

→ Blood of cockroach is ~~is~~ colourless due to absence of respiratory pigment, so, it is called haemolymph.

→ After removing of sclerites the blood filled cavity haemocoel can be seen.

→ This haemocoel cavity divides in 3-chambers, called blood sinuses i.e.,

dorsal chamber	-	Pericardial sinus
ventral	"	Perineurial sinus
Middle	"	Perivisceral sinus

→ For the division of haemocoel cavity 2 diaphragms are ont i.e., dorsal diaphragm b/w pericardial & perivisceral sinus & ventral diaphragm b/w perivisceral & perineurial sinuses.

→ In perineural sinus double & solid nerve cord is extended.

→ In perivisceral sinus, all internal organs are present, and in pericardial sinus, 13-chambered tubular heart is present that opens in head region through anterior aorta.

→ Heart attached with wall of pericardial sinus by 12 pairs of Alary muscles.

→ In each heart chamber 1 pair ostia are present, guarded by unidirectional valves, to prevent the backflow of blood.

→ Due to rhythmic contraction & relaxation of heart chambers, blood passes in forward direction, and pump come to head region by anterior aorta and then circulate in perivisceral & perineural sinus.

Nervous system

→ Most part of nervous system is present in thorax & abdominal region, so, it can survive upto 1 week without head.

→ Nervous system of cockroach is composed of nerve ring & nerve cord.

→ Nerve ring is also called circumoesophageal ring with 2 pairs of ganglia i.e., supra-oesophageal ganglion & sub-oesophageal ganglion

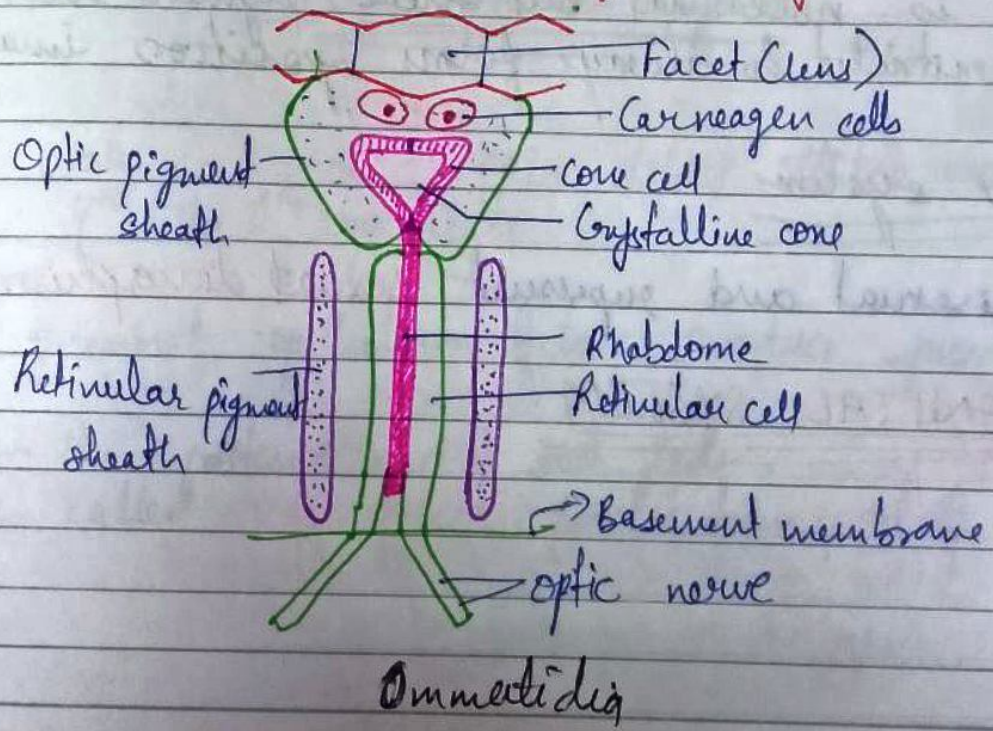
→ A double, ventral, solid & ganglionated nerve cord is present with 9 paired ganglia - 3 in thoracic region & 6 in abdominal region.

Sensory organs

→ In cockroach, sensory organs are present as 1 pair antennae for touch, temperature & smelling.

→ 1 pair ocelli as photoreceptor (Phaosome)
 Stato cyst as balancing organ
 1 pair compound eyes for mosaic vision.

→ Each compound eye is composed of about 2000 units called Ommatidia and each Ommatidium is the structural and functional unit of compound eye.



→ In each ommatidium, straight light rays enter from the small segments of object and form their image, but oblique light rays, becomes focused after striking on pigment sheath.

→ The complete image of object is formed by the joining of small segments of image, so, this type of image is called Apposition image and this type of vision is called mosaic vision.

→ It occurs in diurnal insects.

In nocturnal insects the pigment sheath are constricted so, the overlapping of image occurs and this type of image is called superposition image.

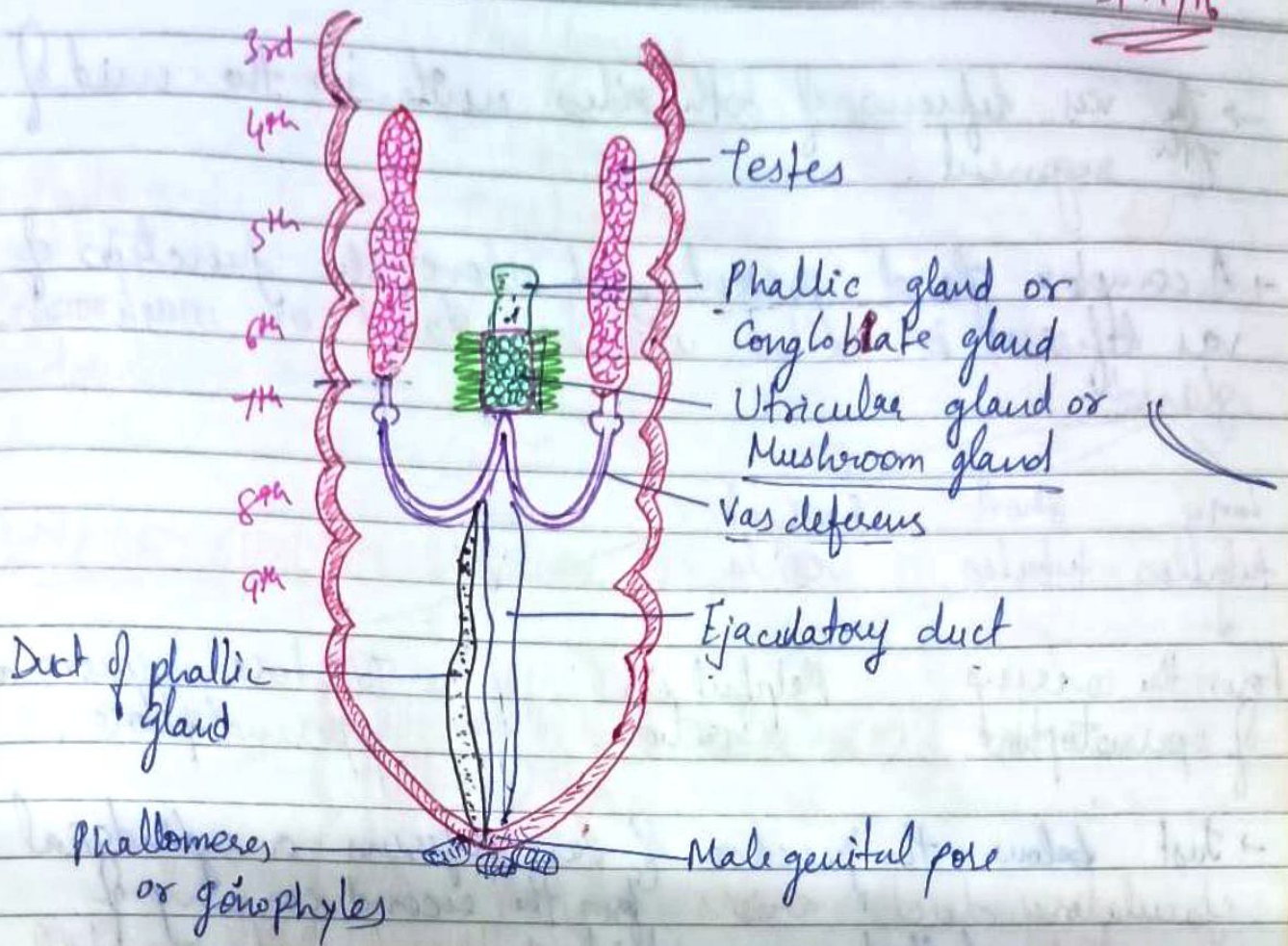
→ Cockroach is nocturnal but their pigment sheath are not constricted so always forms apposition image.

Reproductive system

→ It is unisexual and represent sexual dimorphism.

MALE GENITAL SYSTEM

3/11/16

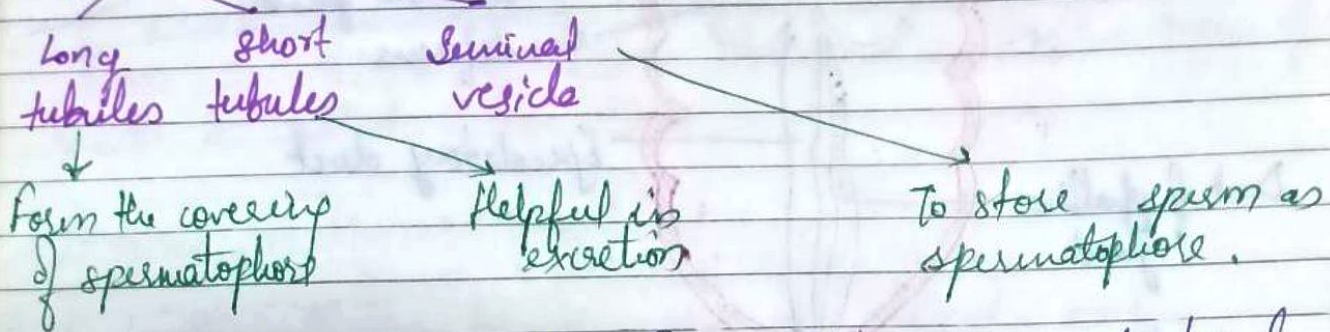


Male reproductive system

- In male cockroach, 1 pair lobed testes are present in 4th to 6th segments.
- The germinal epithelium of testes produce sperm.
- From the posterior end of each testes a long tubule arises called vas deferens for the transport of sperm.

→ The vas deferens of both sides unite in the mid of 7th segment.

→ A complex gland present just above the junction of vas deferens is called **utricular gland** or **mushroom gland**.



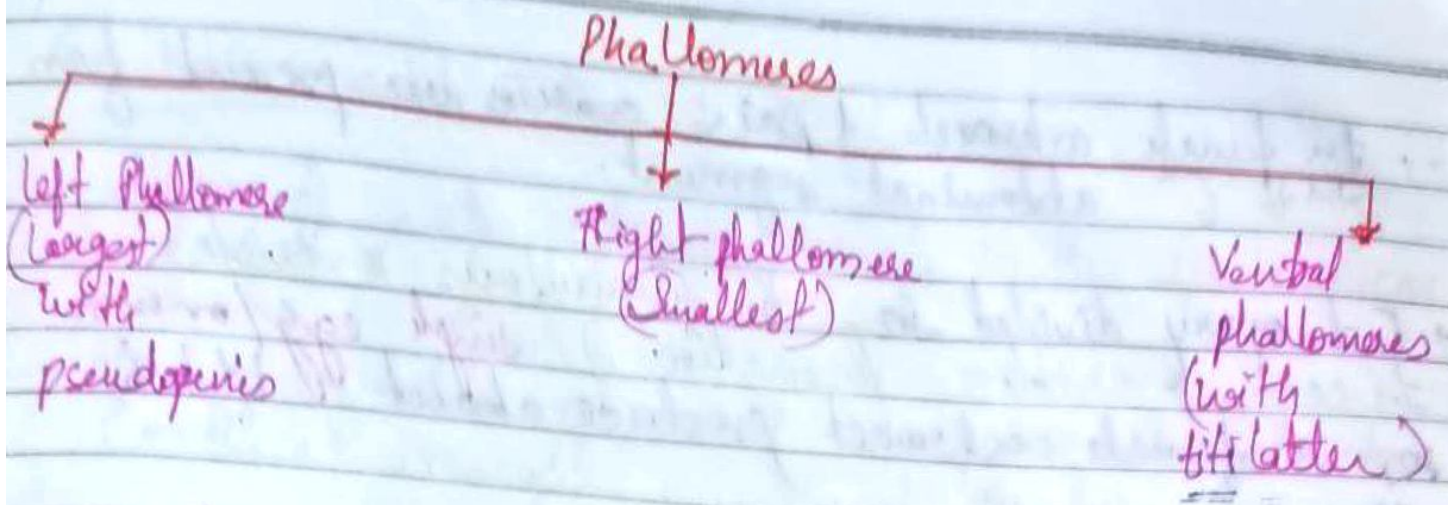
→ Just below the junction of vas deferens a cylindrical **ejaculatory duct** arises from the second covering of spermatophore that opens outside through **male genital pore**.

→ A rectangular gland is present above the utricular gland called **phallic gland** or **conglobate gland**. Third layer of spermatophore is forced by the secretion of phallic gland.

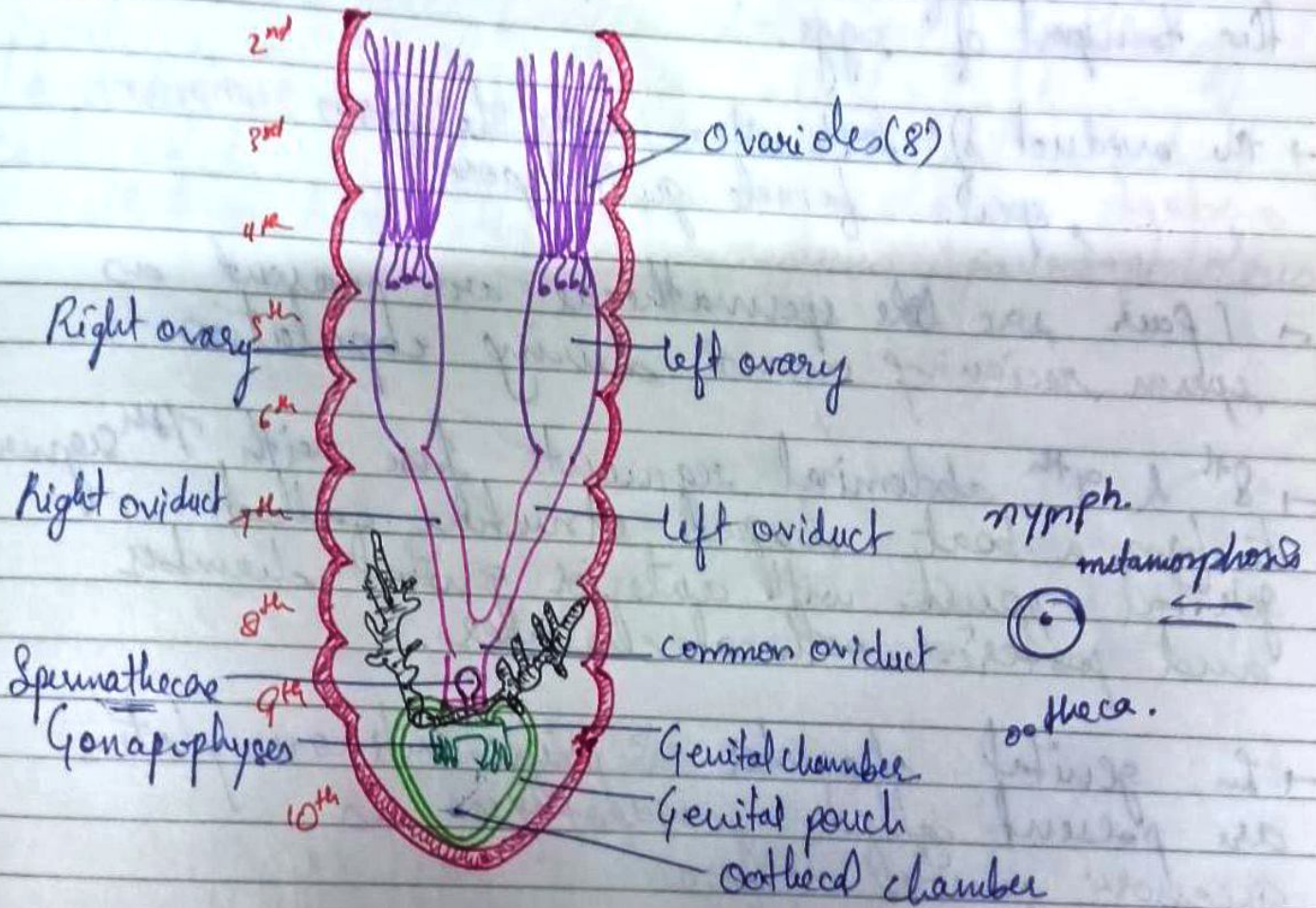
→ Phallic gland opens near the male genital pore.

→ 3 chitinous plates present around the male genital pore are called **gonacophyses** or **phalomeses** which are helpful in copulation.

To Stung
To Stung
To Stung



FEMALE GENITAL SYSTEM



Female genital system

→ In female cockroach 1 pair ovaries are present from 2nd to 6th abdominal segment.

→ Each ovary divided in 8 filamentous ovarioles. In each ovarioles formation of single egg/ovum so, a female cockroach produce about 14 to 16 eggs.

→ The ovaries of both sides opens into oviduct for the transport of eggs.

→ The oviduct of both sides unite to form common oviduct, opens female genital pore.

→ 1 pair sac like spermathecae are present as sperm receiving organs during copulation.

→ 8th & 9th abdominal segments fuse with 7th segment to form a boat shaped structure called genital pouch with anterior genital chamber and posterior oothecal chamber.

→ In genital chamber 3 pairs chitinous plates are present called gonapophyses as accessory genital organs.

→ 1 pair highly branched collateral glands are present. The secretion of collateral glands (silk protein) form the purse like covering of fertilised eggs (called ootheca).

Copulation and embryonic development

- Sperm of male cockroach transfers in the spermathecae of female & fertilise the eggs.
- After fertilisation egg covered in a purse like structure (ootheca) arranged in oothecal chambers.
- A fertilised female cockroach release these ootheca in a dark place & after hatching of fertilised eggs produce a wingless larva called nymph. And by 13 moultings, larva develops in adult cockroach. This type of metamorphosis is called gradual ~~not~~ metamorphosis / paurometabolous.