Dissection and Display of Endocrine Glands in a Laboratory-Bred Rat

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Objective

To dissect a laboratory-bred rat and identify, locate, and display the major endocrine glands.

Principle

The endocrine system consists of ductless glands that secrete hormones directly into the bloodstream. These hormones regulate various physiological functions, including metabolism, growth, reproduction, and homeostasis. The laboratory rat (*Rattus norvegicus*) is a commonly used model organism due to its physiological similarities to humans and well-defined endocrine anatomy.

Materials Required

- Laboratory-bred rat (euthanised as per ethical guidelines)
- Dissecting tray and pins
- Dissecting instruments (scalpel, scissors, forceps, needle)
- Gloves, apron, and mask
- Saline solution
- Chart or diagram of rat anatomy

Procedure

1.
2. Place the rat in a dissecting tray in the dorsal recumbent position and pin the limbs.
3. Sterilise the ventral surface using ethanol or saline.
4. Make a **mid-ventral incision** from the lower abdomen to the throat using a scalpel.
5. Carefully reflect the skin and muscle layers to expose the internal organs.
6. Identify and display the following endocrine glands:
    a. Pituitary gland: Located at the base of the brain; may require skull opening.
    b. Thyroid gland: Two lobes on either side of the trachea below the larynx.
    c. Parathyroid glands: Tiny nodules embedded on the thyroid gland.
    d. Thymus gland: Found in the thoracic cavity above the heart (prominent in young rats).
    e. Adrenal glands: Small glands located on the anterior pole of each kidney.
    f. Pancreas (endocrine portion): Below the stomach; contains islets of Langerhans.
    g. Gonads:
        i. Testes (in males): Found in scrotal sacs.
        ii. Ovaries (in females): Located near the kidneys.
7. Gently clean and separate each gland using saline and display for observation.

Observation Table

Endocrine Gland	Location	Appearance
Pituitary gland	Base of brain	Small, whitish, oval
Thyroid gland	Below larynx (neck region)	Bilobed, reddish-brown
Parathyroid glands	Embedded in thyroid tissue	Tiny, yellowish nodules
Thymus gland	Above heart (thoracic cavity)	Pale, lobulated, prominent
Adrenal glands	Anterior to kidneys	Flattened, yellowish
Pancreas (islets)	Near stomach/duodenum	Diffuse, granular, pale
Testes (*male only*)	Scrotal sacs	Oval, firm, pinkish-white
Ovaries (*female only*)	Near kidneys	Small, bead-like, pale pink

Result

The major endocrine glands of the rat were successfully identified, dissected, and displayed. The anatomical location and gross structure were consistent with mammalian endocrine features.

Conclusion

This dissection highlights the organisation and position of endocrine glands in mammals. It provides insight into the glandular structures responsible for hormone secretion and homeostatic regulation.

Precautions

- Follow all ethical and institutional guidelines for animal handling.
- Handle sharp instruments with care.
- Do not apply excessive force while separating delicate glands.
- Maintain a clean dissection environment.

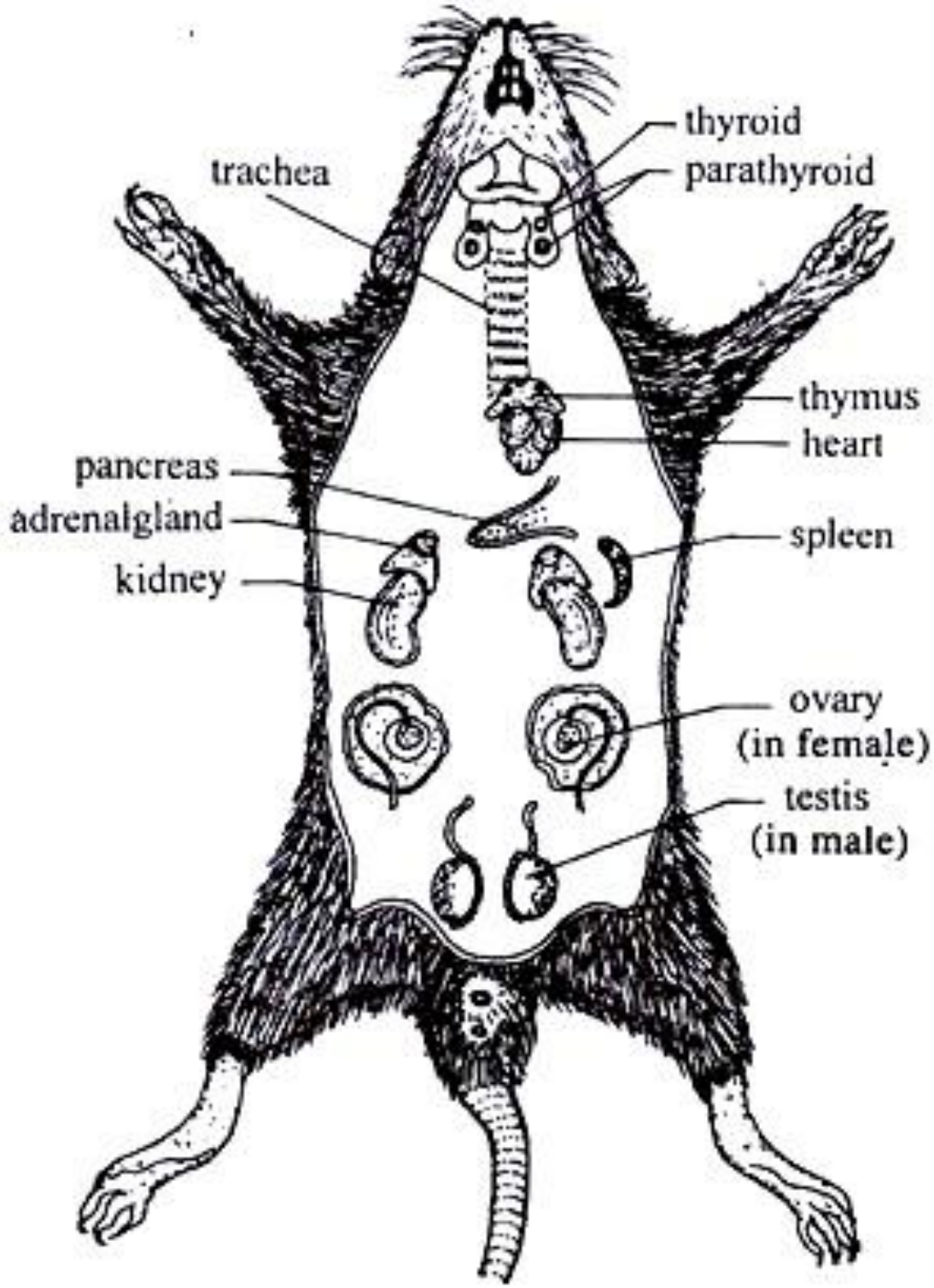

Fig. 19.12 : Rattus sp. Endocrine glands

Kindly draw the image in your practical notebook.