

Histology of Female Reproductive System

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Female Reproductive System

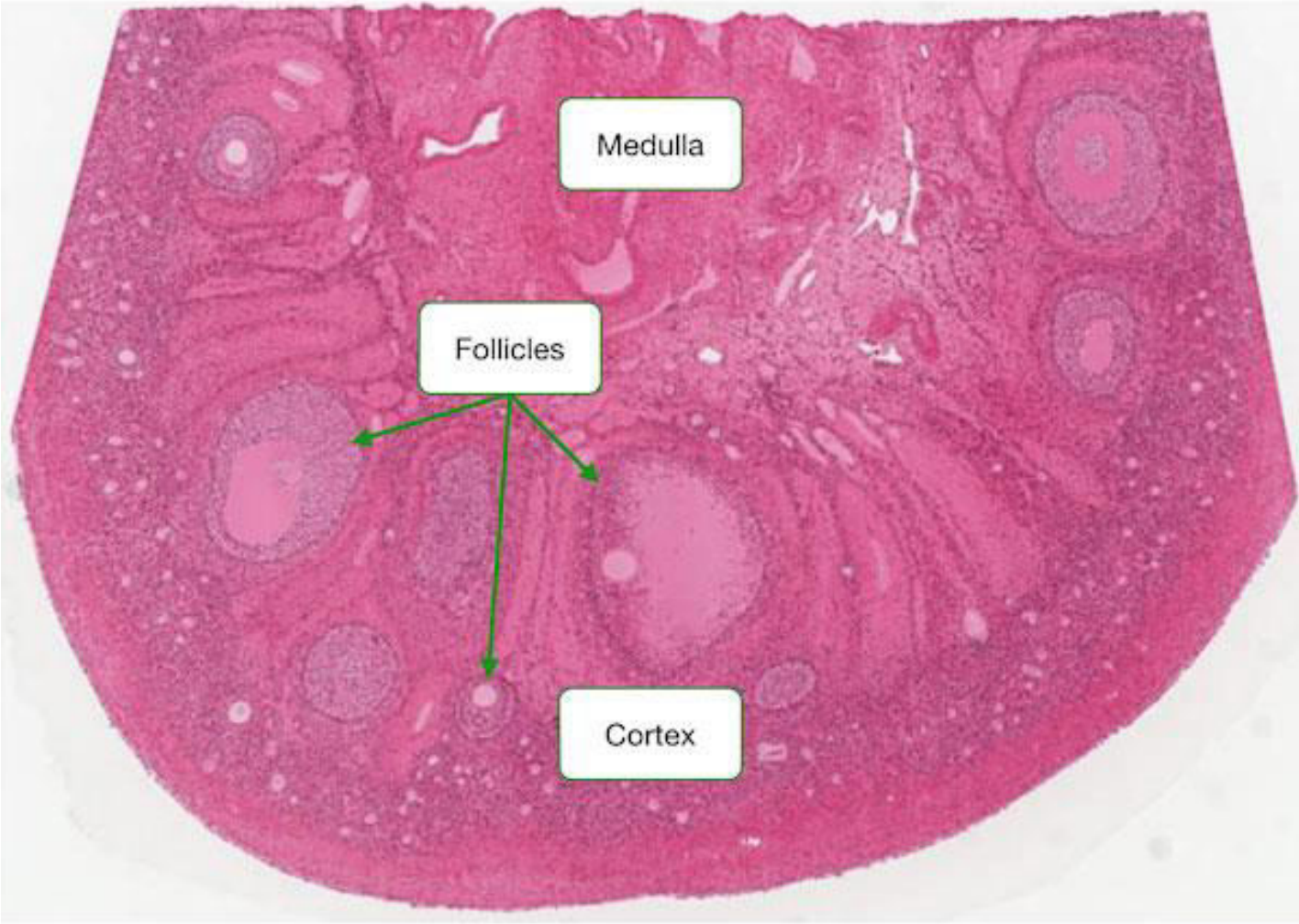
- Ovaries
- Oviducts
- Uterus
- Vagina
- External Genitalia

Ovaries

- The ovaries have exocrine as well as endocrine function.
- The surface of ovary is covered by simple cuboidal epithelium.
- Two types of zone are seen:
 - **Medulla** (Central deeper zone)
 - **Cortex** (broader outer zone)

Ovaries

- **Medulla:** Consist of loose connective tissue , large blood vessels, lymph vessels and nerves.
- **Cortex:** consist of a compact richly cellular connective tissue stroma which contains spherical bodies called *ovarian follicles*.
- The supporting framework consist of spindle shapes fibroblast (stromal cells),reticular fibers and ground substance.
- A layer of dense connective tissue lies between epithelium and cortex known as *tunica albuginea*.



Ovarian Follicles

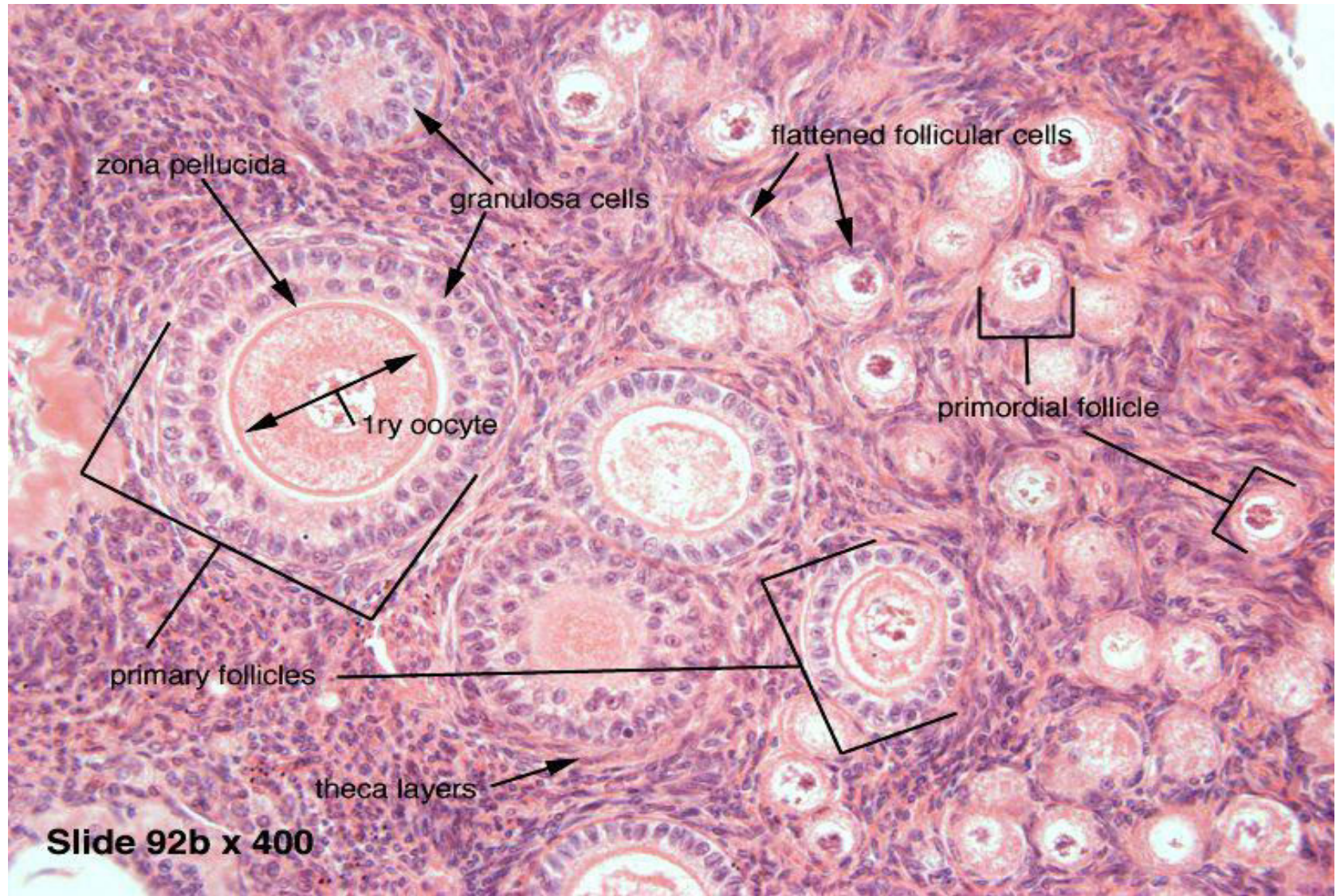
- A spherical structure containing an immature ovum (oocyte) which is surrounded by epithelial cells known as *ovarian follicle*
- A female child contain only one type of ovarian follicle called *primordial follicle*.
- During each sexual cycle a few primordial follicles begin to grow under the influence of FSH and LH, these are called *growing follicles*

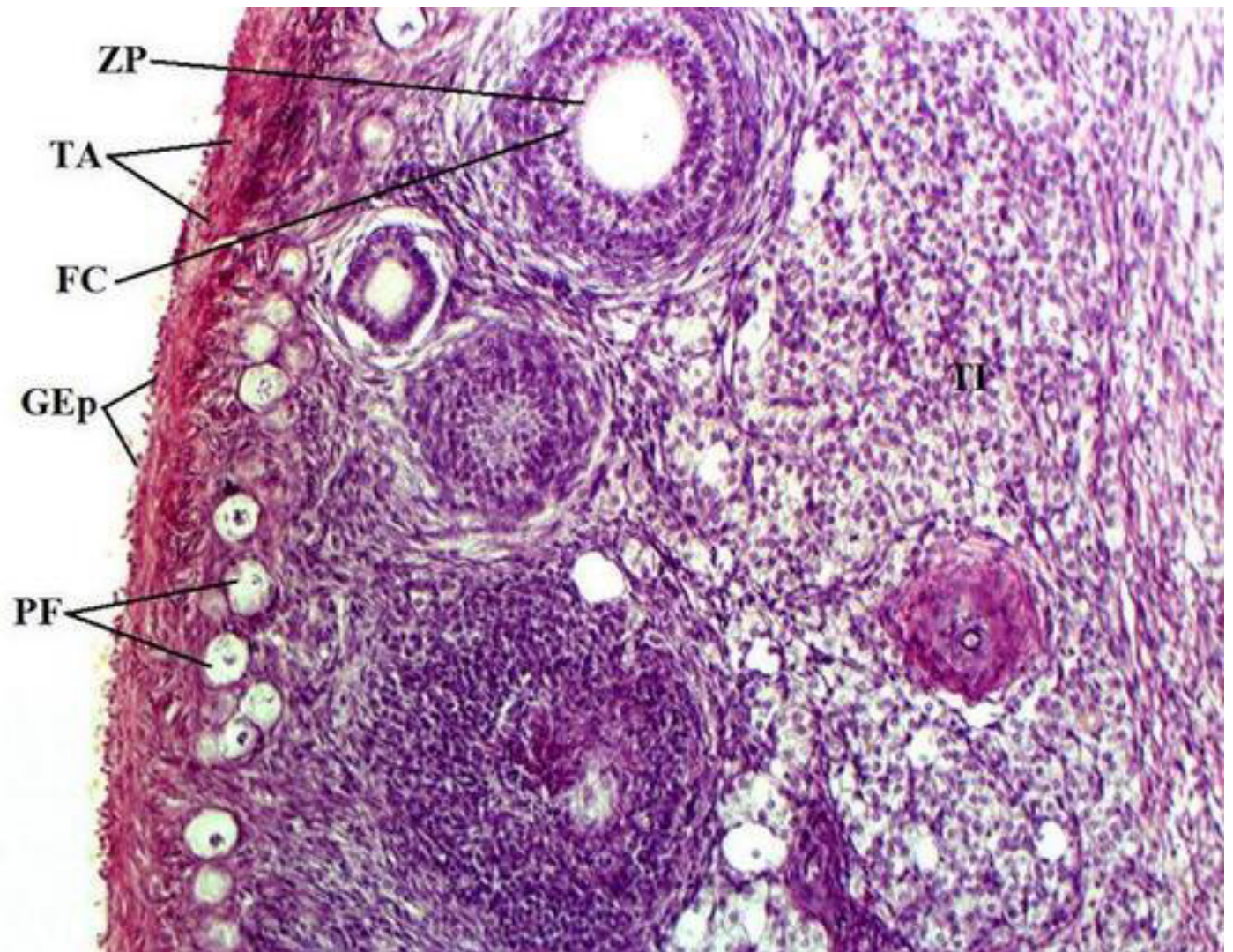
Types of Ovarian Follicles

- Primordial
- Growing Follicles
 - unilaminar primary follicle
 - multilaminar primary follicle
 - secondary follicle
- Mature Follicles (Graafian)

Primordial Follicle

- Primary oocyte with one layer of flattened squamous epithelial cells called *follicular cells*.
- The follicular cells also known as *Granulosa cells*, are attached to each other by desmosomes and rest on basal lamina.
- The cytoplasm contains abundant mitochondria , golgi bodies , RER and numerous lysosome.
- The cell membrane of oocyte also known as *Olemma*.





GEp- Germinal epithelium
TA- tunica albuginea
PF- Primordial follicles
ZP- zona pellucida
FC- Follicle cells
TI- theca interna

Growing Follicles

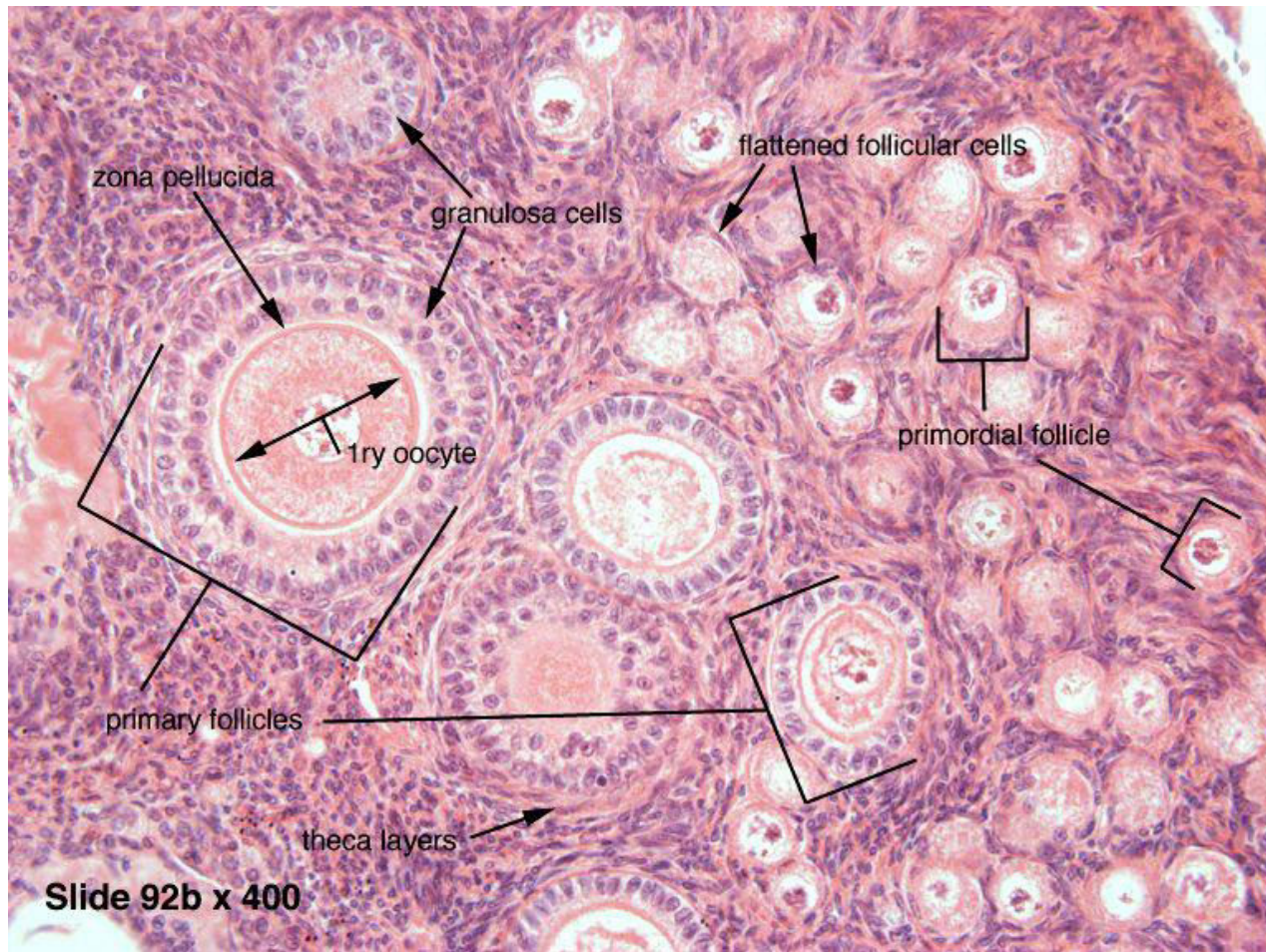
- The growth of the primordial follicle is stimulated by FSH and is characterized by changing in oocyte as well as granulosa cells.
- The primordial follicle passes through following developmental stages:
 - Unilaminar primary follicle
 - Multilaminar primary follicle
 - Secondary follicle

Unilaminar Primary Follicle

- Growth of the primordial follicle leads to changes in the oocyte as well as follicular cells.
- The oocyte enlarges in size and the organelles become numerous and bigger.
- Special secretory granules appear in peripheral part of cytoplasm of oocyte known as *cortical granules and these granules prevent polyspermy.*
- The follicular cells increase in number and change their shape from squamous to cuboidal.
- An amorphous layer is appear between oocyte and granulosa cells called *zona pellucida.*

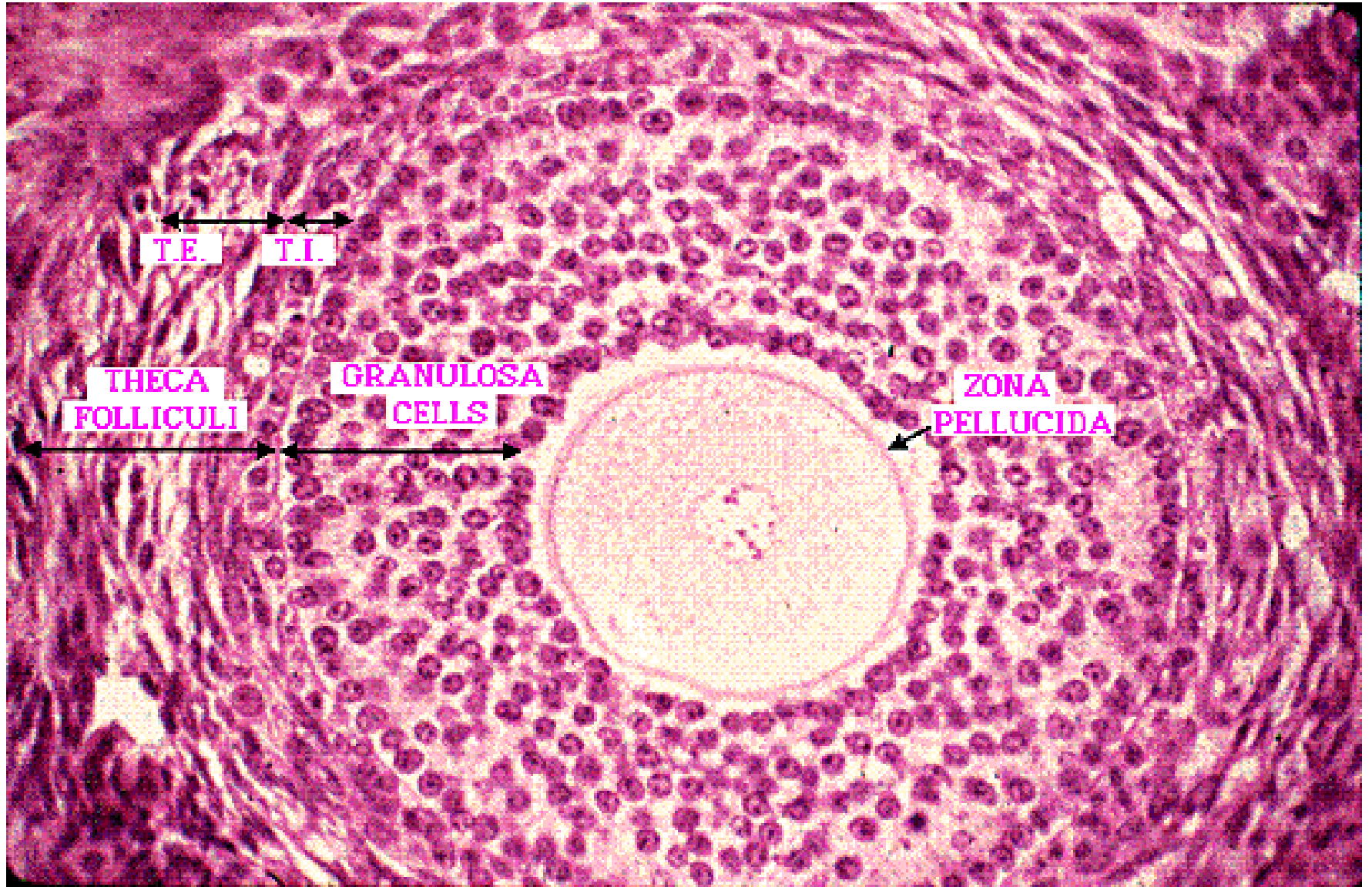


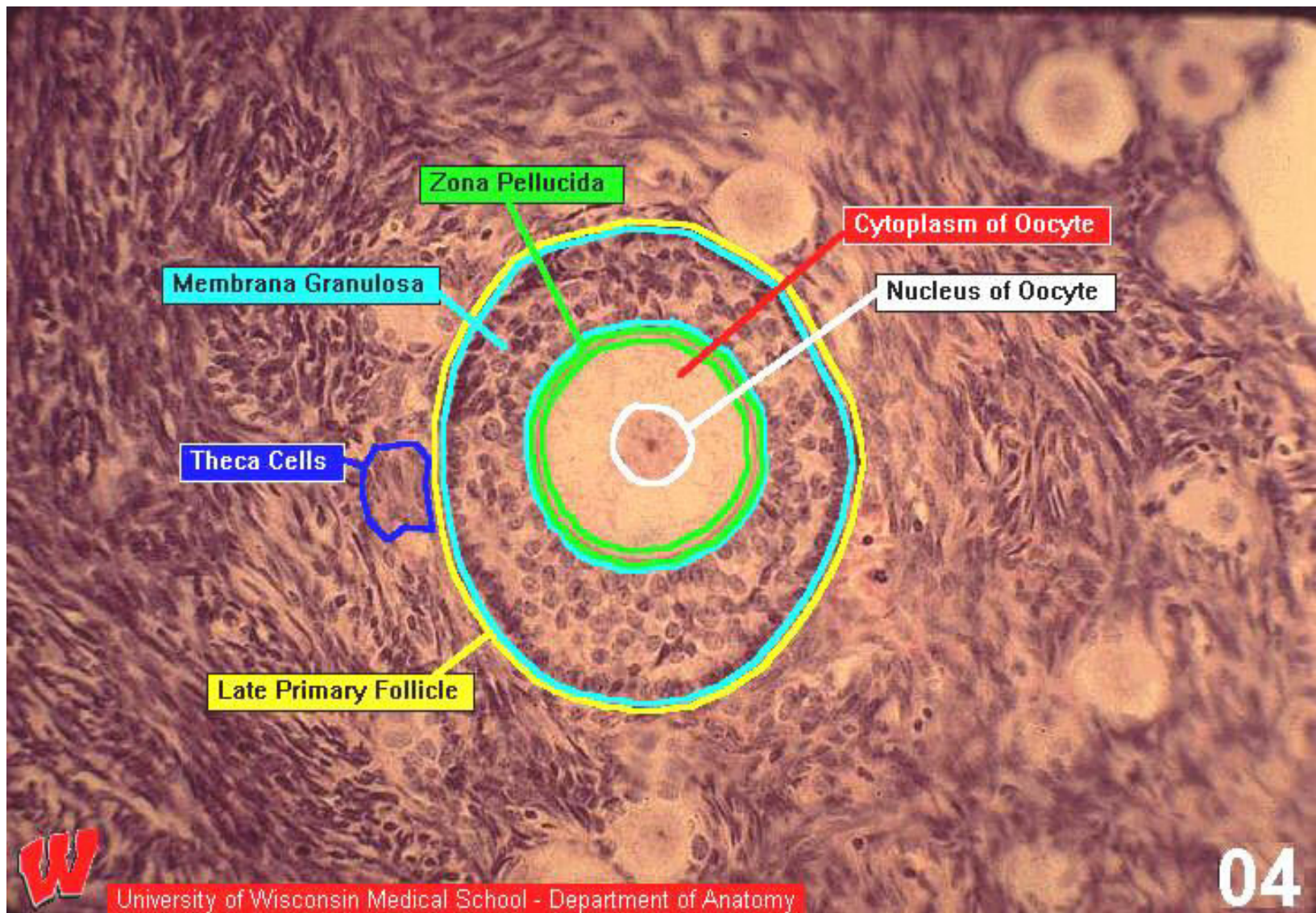
Unilaminar Primary Follicle



Multilaminar Primary Follicle

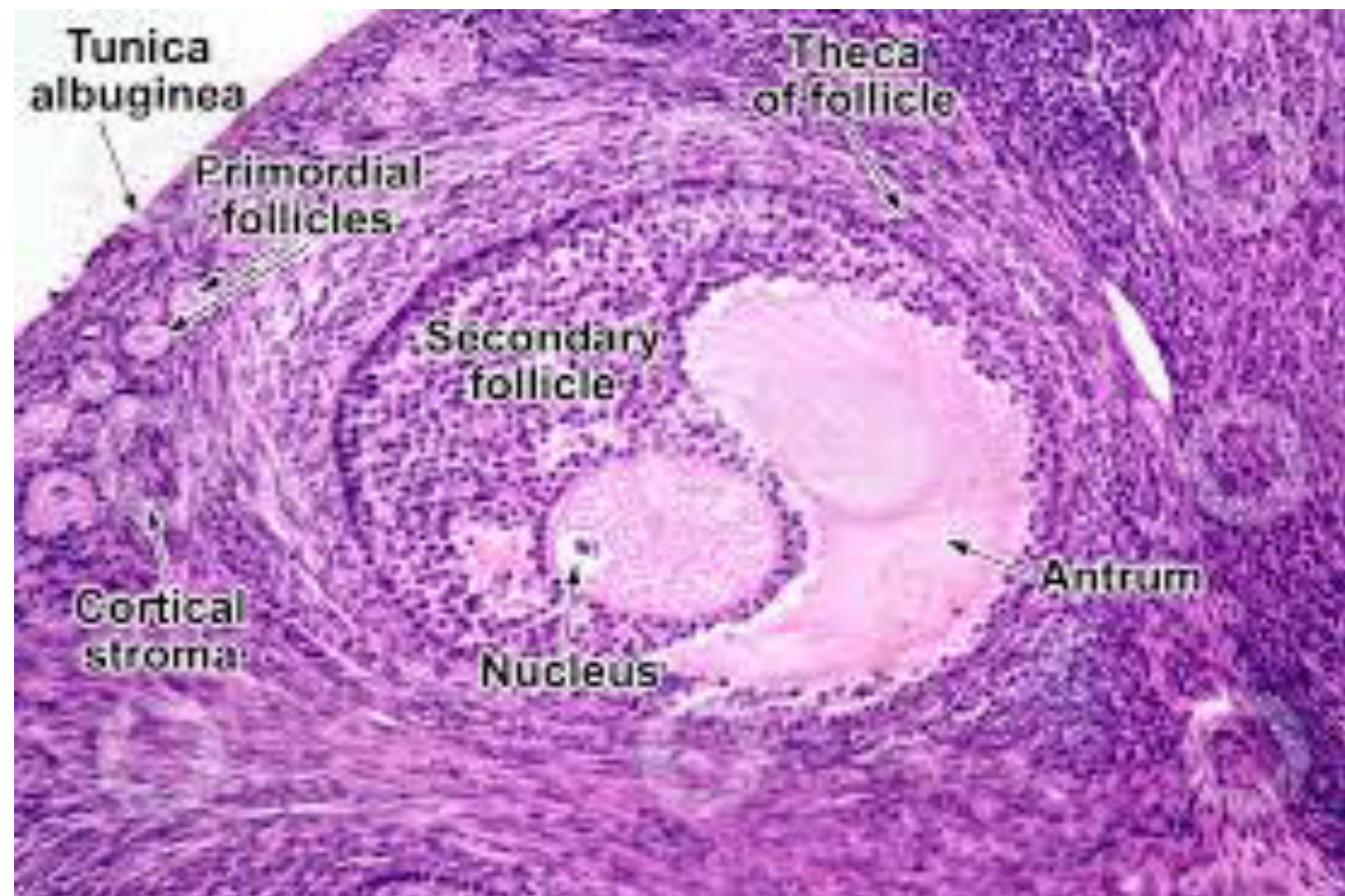
- The granulosa cells proliferate and give rise to several layers of cells around oocyte known as multilaminar primary follicle.
- The multiple layers of granulosa cells are collectively known as *stratum granulosum*.
- The stromal cells of cortex form a sheath of connective tissue around the ovarian follicles called *theca folliculi*.
 - *Theca interna* (consist of cuboidal cells called theca cells , fibroblast , collagen fibers and blood capillaries.)
 - *Theca externa* (consist of fibroblast ,collagen fibers and smooth muscles.)

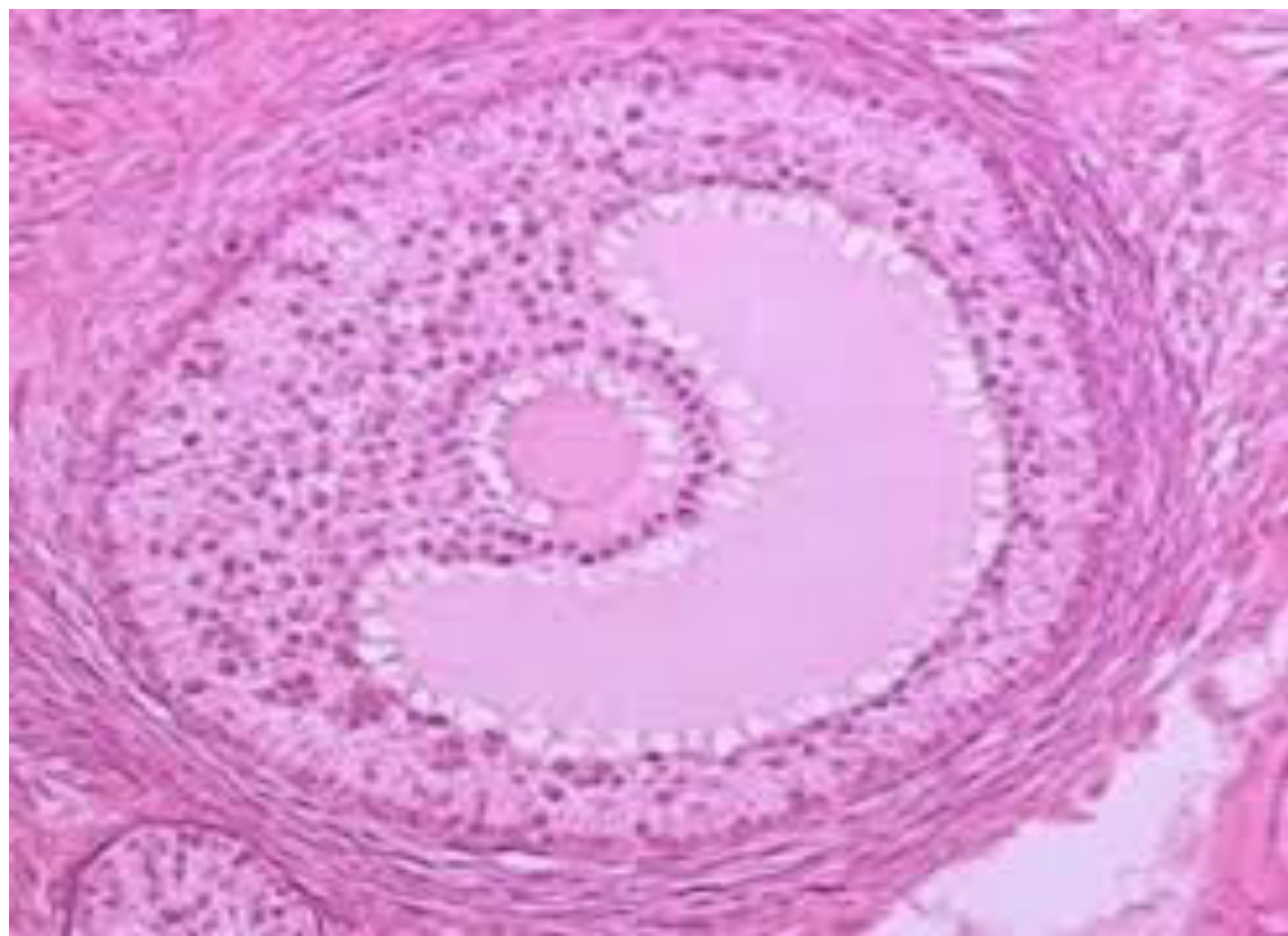




Secondary Follicle

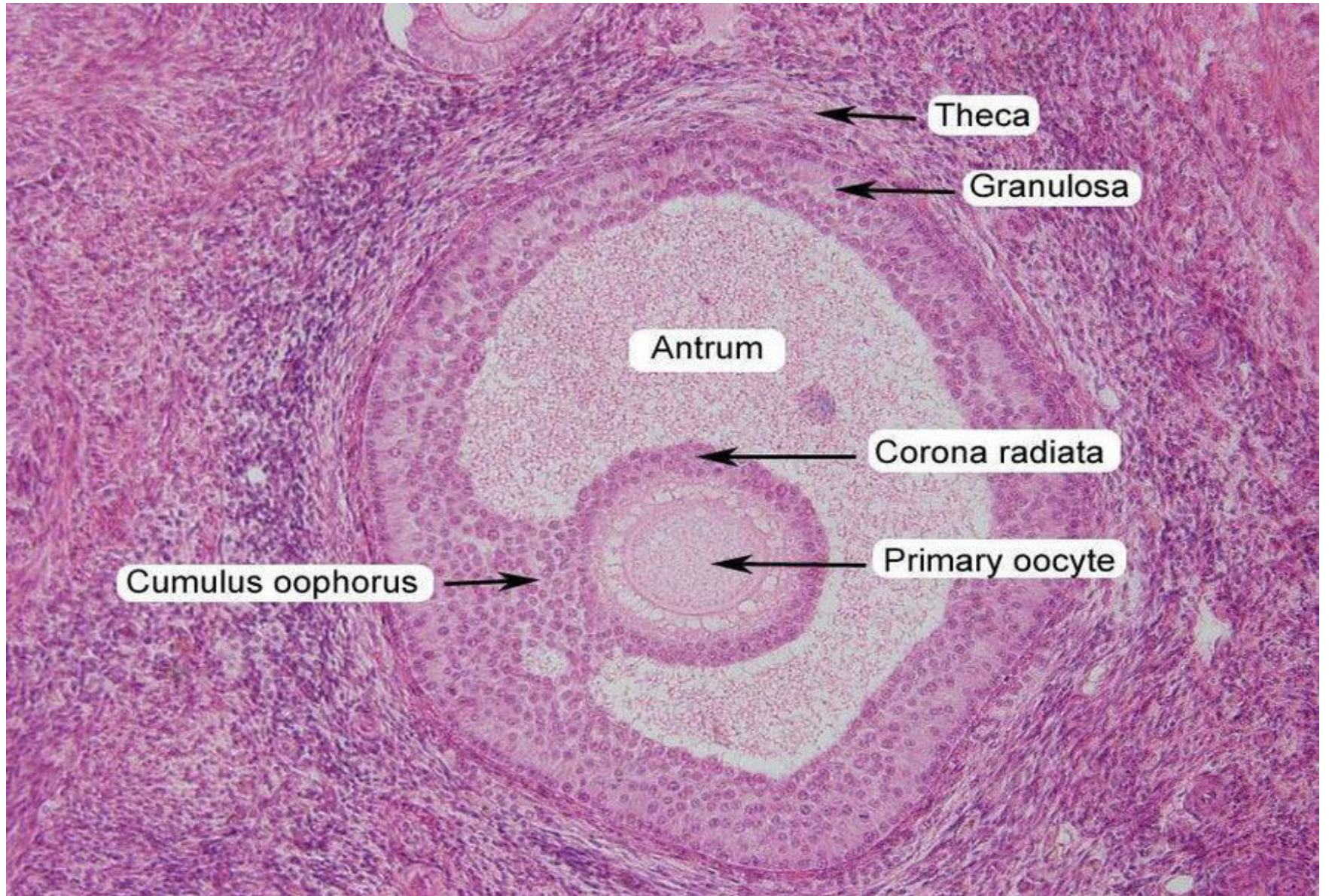
- A secondary follicle is characterized by the presence of cavity called *antrum folliculi*.
- A small cleft appear between the cells of granulosa which is filled by a fluid called *liquor folliculi*.
- Formation of the antrum folliculi pushes the oocyte toward the wall of antrum.
- The oocyte lies within a heap of granulosa cell called *cumulus oophorus*.

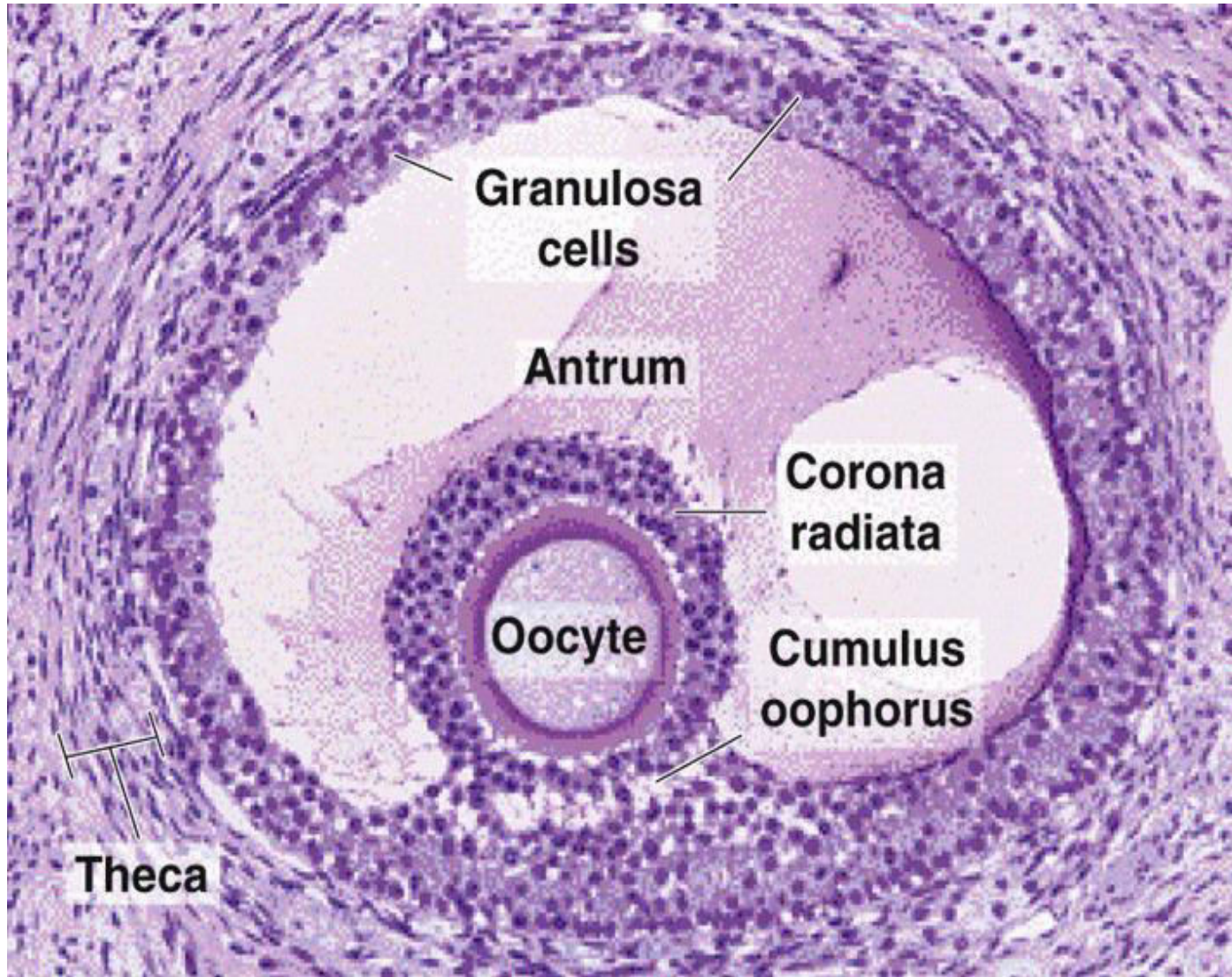




Mature Follicle

- Proliferation continued and the amount of liquor folliculi increase results in formation of mature *ovarian follicle* or *Graafian follicle*.
- The mature ovarian follicle releases its oocyte in the middle of ovarian cycle.
- The process of release of the oocyte from the ovary is called *ovulation*.





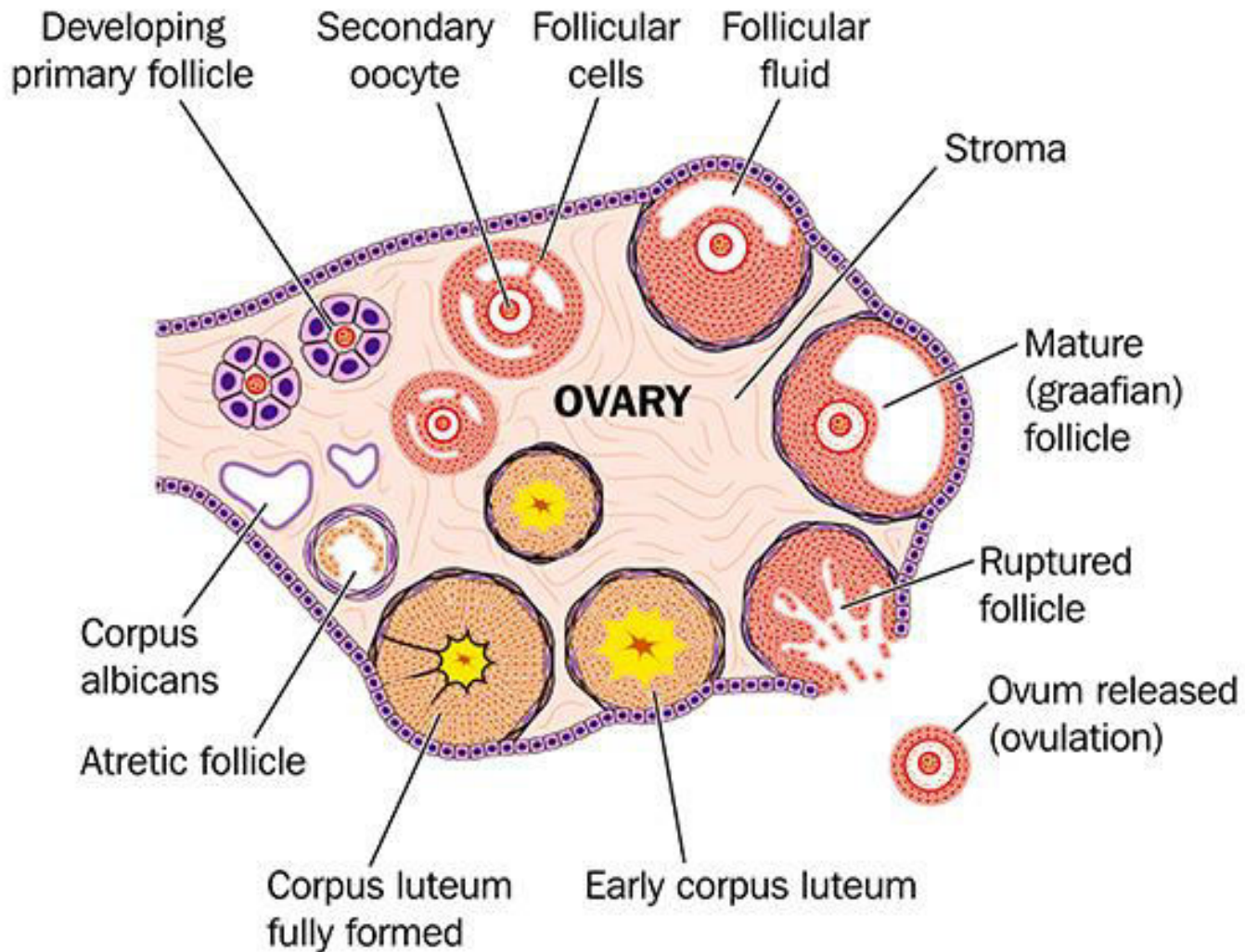
Corpus Luteum

- After ovulation a temporary endocrine organ is formed called **corpus luteum**.
- Due to high level of LH morphological changes occur in the cells of stratum granulosum and theca interna.
- **Granulosa lutein cells** are pale staining large cells about 80% of the total cell of corpus luteum. These cells secrete progesterone.
- **Theca lutein cells** are smaller and stain more intensely. These cells secrete estrogen and progesterone.

Follicle Development

1. **Primordial follicle**: one layer of squamous-like follicle cells surrounds the oocyte
2. **Primary follicle**: two or more layers of cuboidal granulosa cells enclose the oocyte
3. **Secondary follicle**: has a fluid-filled space between granulosa cells that coalesces to form a central antrum
4. **Graafian follicle**: secondary follicle at its most mature stage that bulges from the surface of the ovary
5. **Corpus luteum** : ruptured follicle after ovulation

Cut Section of Ovary



Uterine Tube

- Also known as oviducts or fallopian tube.
- Paired muscular tube conduct the ova from ovary to the uterus and provide suitable environment for fertilization.
- The fallopian tube composed of three layers:
 - Mucosa
 - Muscularis
 - Serosa

1. Mucosa

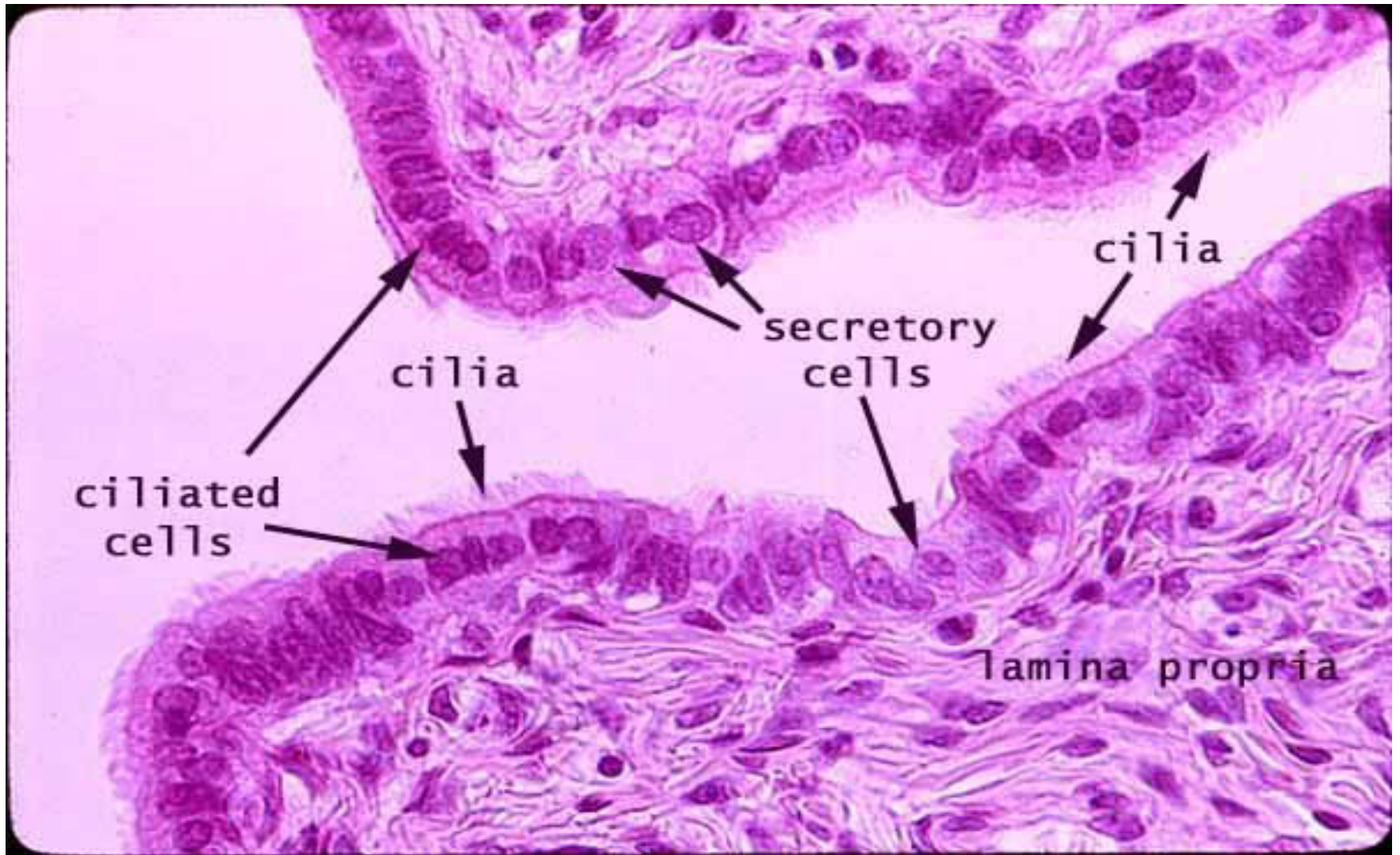
- Epithelium: simple columnar contains two type of cells , Ciliated and non ciliated cells.
- The *ciliated cells* play important role in transportation of the ovum .
- The *non ciliated cells* are secretory cells provide nutritive material to the ovum.

- *Lamina propria* consist of loose connective tissue containing fibroblast , mast cells, lymphocytes ,reticular fibers and collagen fibers.

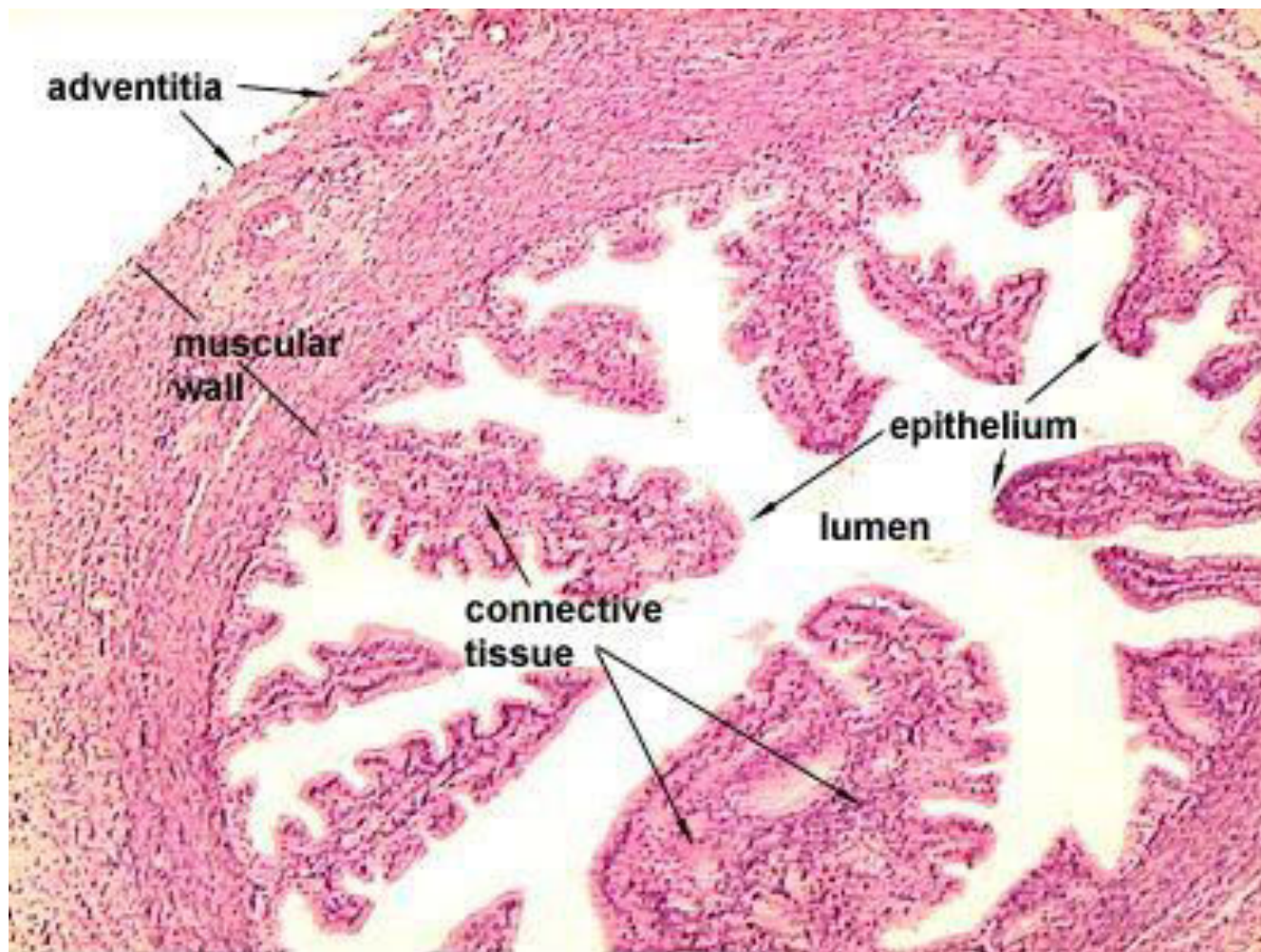
2. Muscularis:

- Inner circular and outer longitudinal smooth muscles.

- ## **3. Serosa :** outermost covering consist of loose connective tissue .



Uterine Tube



Uterine Tube

