

لغشي؟؟؟
Why Dissect:

1

1. To find out what the systems of a mammalian body look like and do, so you understand what things are in your own body and what they do

شو اساو عجب؟؟
To Dissect:

2

- Means to expose to view, not to cut up
- Never cut more than is absolutely necessary to expose a part
- Observe all structures and their connections to other structures

طوبه اشعين الRat؟؟؟

Why use Rat:

- They are mammals and therefore are similar to you (Internal anatomy close to human) شبه التركيب الداخلي للإنسان
- High offspring تربيات
- Available عدد صغار عالية
- Low cost متوفر
- Easily to handle (small on size) مغر حجم التعامل

The classification of the Rat (*Rattus norvegicus*)

المملكة
Kingdom: Animalia

Phylum :Chordata

من الفقاريات
Subphylum :Vertebrata

صنف
Class :Mammalia

Order :Rodentia

Family: Muridae

الجنس
Genus: Rattus

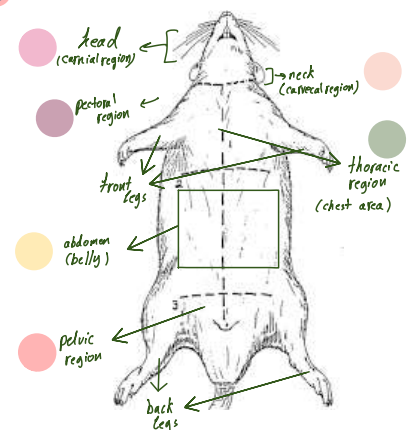
النوع
Species ;norvegicus

الRat من برا
Rat External Anatomy

Procedure: Obtained your rat and observe the general characteristics. Key terms are highlighted

- The rat's body is divided into six anatomical regions:

cranial region - head الرأس cervical region - neck الرقبة pectoral region - area where front legs attach المنطقة التي تتصل فيها أقدام الRat الأمامية thoracic region - chest area المنطقة التي تتصل فيها رجليات الRat الخلفية abdomen - belly البطن pelvic region - area where the back legs attach منطقة الصدر



1. Note the hairy coat that covers the rat and the sensory hairs (whiskers) located on the rat's face, called **vibrissae**.



2. The mouth has a **large cleft** in the upper lip which exposes large front **incisors**. Rats are gnawing mammals, and these incisors will continue to grow for as long as the rat lives.

3. Note the eyes with the large **pupil** and the **nictitating membrane** found at the inside corner of the eye. This membrane can be drawn across the eye for protection. The **eyelids** are similar to those found in humans.

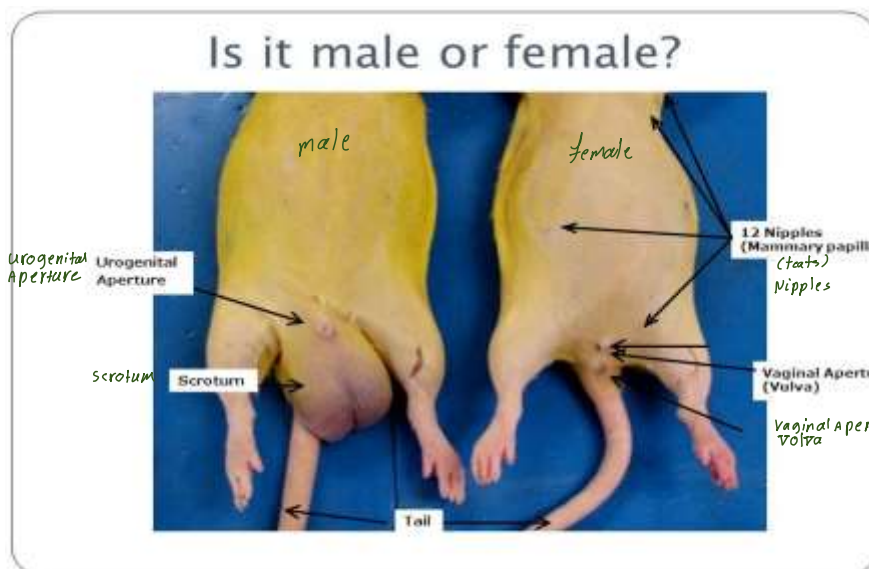
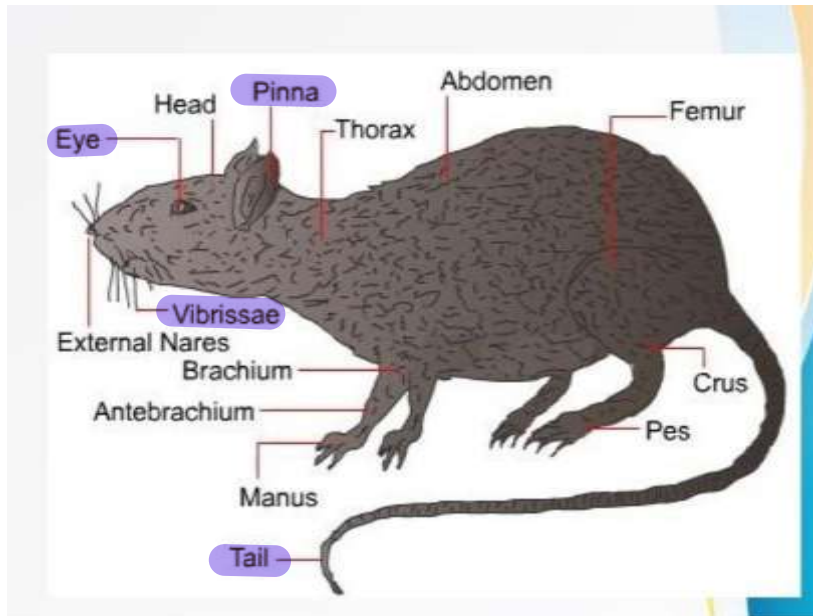
4. The ears are composed of the external part, called the **pinna**, and the auditory meatus, the **ear canal**.

5. Locate the **teats** on the ventral surface of the rat. Check a rat of another sex and determine whether both sexes have teats.

6. Examine the **tail**, the tails of rats do not have hair. Though some rodents, like gerbils, have hair on their tails.

7. Locate the **anus**, which is ventral to the base of the tail.

8. Determine whether your rat is male or female by looking near the tail for the male or female **genital organs**.



The Muscular System of the Rat

You will carefully remove the skin of the rat to expose the muscles below.

Identify the following muscles:

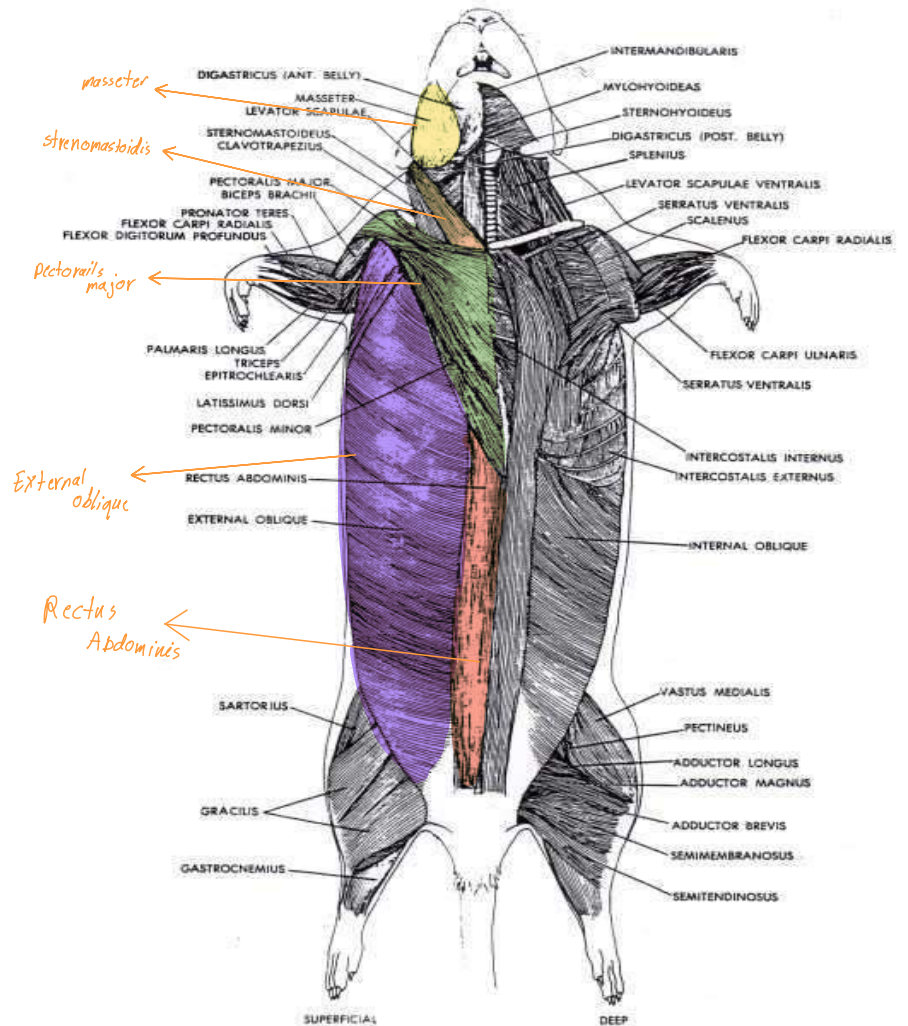
Masseter

Sternomastoidis

Pectoralis major

Rectus abdominis

External oblique



The Thoracic organs

Chest area
Organs

You will carefully remove the skin and muscles of the rat to expose the organs beneath

1. Locate the **diaphragm**, which is a layer of muscle (skeletal) that separates the ^{chest} thoracic from the ^{belly} abdominal cavity.
2. The **heart** is centrally located in the thoracic cavity. The two dark colored chambers at the top are the **atria** (single: atrium), and the **bottom chambers** are the **ventricles**. The heart is covered by a thin membrane called the **pericardium**. (We will come back to the heart later.)
تجويف الصدر
3. Locate the **thymus gland**, which lies directly over the upper part of the heart. The thymus functions in the development of the immune system and is much **larger** in **young rats** than it is in older rats.
4. The **lungs** are spongy organs that lie on either side of the heart and should take up most of the thoracic cavity.
الرئتين
تجويف الصدر

The Abdominal Organs

- Abdomina التجويف التي فيه أعضاء ال
belly area
organs
1. The **coelom** is the body cavity within which the viscera (internal organs) are located. The cavity is covered by a membrane called the **peritoneum**, which is very thin and web-like, you may need to use forceps to remove some of this membrane to see the organs clearly.
 2. Locate the **liver**, which is a dark coloured organ suspended just under the diaphragm. The liver has many functions, one of which is to produce bile, which aids in digesting fat. **Rats do not have a gall bladder**, which is used for storing bile in other animals. There are four parts (lobes) to the liver.
 3. The **esophagus**, moves food from the mouth to the stomach.
 4. Locate the **stomach** on the left side just under the diaphragm. The functions of the stomach include food storage, physical breakdown of food, and the digestion of protein. The opening between the esophagus and the stomach is called the **cardiac sphincter**. The opening between the stomach and the intestine is called the **pyloric sphincter**.
 5. The **spleen** is about the same colour as the **liver** and is attached to the greater curvature of the stomach.
 6. The **pancreas** is a brownish, flattened gland found in the tissue between the stomach and small intestine.
 7. The **small intestine** is a slender coiled tube that receives partially digested food from the stomach (via the pyloric sphincter). The small intestine has three sections: **duodenum**, **jejunum** and **ileum**, (Listed in order from the stomach to the large intestine.)
 8. Locate the **colon**, which is the large greenish tube that extends from the small intestine and leads to the anus. The colon is also known as the **large intestine**. The colon is where the final stages of digestion and water absorption occurs and it contains a variety of bacteria to aid in digestion.

The colon consists of five sections:

- الأعور
المستقيم
- **cecum** - large sac where the small and large intestine meet (the **ileocecal valve** regulates passage of materials)
between ileum and cecum

ascending colon – food travels upward.

transverse colon – a short section that is parallel to the diaphragm

descending colon – the section of the large intestine that travels back down toward the rectum.

- **rectum** - the short, terminal section of the colon that leads to the anus. The rectum temporarily stores feces before they are expelled from the body.

* ضروري تدرس الصور

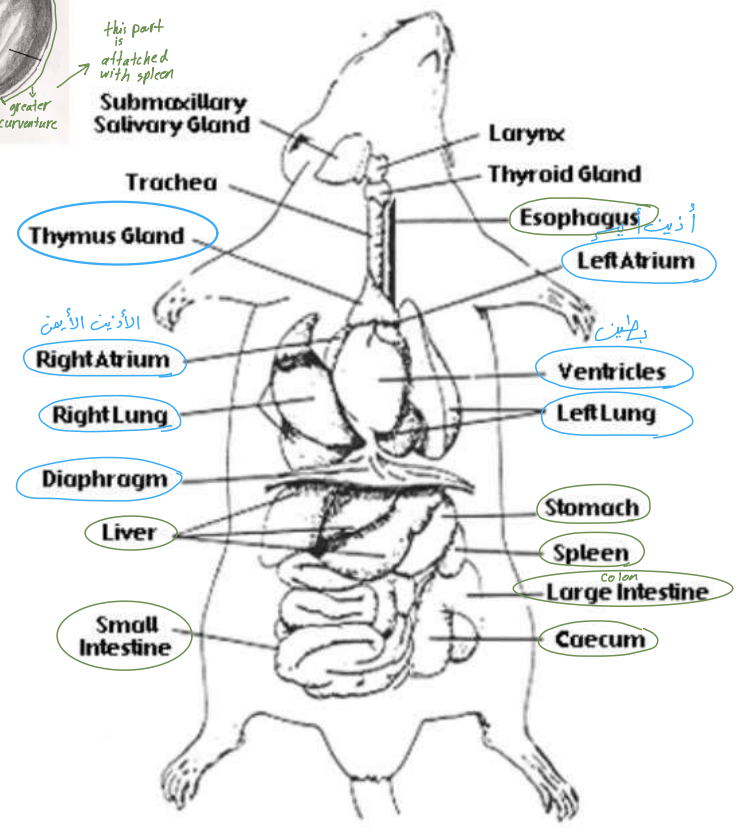
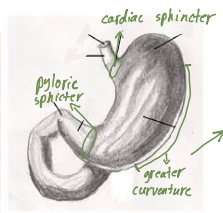
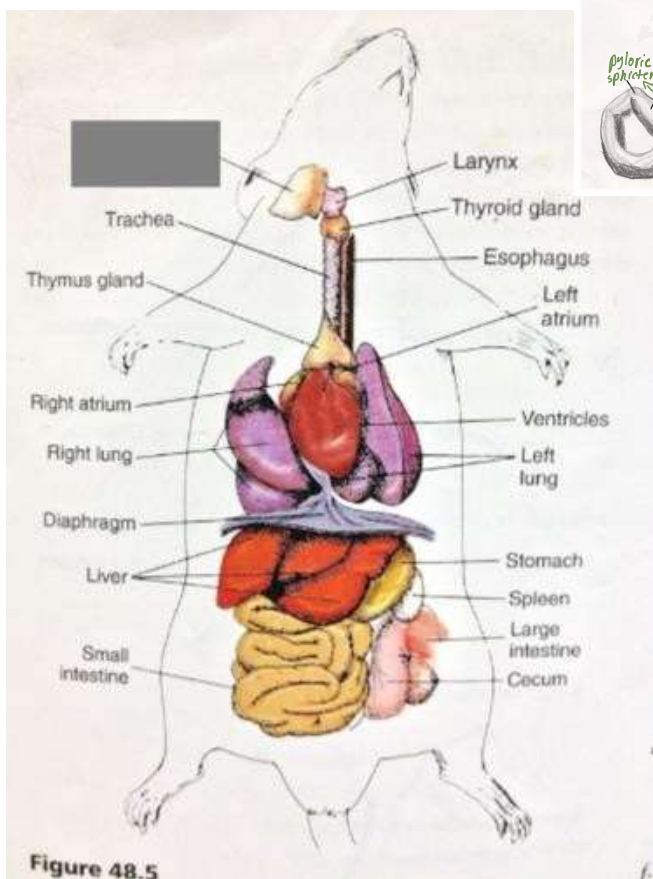


Figure 48.5

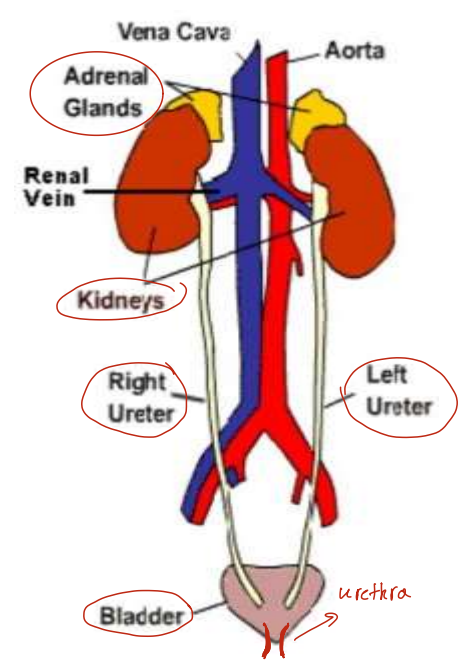
الاجهاز البولي

● **Urogenital System**

The excretory and reproductive systems of vertebrates are closely integrated and are usually studied together as the urogenital system. However, they do have different functions: the excretory system removes wastes and the reproductive system produces gametes (sperm & eggs) and provides an environment for the developing embryo.

● **Excretory Organs**

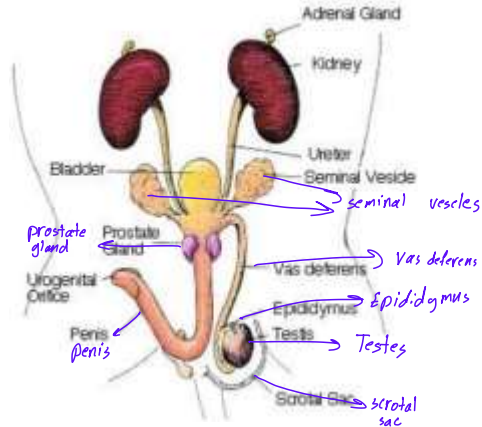
- 1. The primary organs of the excretory system are the **kidneys**. Locate these large bean shaped structures located toward the back of the abdominal cavity on either side of the spine.
- 2. Locate the delicate **ureters** that attach to the kidney and lead to the **urinary bladder**.
- 3. The **urethra** carries urine from the bladder to the urethral orifice (this orifice is found in different areas depending on whether you have a male or female rat).
- 6. The small yellowish glands embedded in the fat atop the kidneys are the **adrenal glands**.



The Reproductive Organs of the Male Rat

1. The major reproductive organs of the male rat are the **testes** (singular: testis) which are located in the **scrotal sac**. On the surface of the testis is a coiled tube called the **epididymus**, which collects and stores sperm cells. The tubular **vas deferens** moves sperm from the epididymus to the **urethra**, which carries sperm through the **penis** and out the body.

2. The lumpy brown glands located to the left and right of the urinary bladder are the **seminal vesicles**. The gland below the bladder is the **prostate gland** and it is partially wrapped around the penis. The **seminal vesicles** and the **prostate gland** secrete materials that form the **seminal fluid** (semen).



The Reproductive Organs of the Female Rat

1. The short gray tube lying dorsal to the urinary bladder is the **vagina**. The vagina divides into **two uterine horns** that extend toward the **kidneys**. This **duplex uterus** is common in some animals and will accommodate multiple embryos (a litter). In contrast, a simple uterus, like the kind found in **humans** has a **single chamber** for the development of a single embryo.

2. At the tips of the uterine horns are small lumpy glands called **ovaries**, which are connected to the uterine horns via **oviducts**.

