

FEMALE GENITAL SYSTEM

-it consists in adult birds of:

1- left ovary.

2- left oviduct.

Embryologically:

Two gonads and oviducts are present,
but the organs of the right side are rarely
developed.

Left ovary

Function:

- It produces the ovum.
- The yolk being fabricated within oocyte from raw materials synthesized by liver.

Position :

- It lies in cranial part of body cavity ventral to left kidney.

Growth and shape of ovary:

1-Before sexual maturity:

- At early embryonic stage: female has left and right symmetrical gonads containing nearly the same number of germ cells.
- From fourth day of incubation: the left ovary contains more germ cells than the right one.
Therefore, the left ovary becomes larger in size.

2-During sexual activity :

- The left ovary resembles bunch of grapes due to presence of many rounded follicles of varying sizes.

3-In actively laying hen :

- About 4-5 large follicles and thousands of smaller ones may be present in ovary.
- The ovary increases in size.

4-During resting phase :

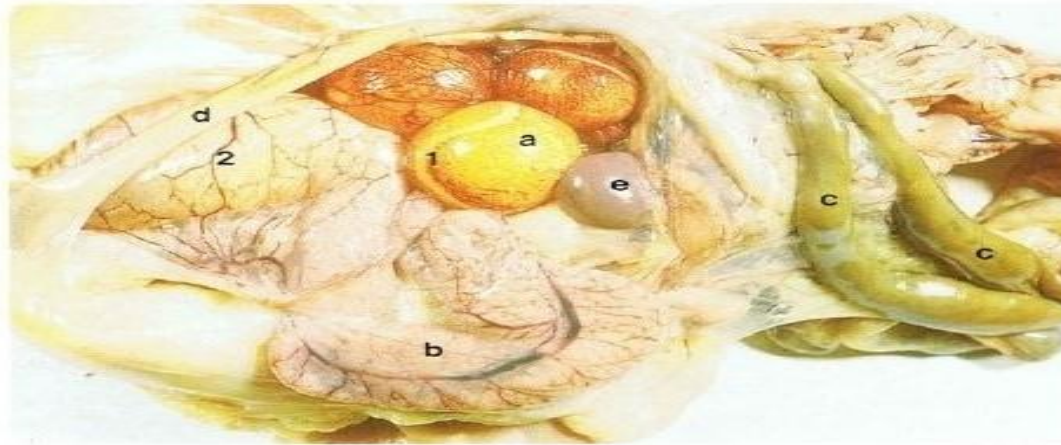
- The ovary diminishes in size**
- it becomes elongated flat oval.**
- The oocytes are small or minute masses .**

5-After laying period :

- The bird enters in non breeding state during which it is involved in incubation & caring for the chicks .**

Urogenital system

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161 Ovary and oviduct of an in-lay chicken. Right lateral view: (a) ovary; (b) oviduct; (c) right and left caeca; (d) rectum; (e) spleen. While left and right gonads and oviducts are present in the avian embryo, in most species only the left ovary and oviduct develop after hatching and become functional. In this photograph, three large, mature, highly vascular follicles can be seen suspended from the

ventral surface of the ovary. On the surface of the follicles is a white avascular band, the stigma (1), where at ovulation the wall of the follicle splits to release the oocyte. The oviduct lies in the left dorsal part of the body cavity to the left of the gut mesentery and is pink due to its great vascularity. An egg is present in the uterus (2). Paired ovaries and oviducts may be found in some birds of prey.

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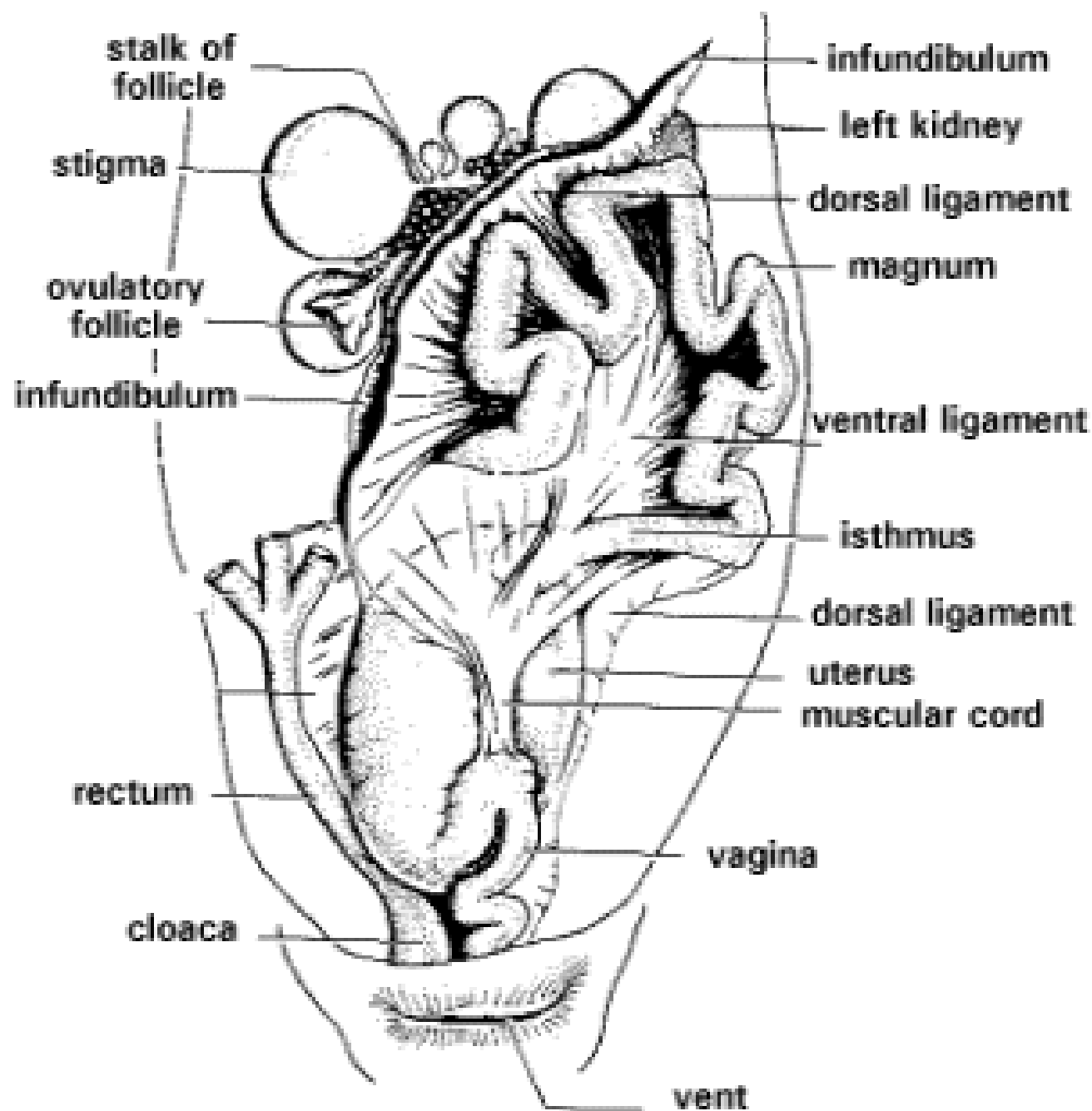
162 Ovary of an in-lay chicken. Modern breeds of chickens come into lay at about 18-21 weeks. The ovary then weighs about 60 g and resembles a bunch of grapes with four or five large, mature follicles (a) and thousands of smaller immature follicles (b). The yellow colour of the mature follicles is due to the presence of yolk, the protein and lipids of which are manufactured in the liver and travel in the bloodstream to the oocyte. About two hours before ovulation the primary oocyte in the follicle undergoes the first maturation division to form the secondary oocyte. Ovulation takes place under the influence of luteinizing hormone and in the chicken generally occurs about 30 minutes after an egg is laid. Immediately after ovulation the follicle becomes a thin-walled sac, the post-ovulatory follicle (arrow), which in the chicken regresses in about 10 days. Unlike in mammals there is no corpus luteum.

Left oviduct

- It is thick walled convoluted tube extends from ovary to the cloaca.
- It opens in left side of urodeum .

Size of oviduct :

- In day-old chick it is as a tiny tube.
- It increases gradually in size until puberty,
- In laying hen it is about 60-70 cm long.
- After laying it reduces to about 15 cm.



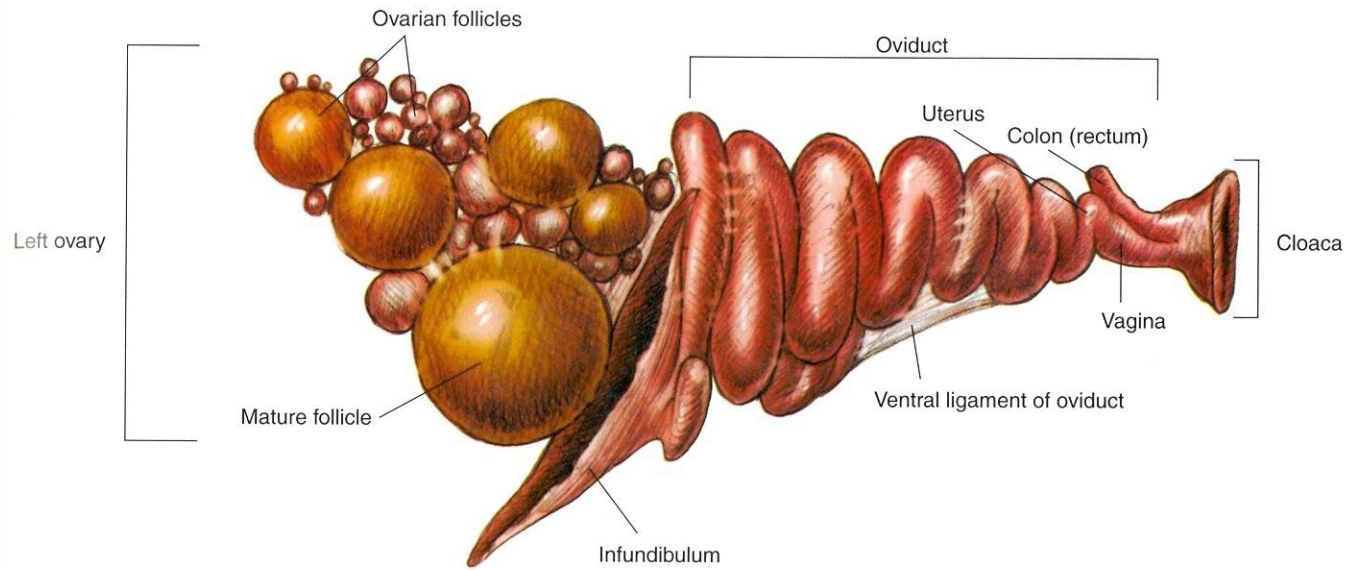
Position of oviduct:

It occupies completely left dorsal quadrant of body cavity, and also to some extent left ventral quadrant.

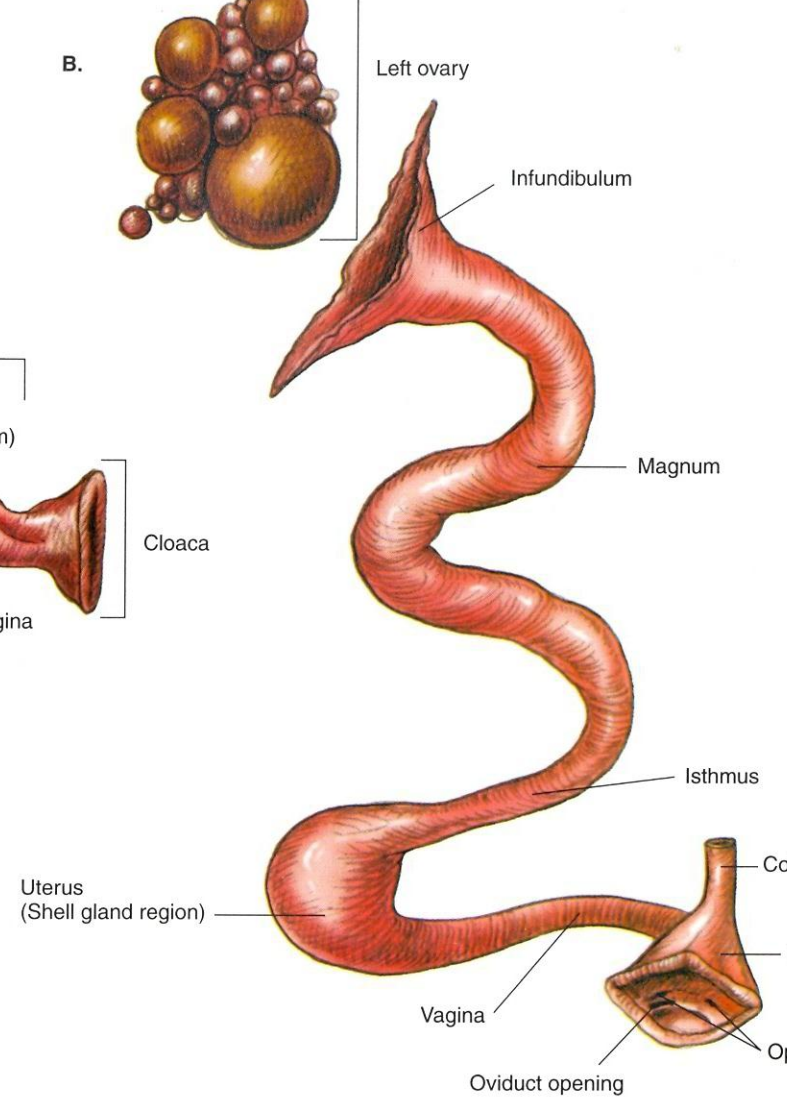
Parts of oviduct :

- 1- infundibulum
- 2- magnum
- 3- isthmus
- 4- uterus
- 5- vagina

A.



B.



1- Infundibulum :

- 4 to 10 cm (mean 7 cm) long.**
- Has funnel and tubular parts.**

a)-Funnel part :

- It has thin wall and low mucosal folds .**
- It has elongated slit opening .**

b)-Tubular part (chalaziferous region):

- Has slightly thicker wall and taller mucosal folds.**
- Has some tubular glands near to magnum.**

2- Magnum :

- It is 20 to 48 cm (mean 34 cm).
- It is the longest & most coiled part .
- The mucosal folds are higher and thicker than the other parts.
- Its great thickness is due to numerous branched tubular glands.
- Its secretion forms bulk of egg white protein and makes the magnum having milky white color.

3-Isthmus:

- It is 4 to 12 cm (mean 8 cm).
- It is short and slightly reduced in diameter.
- The folds are less than those of magnum .

4-Uterus:

- It is 4 to 12 cm long (mean 8 cm).
- The uterus or shell gland is a short sac-like region.
- Its longitudinal folds increased by transverse furrows thus forming leaf-like lamellae .

5-Vagina :

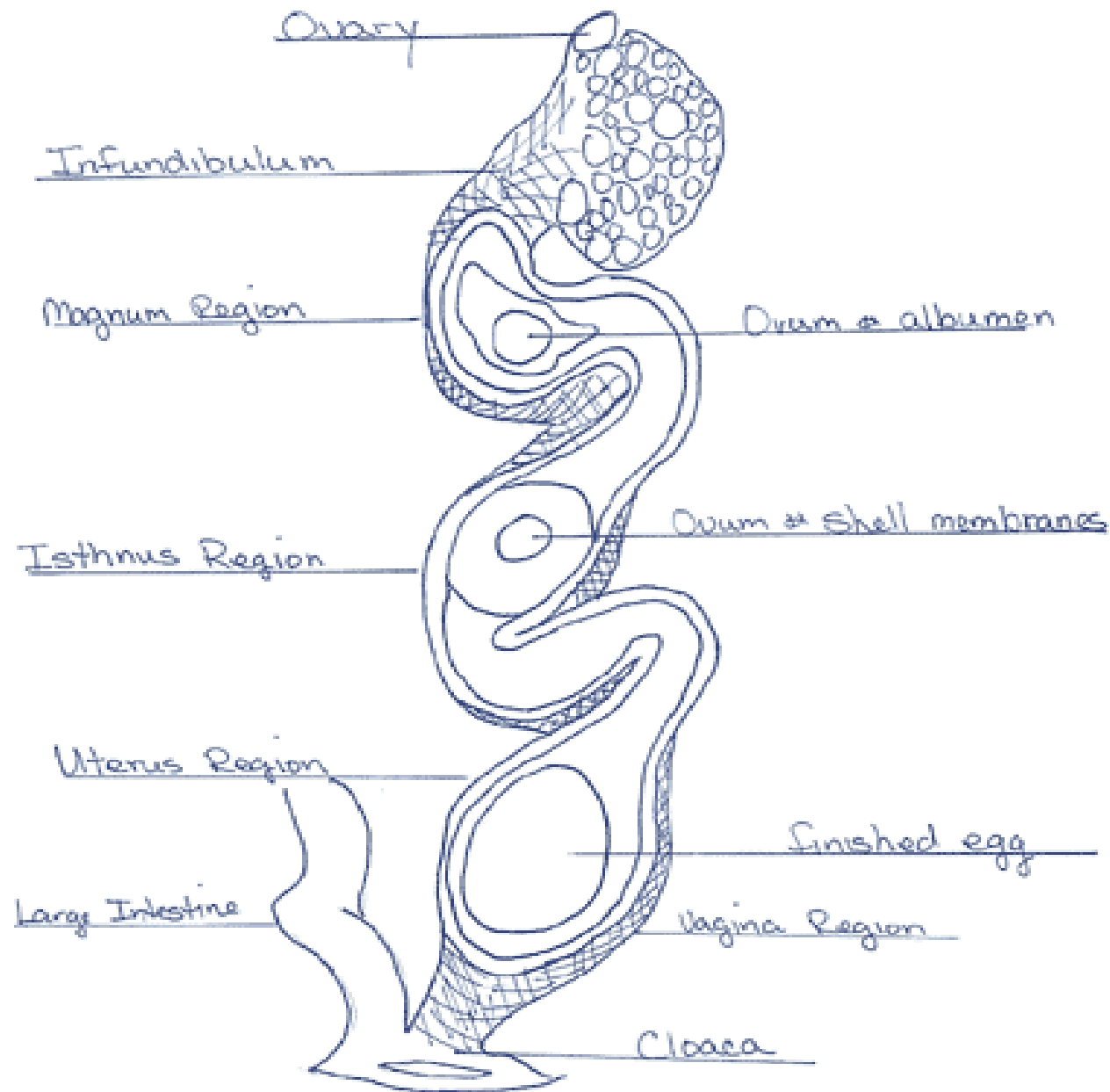
- It is 4 to 12 cm long (mean 8 cm).**
- It is a narrow muscular tube.**
- Its muscle is the thicker than the other parts.**
- it has S-shaped form.**
- Mucosal folds are low & has secondary folds.**
- No tubular glands .**

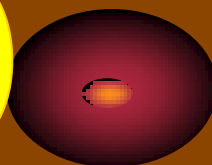
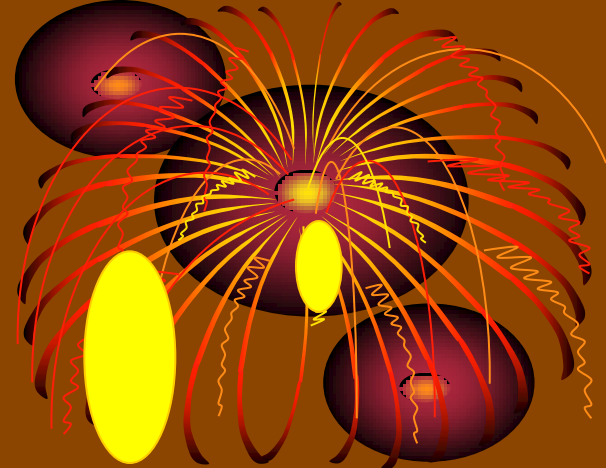
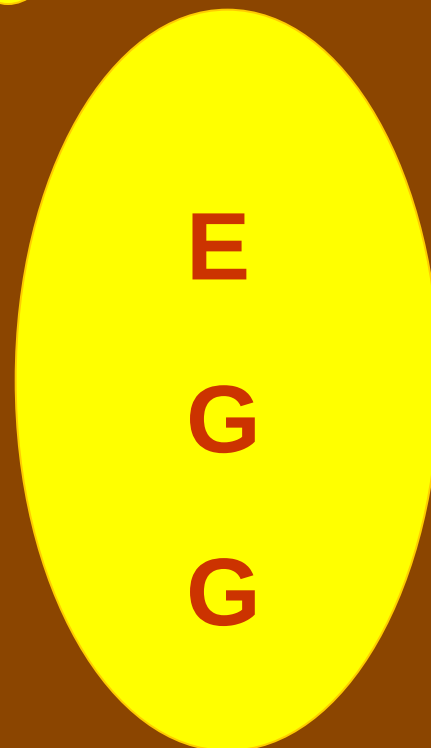
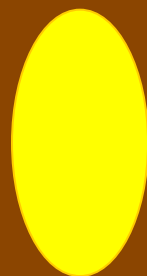
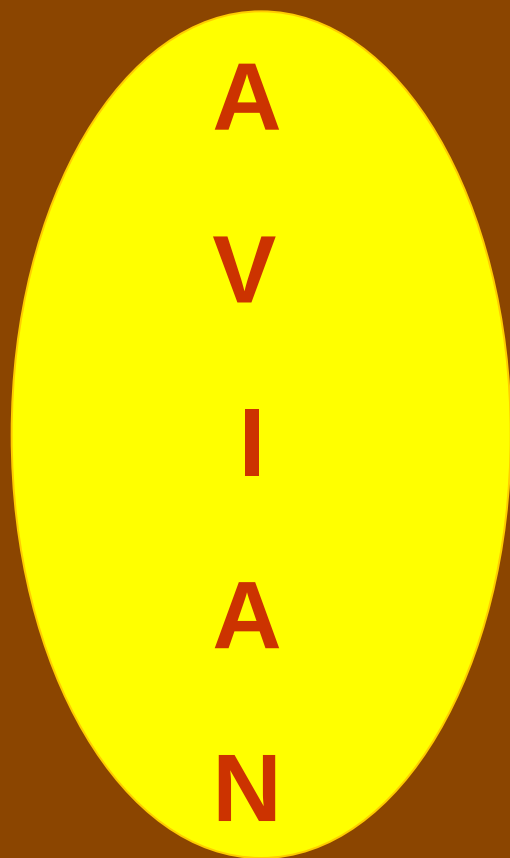
- .The junction between uterus & vagina is marked by vaginal sphincter.**
- in region of sphincter, spermatic fossulae - (sperm host gland) are present.**
- The fossulae are the main site for storage of sperms.**

Ligaments of oviduct :

The ovary is suspended from the roof of the body cavity by sheet of peritoneum forming dorsal and ventral ligaments of the oviduct .

Female Reproductive System





Avian egg

The egg consists of:

- | | |
|-----------------------|-------------|
| 1- germinal disc. | 2- yolk. |
| 3- membranes of yolk. | 4- albumen. |
| 5- shell. | |

The egg is about:

- A- three parts yolk.
- B- six parts albumen.
- C- one part shell plus membrane.

1-Germinal disc or blastodisc :

It is a small disc of cytoplasm containing remnants of the nucleus.

2-Yolk:

-It is a thick viscous material containing 50% solids of which 99% proteins.

-There are two kinds of yolk:

a)White yolk: it is about $\frac{2}{3}$ proteins and $\frac{1}{3}$ fat.

b)Yellow yolk: it is about $\frac{2}{3}$ fat and $\frac{1}{3}$ proteins.

- It is suspended by chalazae in center of egg.
- It can rotate about the long axis of the egg until chalazae are lightly twisted.

3-Yolk membranes:

- They form the narrow layer. They form a barrier between the yolk and permeable to water and salts.

4-Albumen:

It has five components :

a)Chalaziferous layer:

thin layer of dense albumen encloses yolk membrane.

b)Inner thin layer: of thin albumen.

c)Middle dense layer: of dense albumen.

d)Outer thin layer: of thin albumen.

e)Two chalazae:

- Each is a spiral strand extends between chalaziferous layer and middle dense layer of albumen
- The tension in chalazae holds yolk near center of egg.

5-Shell:

It consists of: shell membranes, testa and cuticle.

a) Two Shell membranes:

- Outer and inner S.M. are thin, pliable and very tough membranes.

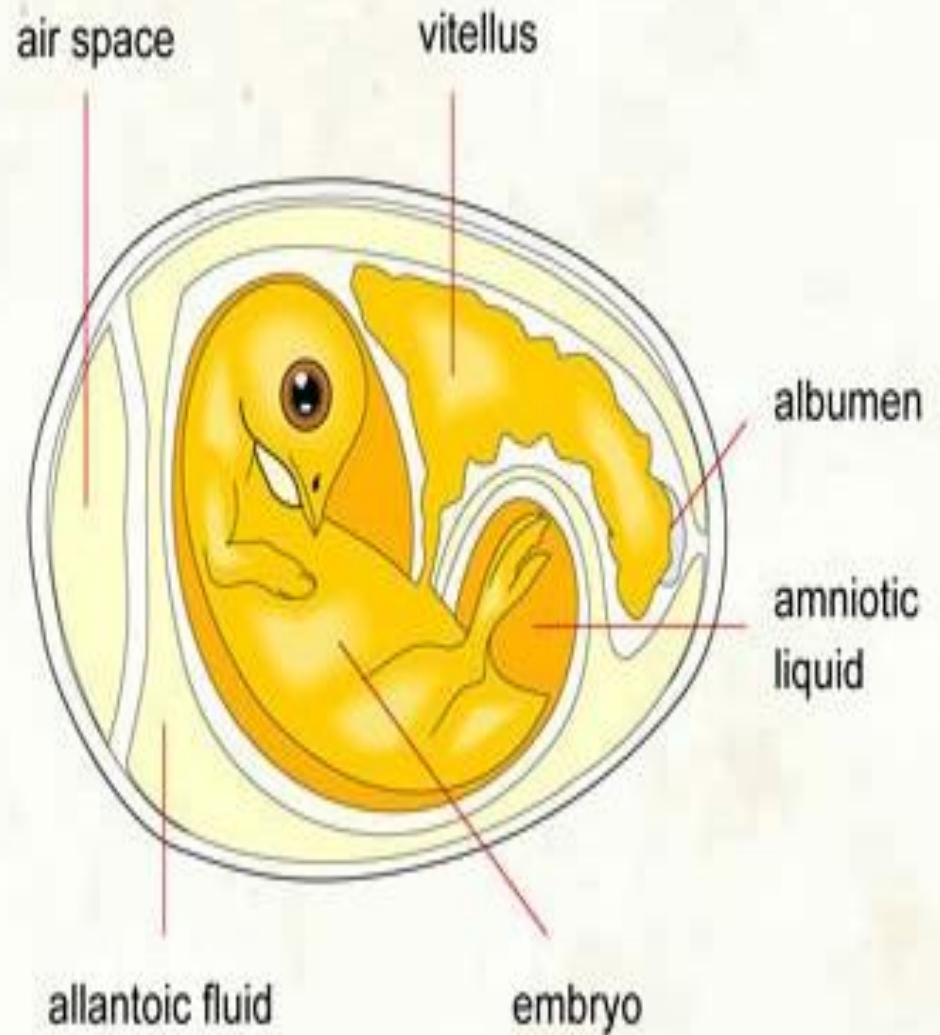
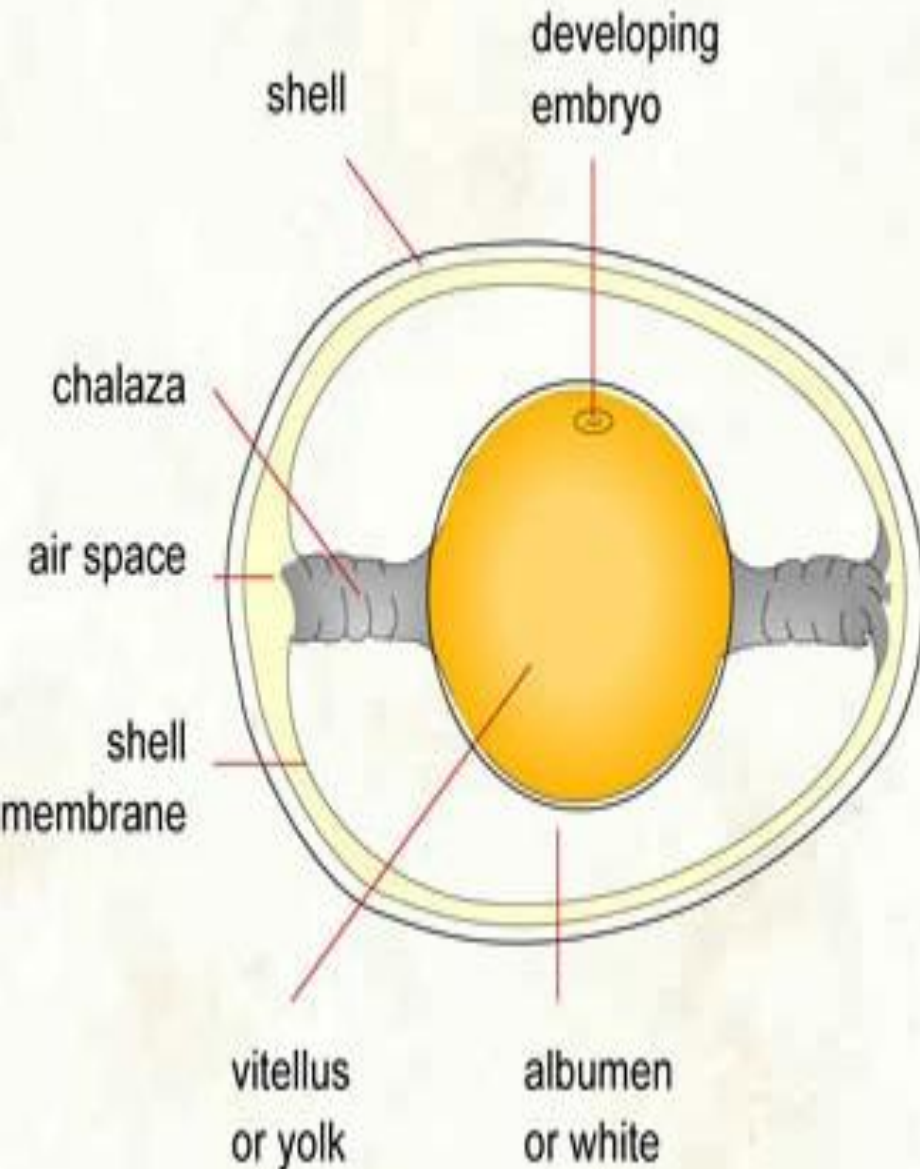
- At blunt end of egg the two shell membranes are separated by air cell or chamber.

b) Testa:

- it is a smooth, hard, calcareous structure, firmly attached to the outer shell membrane.
- Thousands of **fine pores** open on surface of shell and extend to shell membranes . Pores are especially numerous over blunt end of egg near air cell.

c)Cuticle:

- it is a thin permeable layer covers outer surface of shell, including pores.
- The cuticle is:
 - * permeable to gases
 - * water repellant, reduce water loss.
 - * acts as a barrier to bacteria.

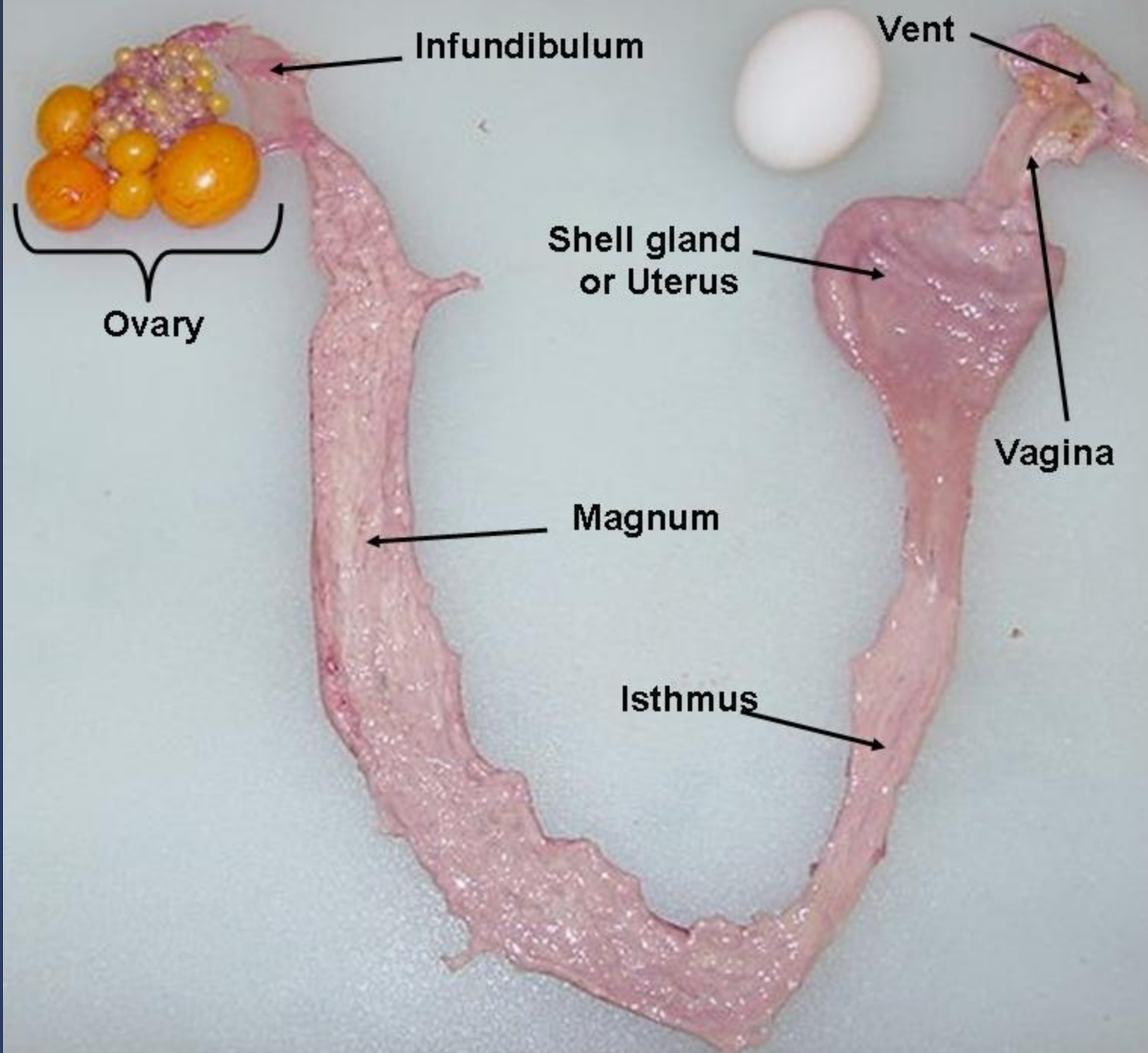


Formation of the egg

- The egg traverses oviduct in about 24-25 hours.
- The raw materials of yolk (protein and lipids) are synthesized in liver and travel in blood plasma to oocyte. The oocyte reorganizes them into yolk spheres and fluid.

1-In infundibulum:

- Egg passes through it in 15 minutes.
- In it chalaziferous layer and two chalazae are formed .



2-In magnum:

- Egg passes through it in 3 hours.
- In it albumen is secreted tubular glands.

3-In isthmus:

- Egg passes through it in 75 minutes.
- in it inner and outer shell membrane are formed.
- Moreover, 10% of protein is added to albumen.

4-In uterus:

- Egg passes through it in 20 hours.
- Shell is formed by uterus thus is called shell gland.

5-Vagina:

- Egg passes through it in a few seconds. –
- It may contribute to formation of cuticle .
- The cuticle covering the egg is sticky when it is first laid but it dries rapidly.