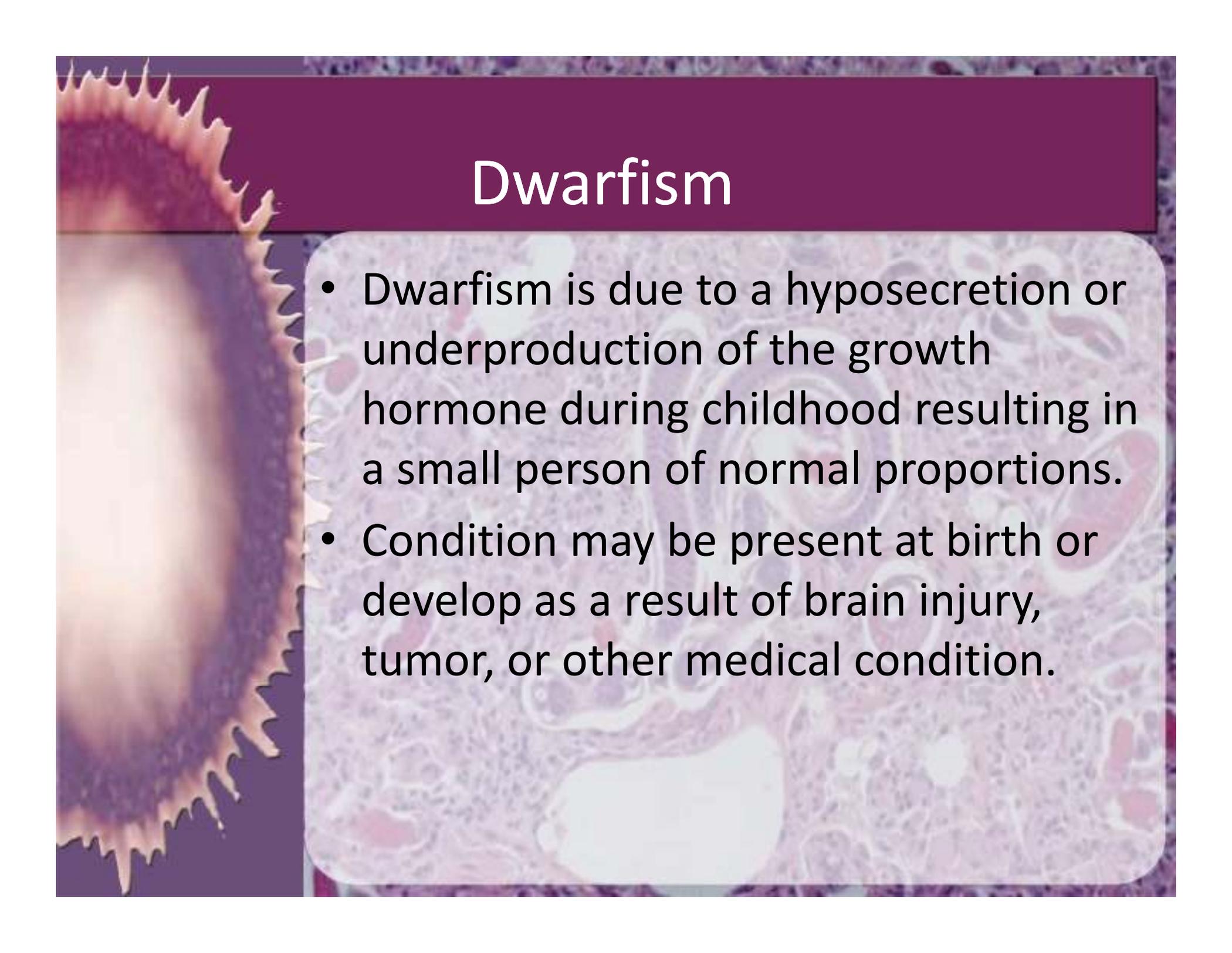
Type II Diabetes Mellitus

- Pancreas produces insulin but the body does not respond
- Glucose increases in the bloodstream instead of going into the body cells
- Most common form of diabetes.
- Treated by better diet and exercise



Gigantism

- Gigantism is due to a hypersecretion of growth hormone during childhood resulting in a person who grows to a very large size.
- May be caused by a non-cancerous tumor of the pituitary gland.



Dwarfism

- Dwarfism is due to a hyposecretion or underproduction of the growth hormone during childhood resulting in a small person of normal proportions.
- Condition may be present at birth or develop as a result of brain injury, tumor, or other medical condition.

Hypothyroidism

- Hypothyroidism occurs when the thyroid gland fails to produce enough thyroid hormone.
 - May result in mental retardation and stunted growth.
 - Cretinism (early onset, infants & young children).
 - Myxedema (later onset).

Hyperthyroidism

- Hyperthyroidism occurs when the thyroid gland produces too much of the thyroid hormones.
 - Symptoms include weight loss, increased appetite, nervousness, restlessness, increased sweating and protruding eyes.
 - Treatment may include removal of the thyroid with radiation or surgery and replacement of thyroid hormones.