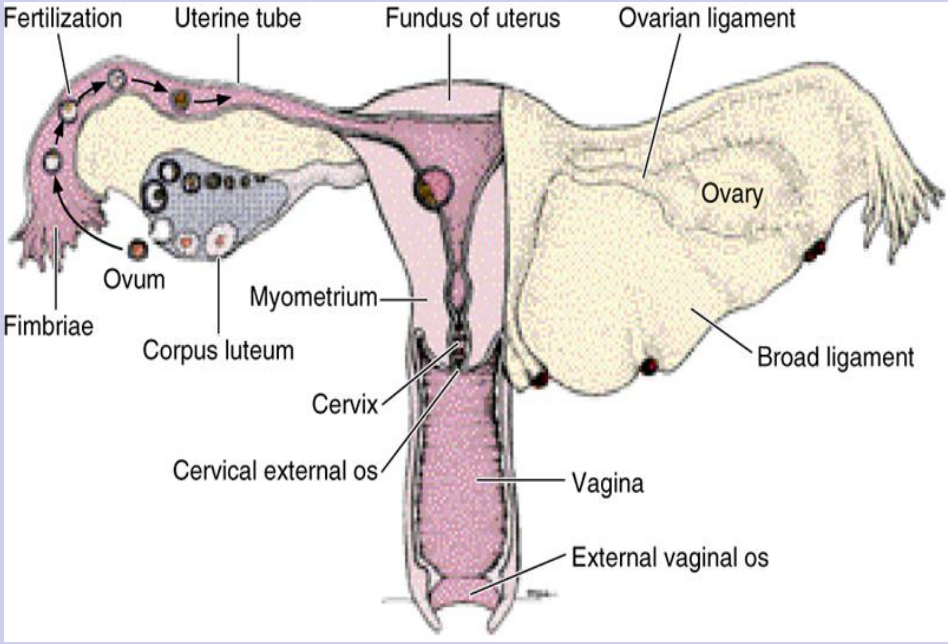
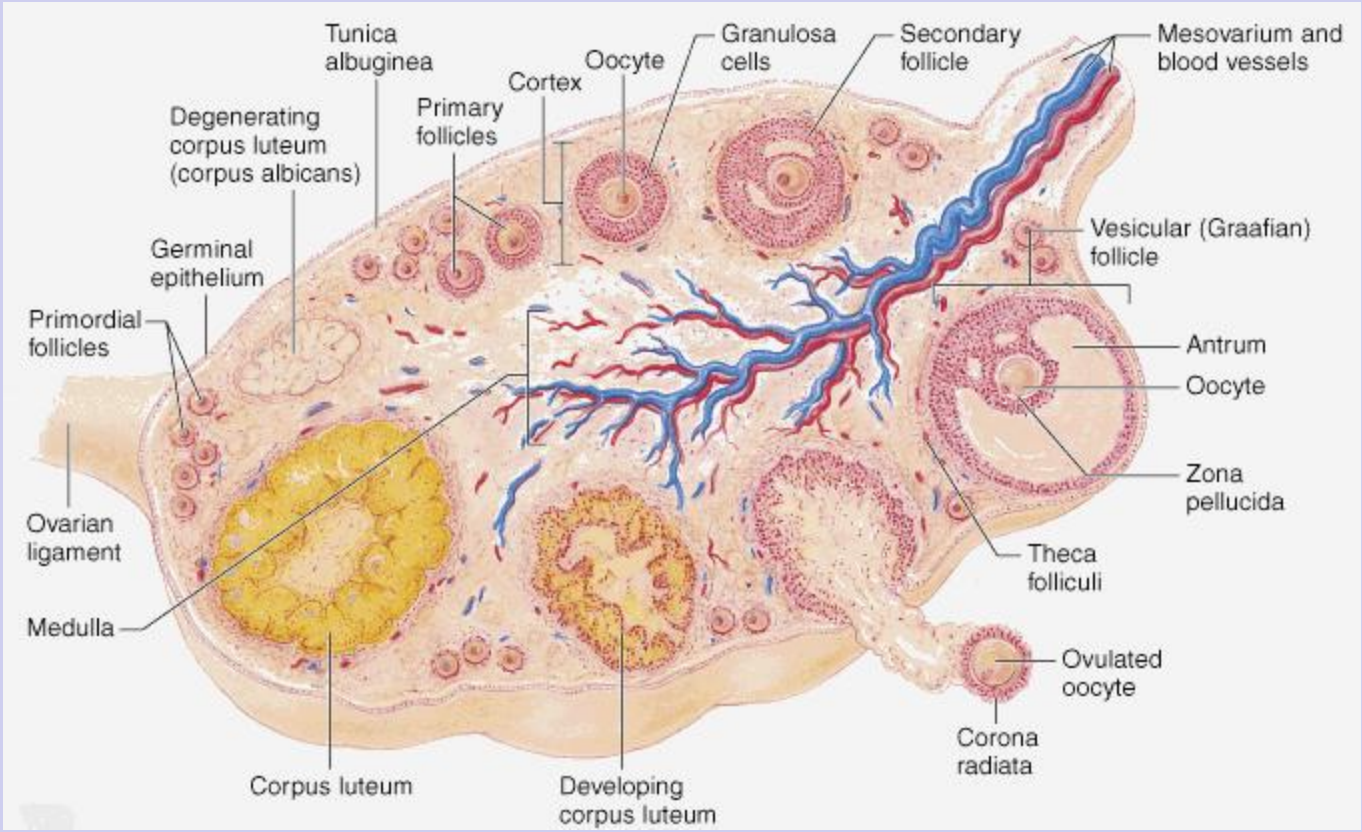
Female reproductive system

- The female reproductive system consists of two ovaries , two oviducts , the uterus , the vagina and the external genitalia.
- Its functions are to produce female gametes.
- The system also produce sexual hormones
- Menarche: is the first mense
- Menopause: is a variable period during which the cyclic changed become irregular and eventually disappear.

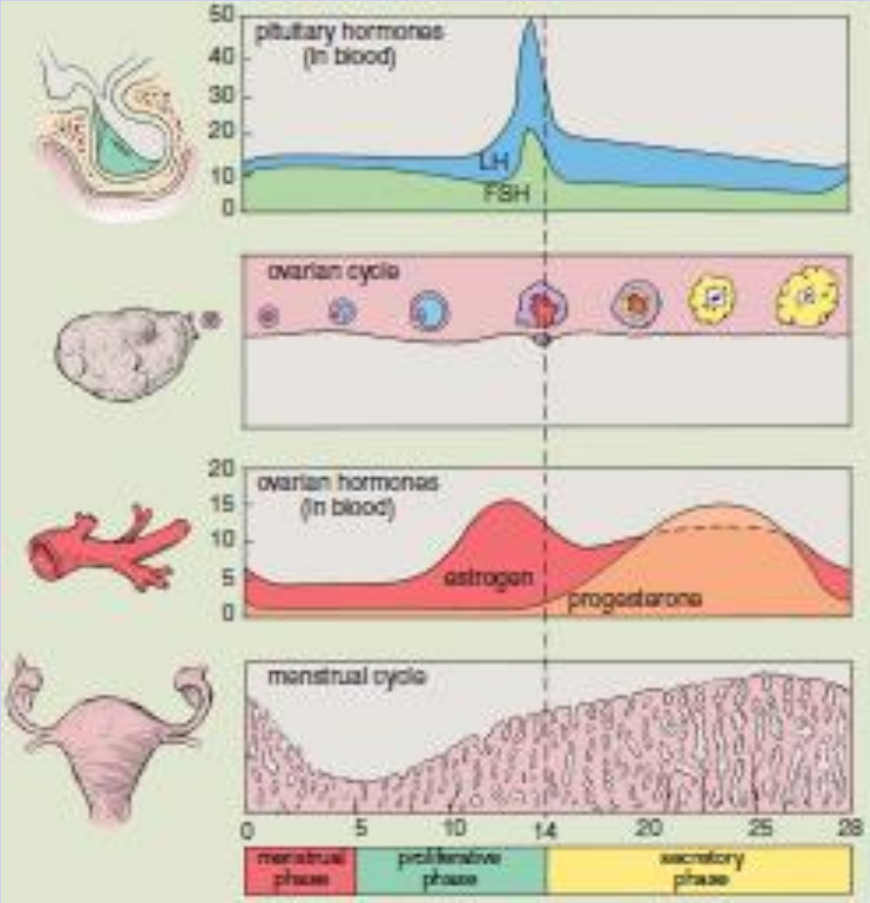


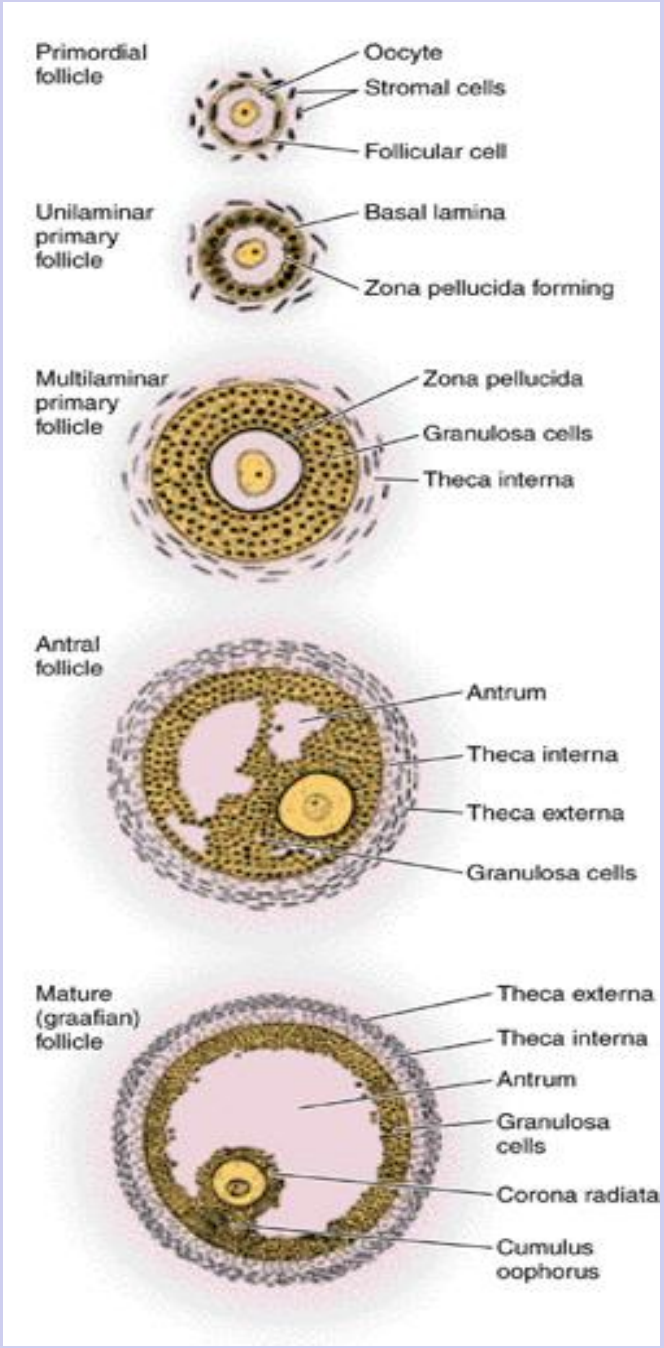
Ovary



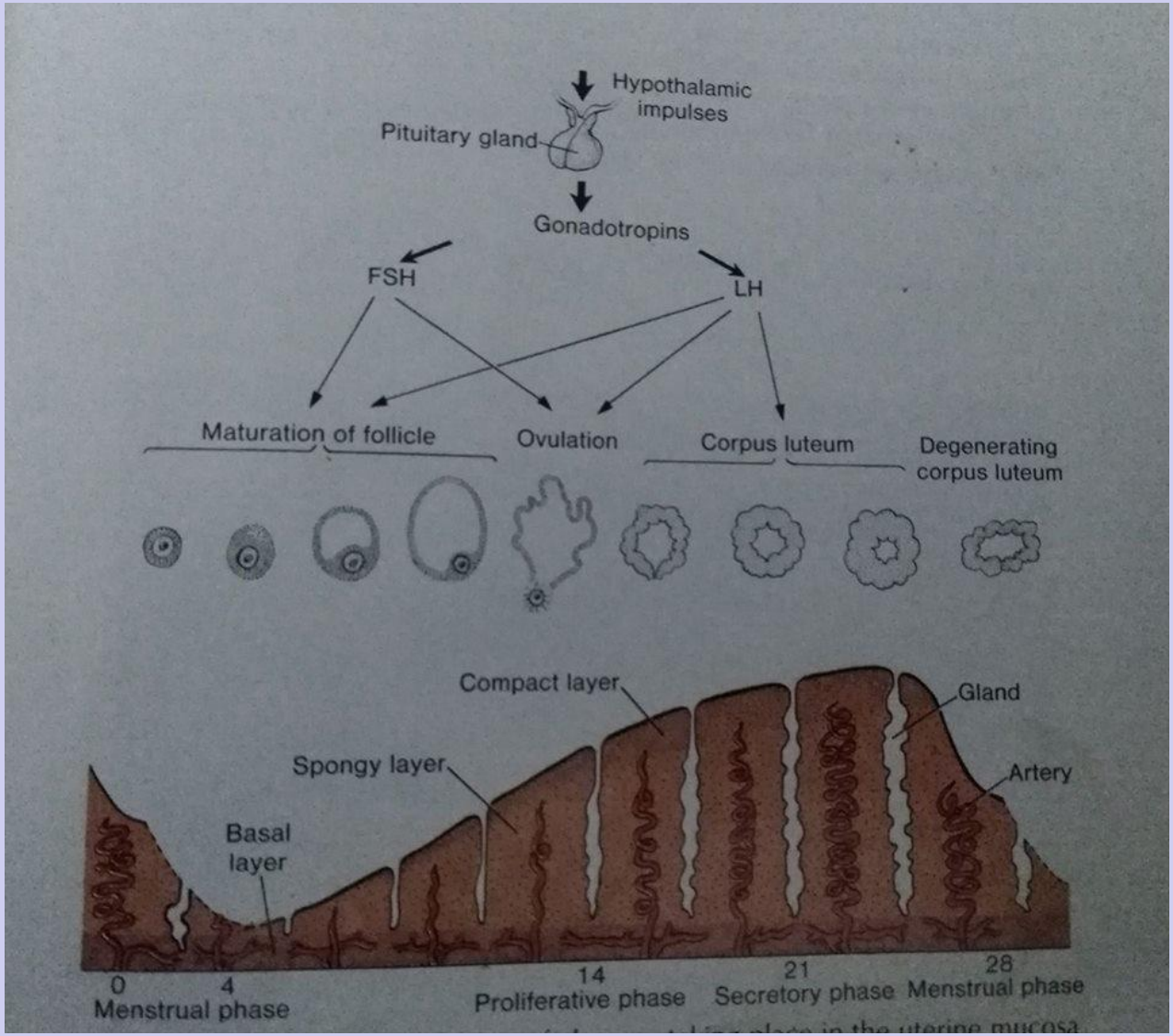
- under germinal epithelium the tunica albuginea , Underneath it is the cortical region where the ovarian follicles predominate. The follicles are embedded in the connective tissue (stroma).
- The most internal part of the ovary is the medullary region containing a rich vascular bed within a loose connective tissue .

- **Follicular growth :**
- At puberty, primordial follicles begins follicular growth. This consists of modifications of the oocyte, of the granulose cells, and of the stromal fibroblasts.

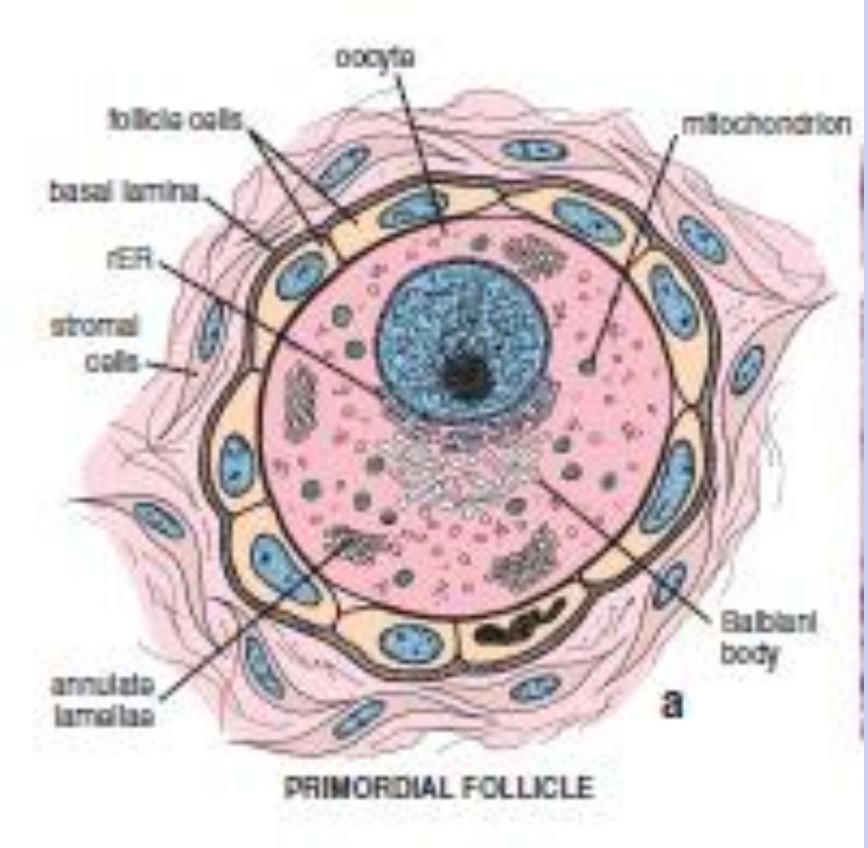




Menstrual cycle

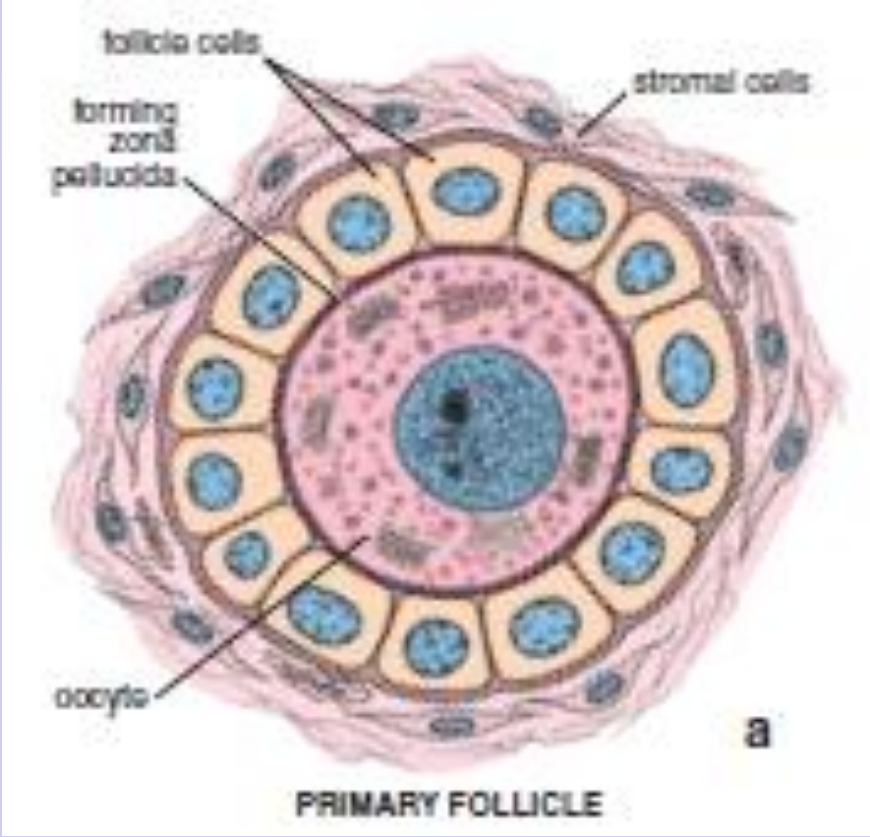


Primordial follicle



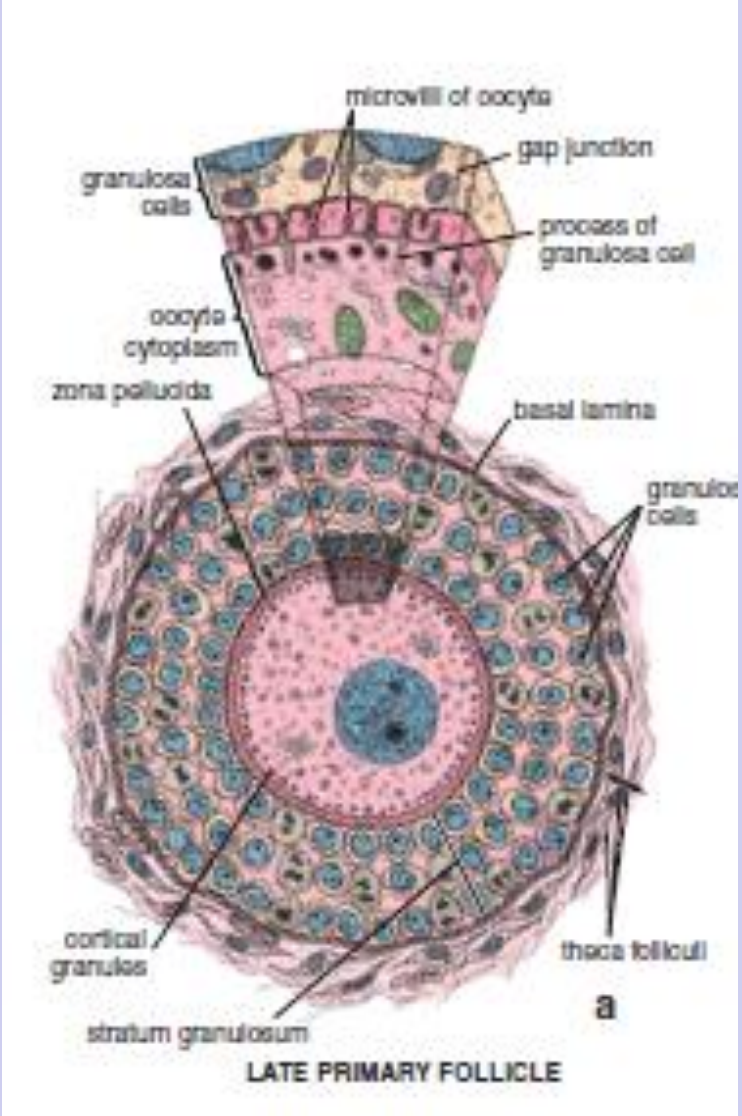
Unilaminar primary follicle

- Follicular growth is stimulated by FSH. Follicular cells divide by mitosis and form a single layer of cuboidal cells; the follicle is then called a unilaminar primary follicle.

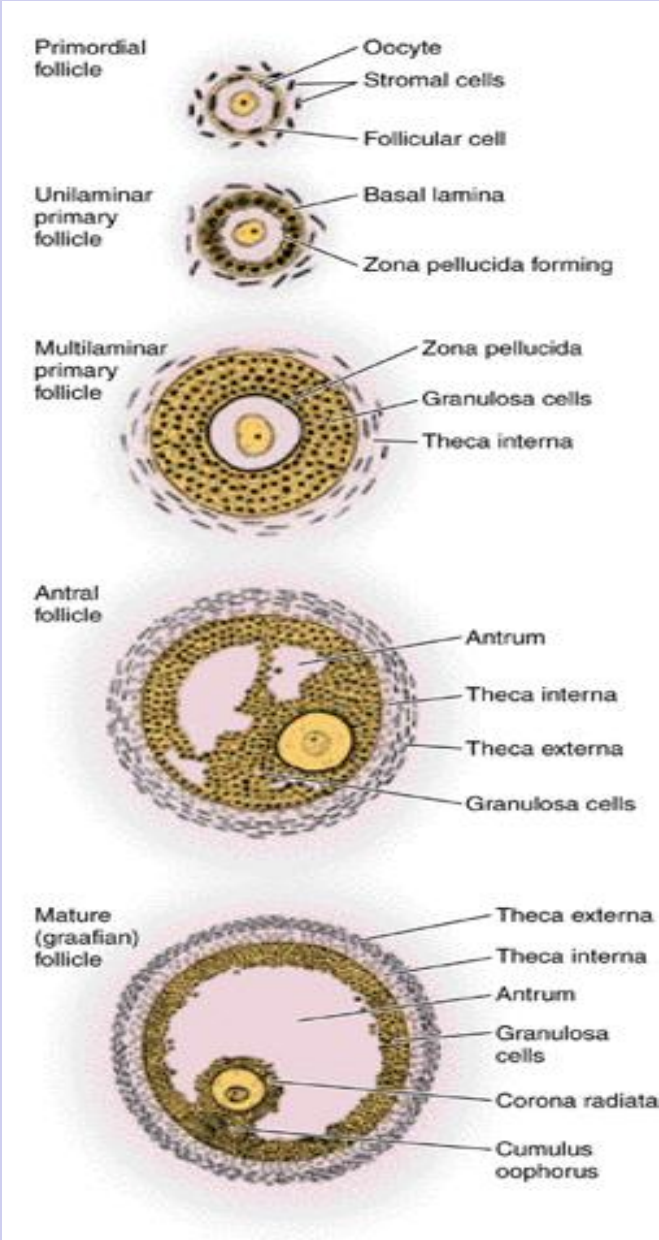


Multilaminar or preantral Follicle

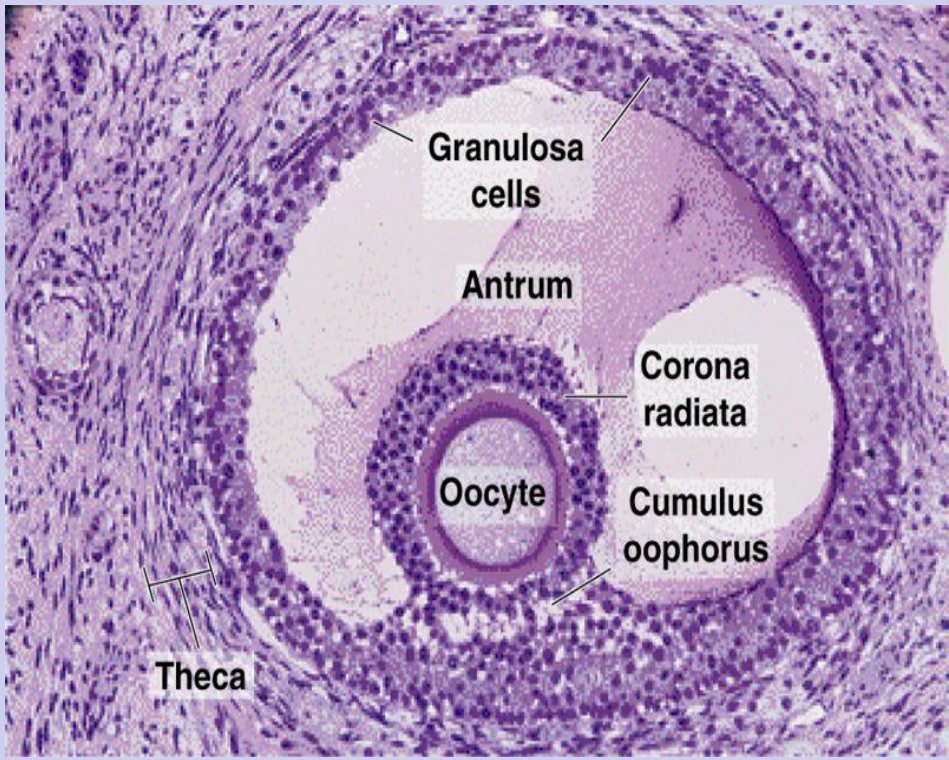
- The follicular cells continue to proliferate and form a stratified follicular epithelium, or granulose layer. The follicle is then called a multilaminar primary or preantral follicle.
- A thick amorphous layer, the zona pellucida composed of glycoproteins is secreted by follicular cells and oocyte) and surround the oocyte. Filopodia of follicular cells and microvilli of the oocyte penetrate the zona pellucida and make contact with one another via gap junctions.



- As the follicles grow, liquid (liquor folliculi) begins to accumulate between the follicular cells.The small spaces that contain this fluid coalese and the granulose cells reorganize themselves to form a large cavity, the antrum. The follicle is then called secondary or antral follicles.
- During the reorganization of the granulose cells, some of these cells concentrate at a certain point on the follicular wall to form the cumulus oophorus. A group of granulose cells concentrates around the oocyte and form the corona radiate. These granulose cells accompany the oocyte when it leave the ovary.
- The fibroblast differentiate to form the theca interna and externa.
- The cells of the theca interna acquire the ultrastructural characteristics of cells that produce steroids.
- The boundary between the theca interna and the granulose layer is well defined.



- During each menstrual cycle, usually one follicle grows and reach the most developed stage of follicular growth – the mature, preovulatory or graafian follicle that ovulate, the other follicles enter atresia. Mature follicles are about 2.5 cm in diameter as a result of accumulation of liquid, the follicular cavity increase in size and the oocyte adhere to the wall of follicle.



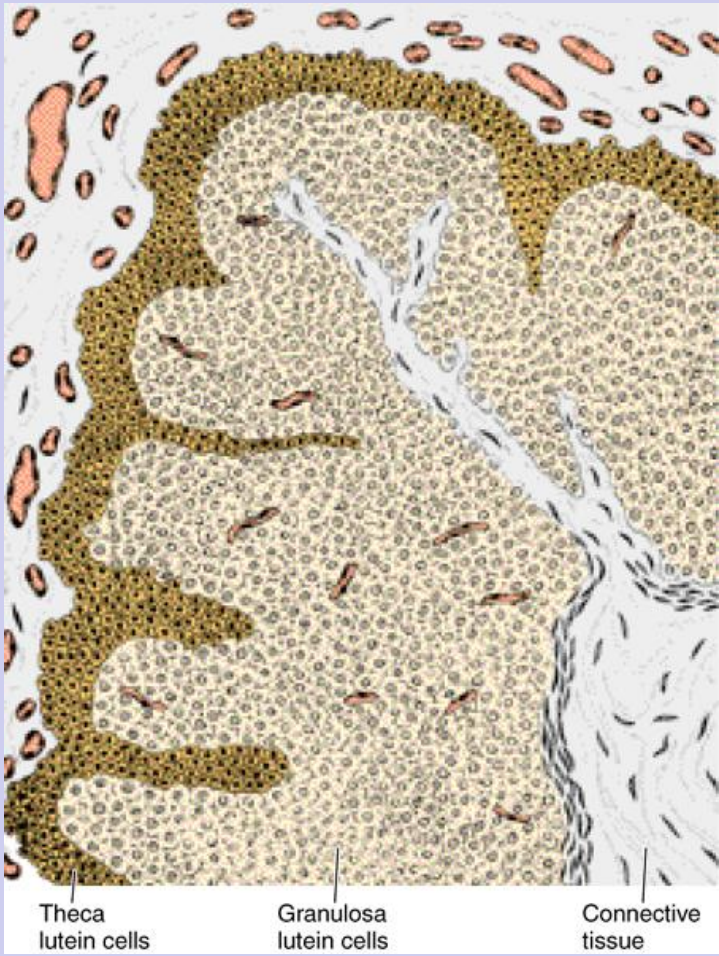
- **Follicular atresia :**
- Most ovarian follicles undergo atresia in which follicular cells and oocytes die and are disposed of by phagocytic cells .
- This process is characterized by cessation of mitosis in the granulose cells from the basal lamina and death of the oocyte and granulose cells .
- At later stage , fibroblasts occupy the follicle and produce a scar of collagen that may persist for a long time .
- Follicular atresia takes place from before birth until a few years after menopause .

ovulation

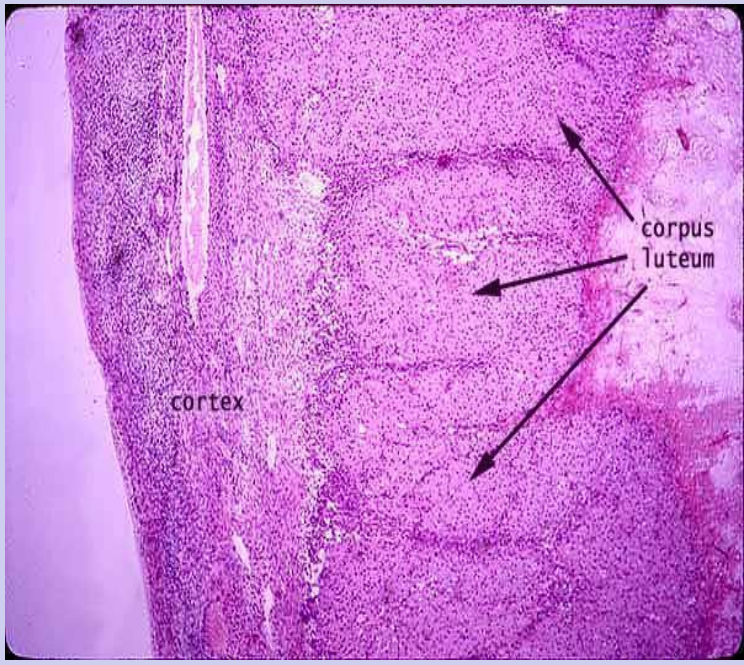
- *It take place around the 14th day of a 28 day cycle .*
- *In human usually only one oocyte is liberated but sometime two or more oocytes can be expelled , and if they are fertilized there may be two or more fetuses .*
- *The stimulus for ovulation is a surge of LH in response to high levels of circulating estrogen .*
- *A small area of the wall of the follicle becomes weak because of collagen degradation of the tunica albuginea , ischemia and the death of some cells . This weakness combined with an increased pressure of the follicular fluid leads to the rupture of the outer follicular wall and ovulation .*
- *The first meiotic division is completed just before ovulation to yield secondary oocytes and the first polar body and starts the second meiotic division which stops in metaphase .*
- *The oocyte and the first polar body both enclosed by the zone pellucida .*
- *the corona radiate and some follicular fluid leave the ovary and the uterine tube where the oocyte may be fertilized. If this does not happen within the first 24 hours after ovulation , it degenerate .*

Corpus Luteum :

- After ovulation, the granulose cells and theca cells reorganized to form a temporary endocrine gland called the corpus luteum.
- The granulose cells increase greatly in size, they make up about 80% of the corpus luteum and are then called granulose lutein cells.
- Cells of the theca interna also contribute to the formation of the corpus luteum by giving rise to theca lutein cells.
- The blood capillaries and lymphatics grow into the interior of the corpus luteum and form the rich vascular network of this structure.
- The development of corpus luteum result from the LH released before ovulation . Also under stimulus by LH, the cells of the corpus luteum change their sets of enzymes and begin secreting progesterone and estrogen.

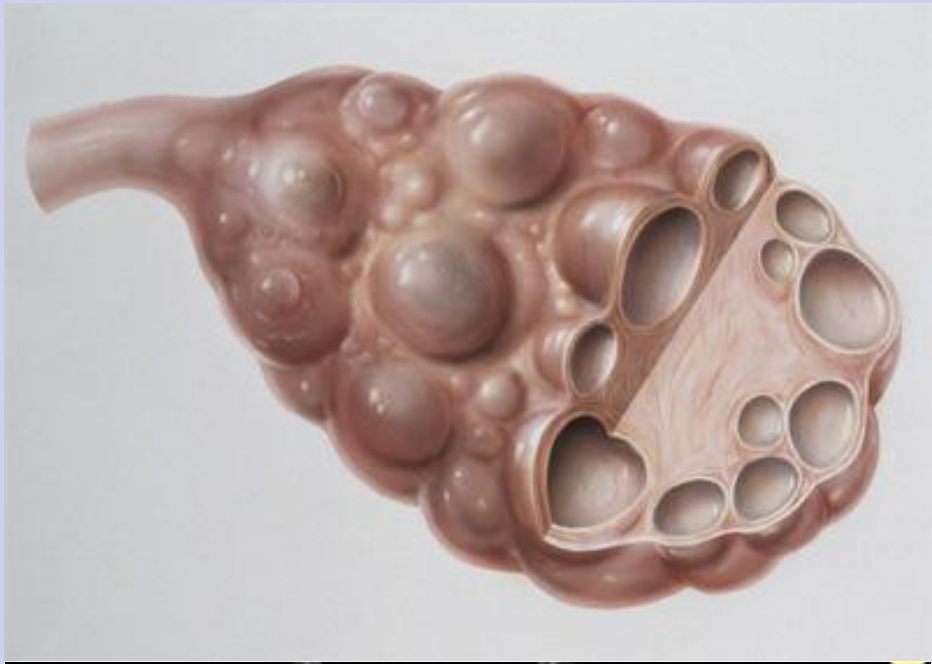


- The fate of the corpus luteum depends on whether pregnancy is established. The corpus luteum is programmed to secrete for 10-12 days.
- If pregnancy does not occur, the cells of the corpus luteum degenerate. Its cellular remnants are phagocytosed by macrophages. Neighboring fibroblasts invade the area and produce a scar of dense connective tissue called the corpus albicans (white body).
- If pregnancy occurs a signal to the corpus luteum is given by a hormone called human chorionic gonadotropin (HCG) secreted by placenta. The action of HCG is similar to that of LH which (which will maintain the uterine mucosa throughout pregnancy). Progesterone also stimulate secretion of the uterine glands which is thought to be important for the nutrition of the embryo before the placenta is functional, this is the corpus luteum of pregnancy.



Polycystic ovary

- Oyster ovaries
- Like white balloon filled with tightly packed marbles
- Oligomenorrhea, infertile, hirsutism.



Thanks