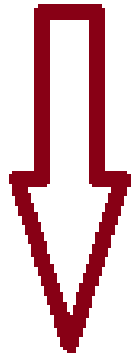


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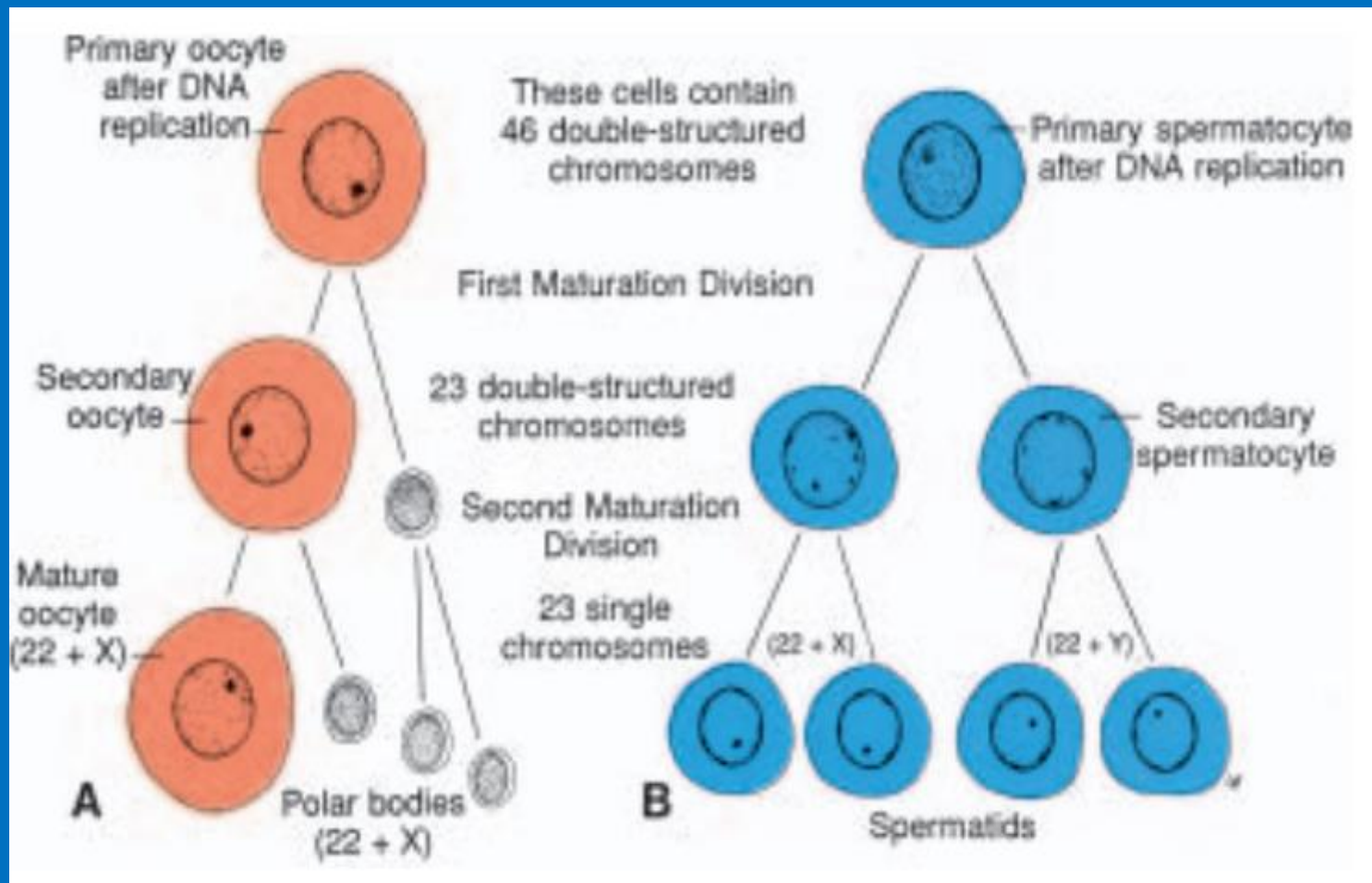
**What to do?**




**Infant**

# Oogenesis

**Oogonia differentiate into mature oocytes.**



- **Maturation of Oocytes Begins Before Birth**
- Primordial germ cells (PGCs)  Oogonia  
Arranged in clusters surrounded by a layer of flat epithelial cells .

- During the next few months, oogonia increase rapidly in number, and by the **fifth month** is **7 million**.
- **Primary oocyte** **arrest their cell division in prophase of meiosis I** .
- A **primary oocyte** with **flat epithelial cells** is called **Primordial follicle**

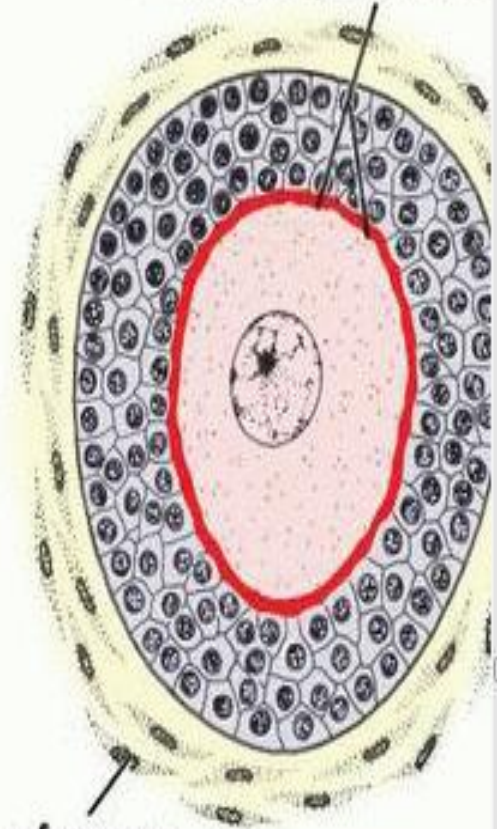
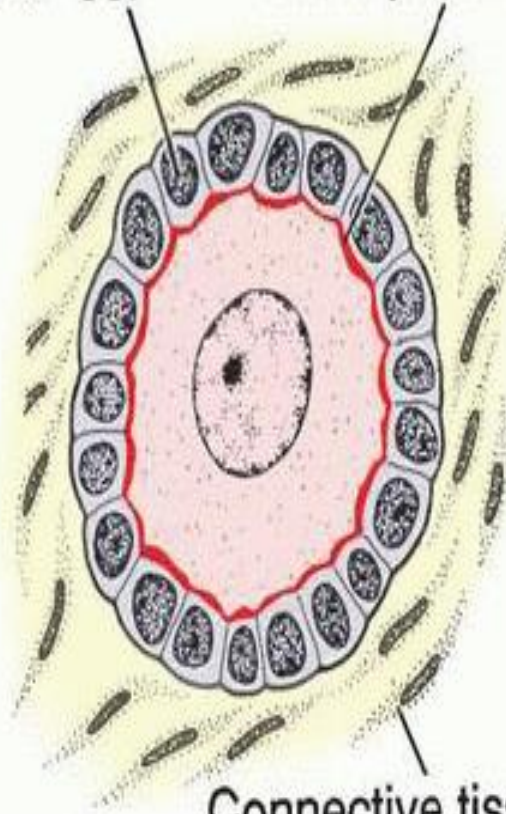
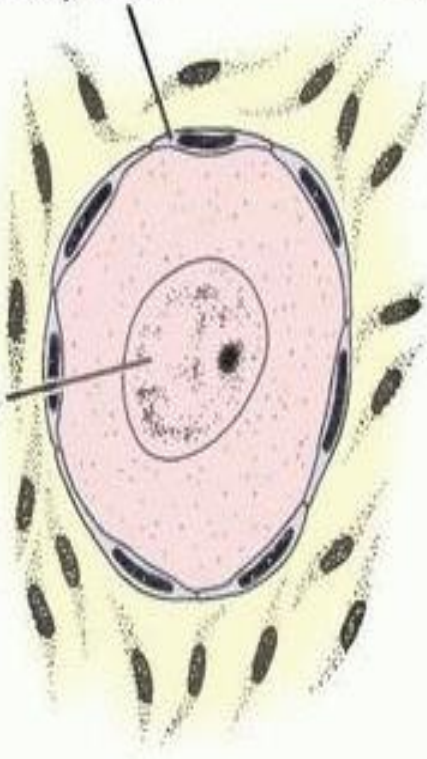
Flat epithelial  
(follicular) cell

Cuboidal  
follicular cell

Beginning of  
zona pellucida

Zona pellucida

Nucleus of  
primary oocyte



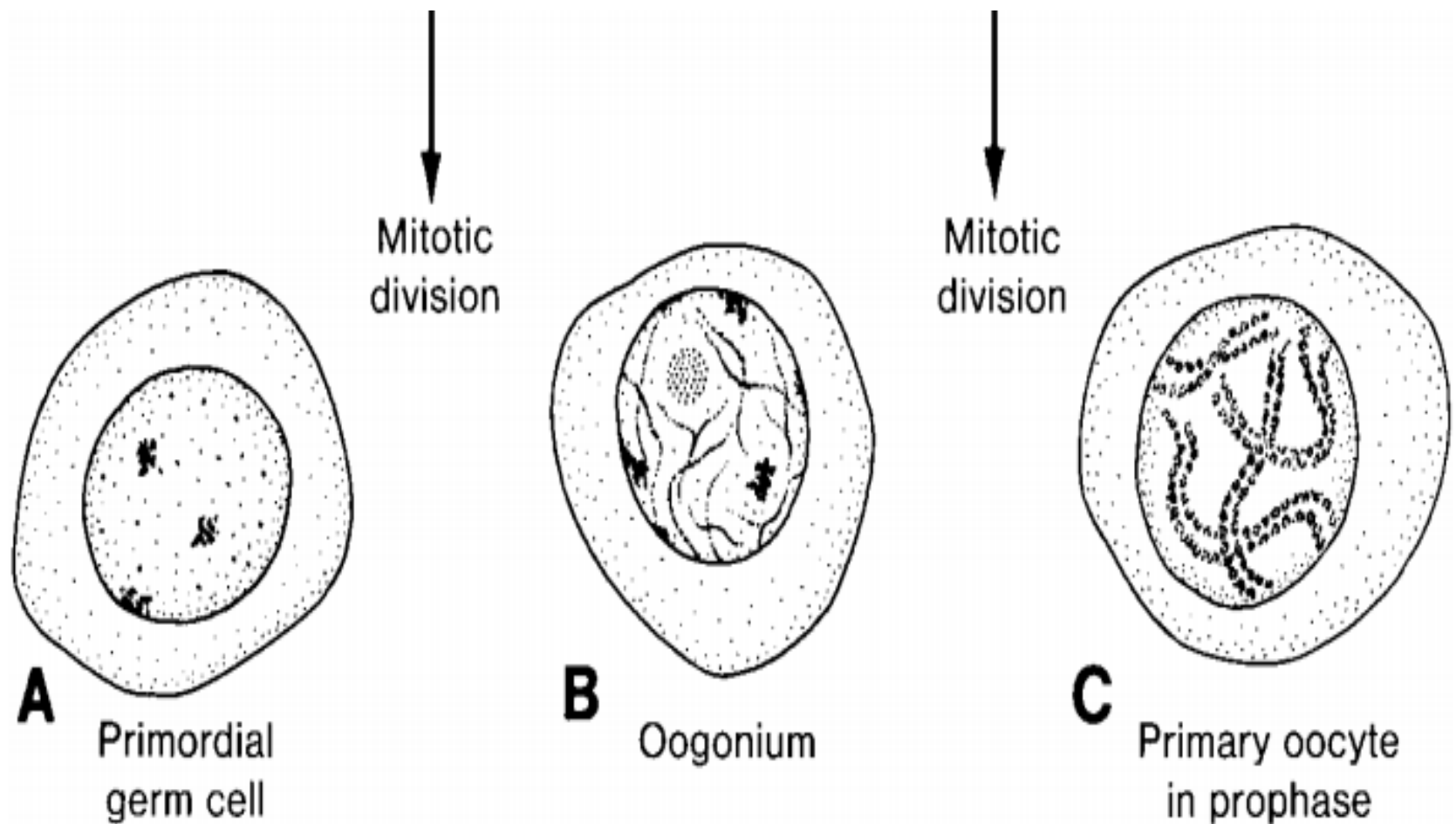
**A** Primordial Follicle

**B** Growing Follicle

**C** Primary Follicle

- **Maturation of Oocytes**
- Near the time of birth, all primary oocytes have started prophase of meiosis I, in **diplotene stage**
- Primary oocytes finish their **first meiotic** division at puberty .

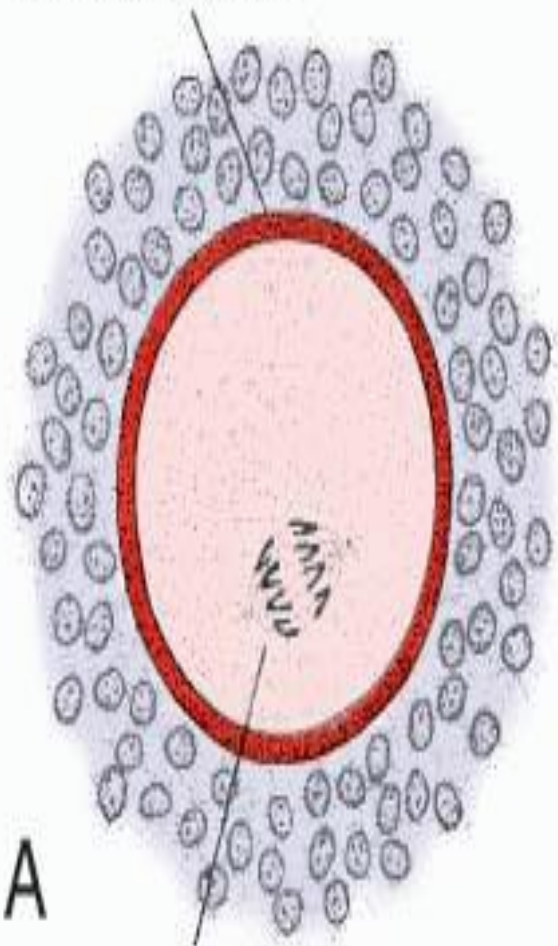




**Figure 1.16** Differentiation of primordial germ cells into oogonia begins shortly after their arrival in the ovary. By the third month of development, some oogonia give rise to primary oocytes that enter prophase of the first meiotic division. This prophase may last 40 or more years and finishes only when the cell begins its final maturation. During this period it carries 46 double-structured chromosomes.

- **oogonia increase rapidly in number, and by the fifth month is 7 million.**
- **800,000** Primary oocytes at birth
- **40,000** At puberty
- **500** Ovulated.
- 40 years** Chromosomal abnormalities

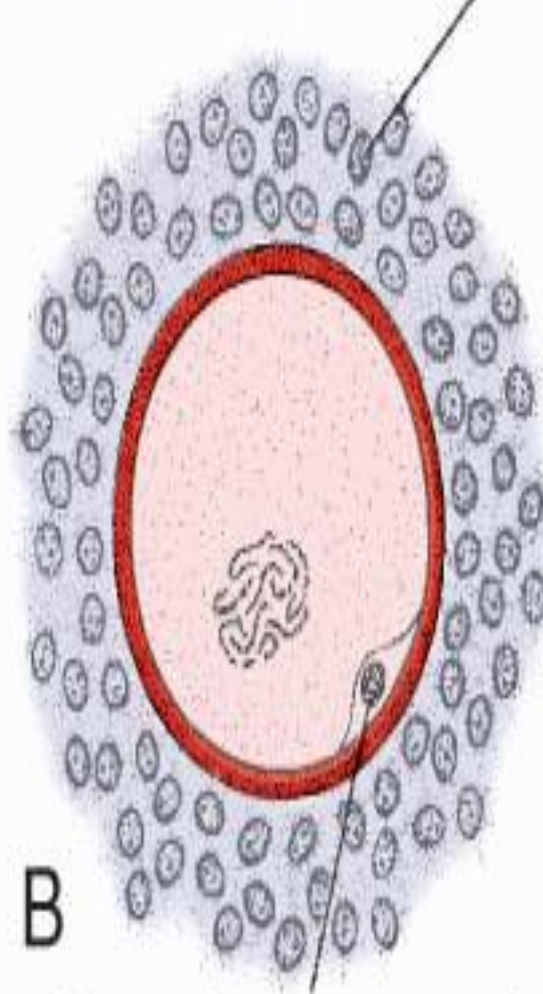
Zona pellucida



A

Primary oocyte in division

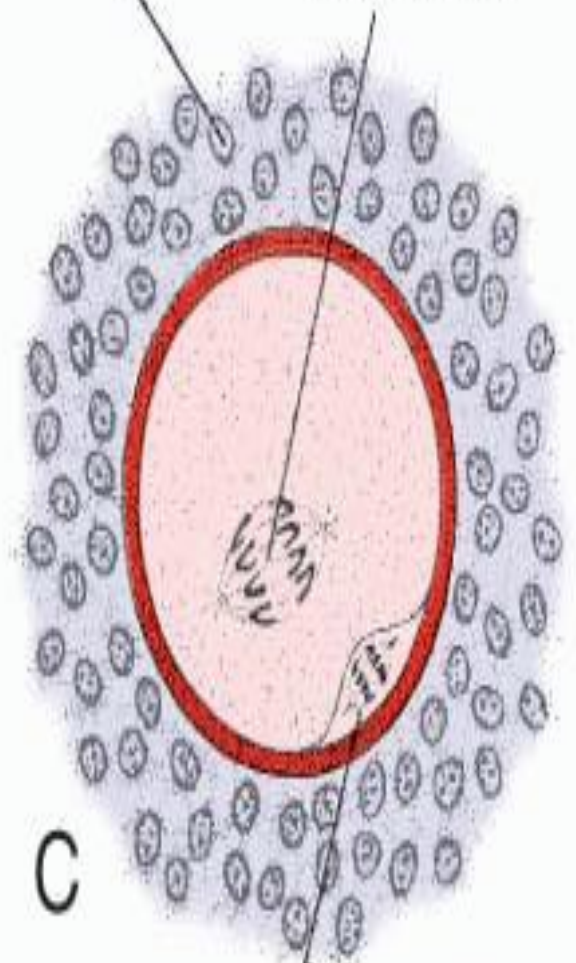
Granulosa cells



B

Secondary oocyte and  
polar body 1

Secondary oocyte  
in division



C

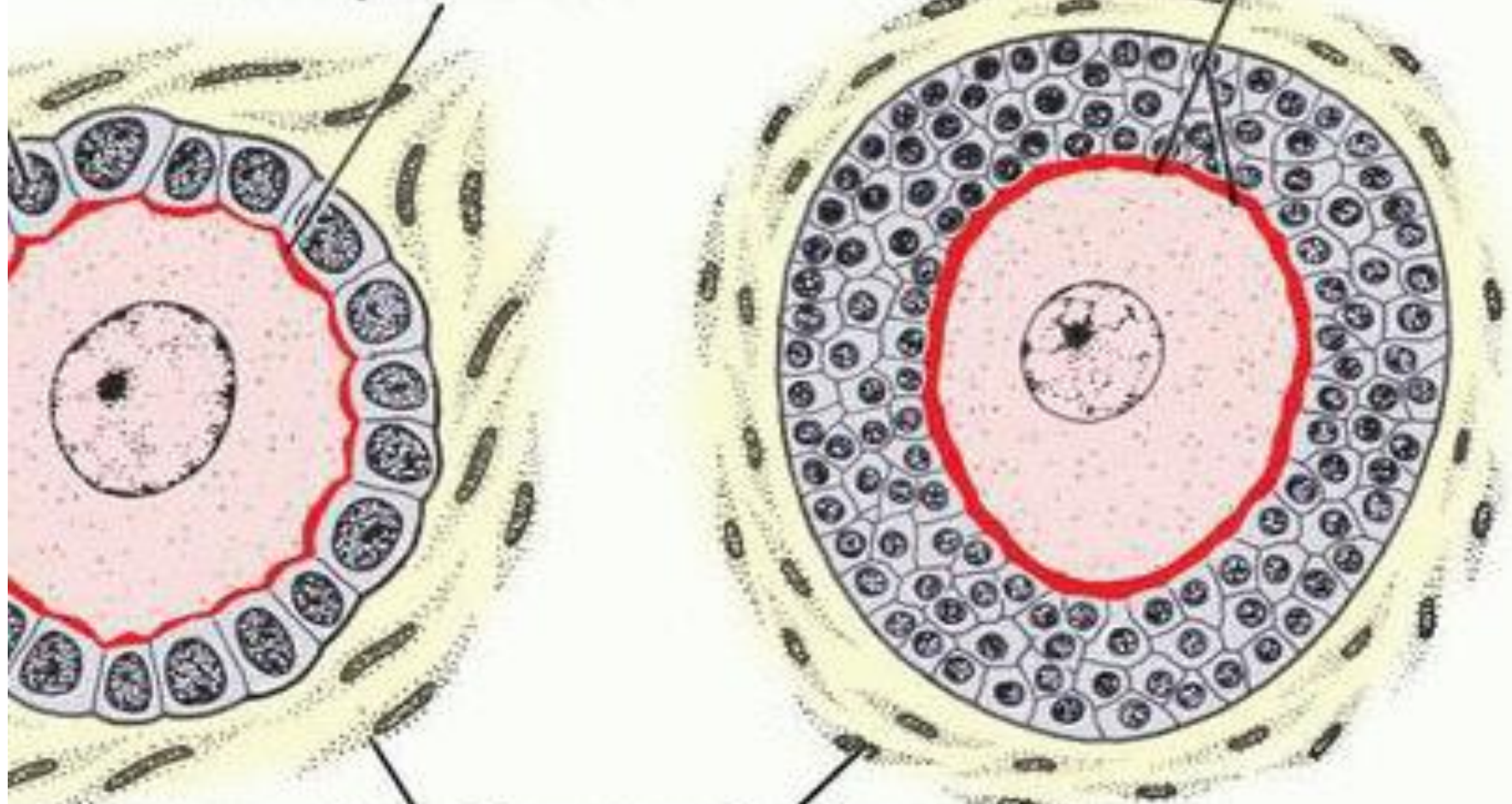
Polar body in division

- At puberty, stages of follicle
  - (1) Primary or preantral,
  - (2) Secondary or antral,
  - (3) Preovulatory (Graafian follicle).

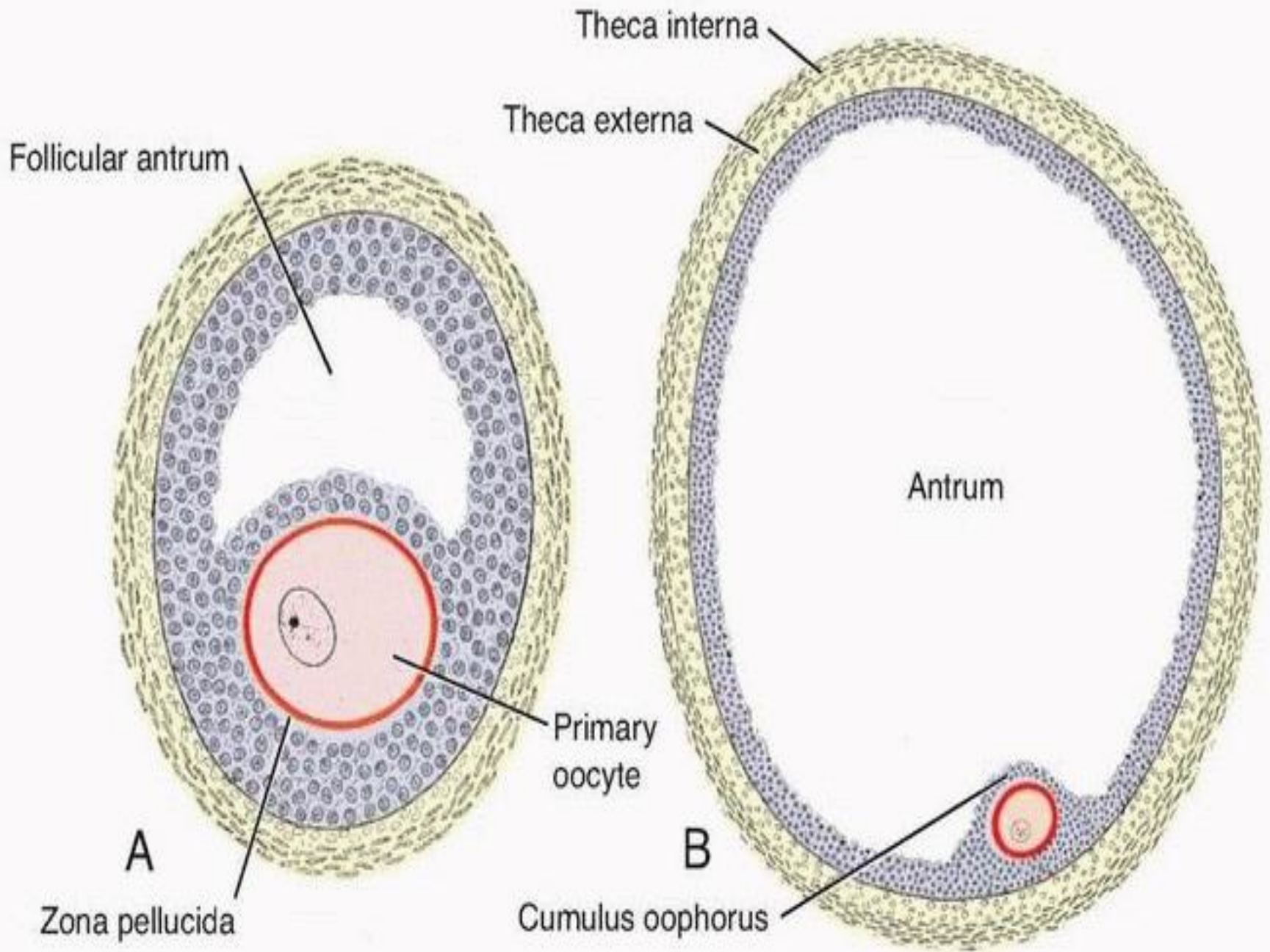
# Primary or preantral follicle

Beginning of  
zona pellucida

Zona pellucida



Connective tissue of ovary



- **In cooperation, theca interna and granulosa cells produce estrogens**

As a result of **this estrogen** production:

The uterine endometrium enters proliferative phase;

**Thinning** of the cervical mucus.

**Pituitary gland** is stimulated **to secrete LH.**

- **At midcycle, there is an LH surge that:**
- Causing oocytes to complete meiosis I
- initiate meiosis II;
- Stimulates production of progesterone by follicular stromal cells
- Causes follicular rupture and ovulation.



- **Ovulation**
- **FSH and LH causes** the secondary follicle grows rapidly to a diameter **of 25 mm.**
- Abrupt increase **in LH** that causes the primary oocyte to complete meiosis I and the follicle to enter the preovulatory stage. Meiosis II is also initiated, but the oocyte is **arrested in metaphase** approximately 3 hours before ovulation.
- the surface of the ovary begins to bulge and avascular spot, **the stigma**, appears.

- **High concentration of LH** increases **collagenase activity**, resulting in digestion of collagen fibers surrounding the follicle. **Prostaglandin** levels also increase in response to the LH surge and cause local **muscular contractions** in the ovarian wall. Those contractions extrude the oocyte, which together with its surrounding granulosa cells from the **coronaradiata**

# Clinical Correlates

**Ovulation**

**“middle pain”**

**Accompanied by a rise in basal temperature**

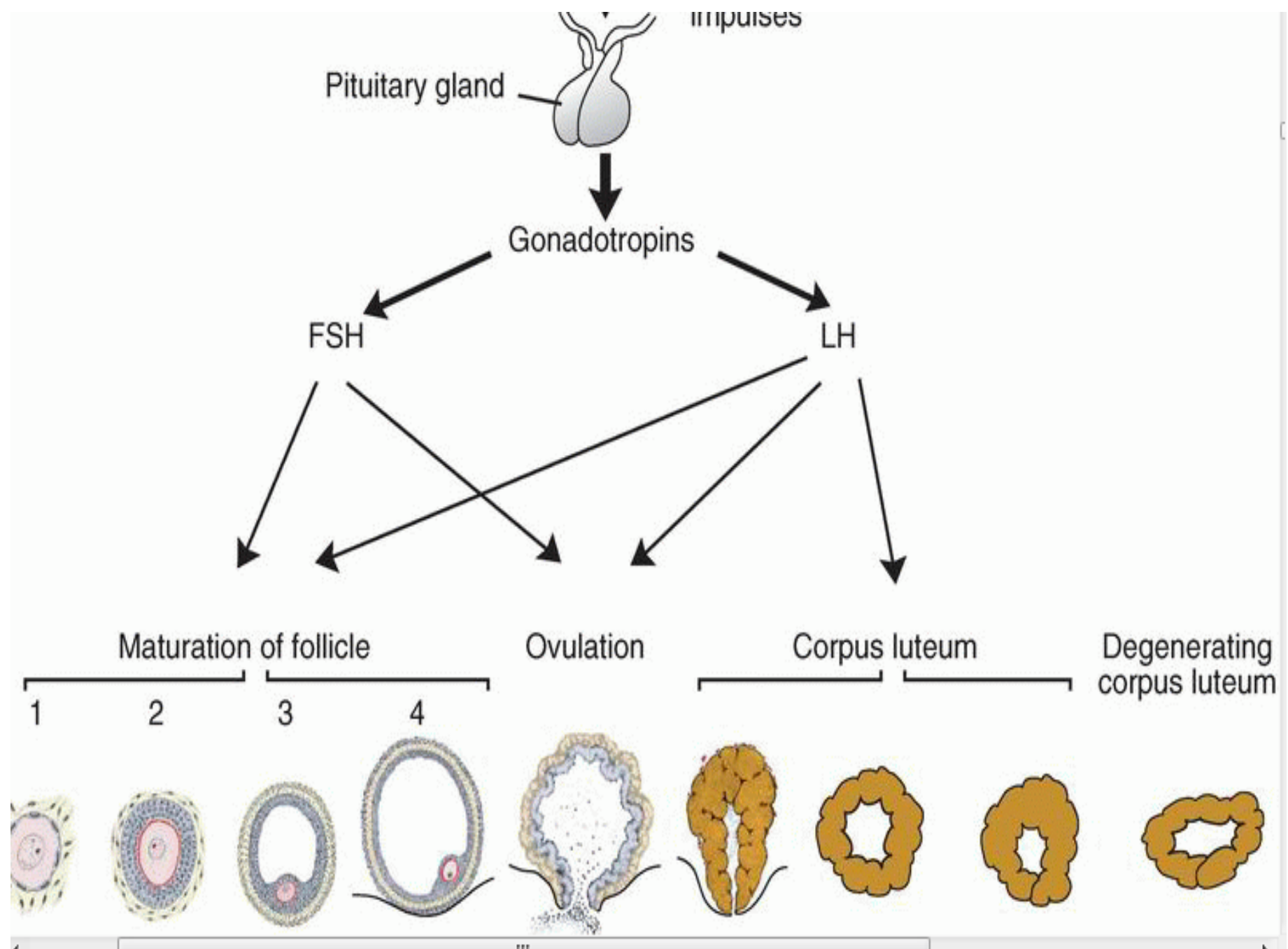
- **Corpus Luteum**
- Under the influence **of LH**, these cells develop a yellowish pigment and change into lutean cells, which form the corpus luteum and **secrete estrogens and progesterone** .
- Causes the **uterine mucosa** to enter the progestational or secretory stage in **preparation for implantation of the embryo.**

## **Corpus Albicans**

If fertilization does not occur, the corpus luteum shrinks and forms a mass of fibrotic scar tissue, the corpus albicans.

- If **the oocyte is fertilized**, degeneration of the corpus luteum is prevented by **Hcg**, a hormone secreted by the **syncytiotrophoblas**.
- Corpus luteum grow and forms **the corpus luteum of pregnancy** .

- Continue to secrete progesterone until the end of **the fourth month**.
- As progesterone secreted by placenta becomes adequate for maintenance of pregnancy.





## UTERUS AT TIME OF IMPLANTATION

Endometrium

Myometrium

Perimetrium

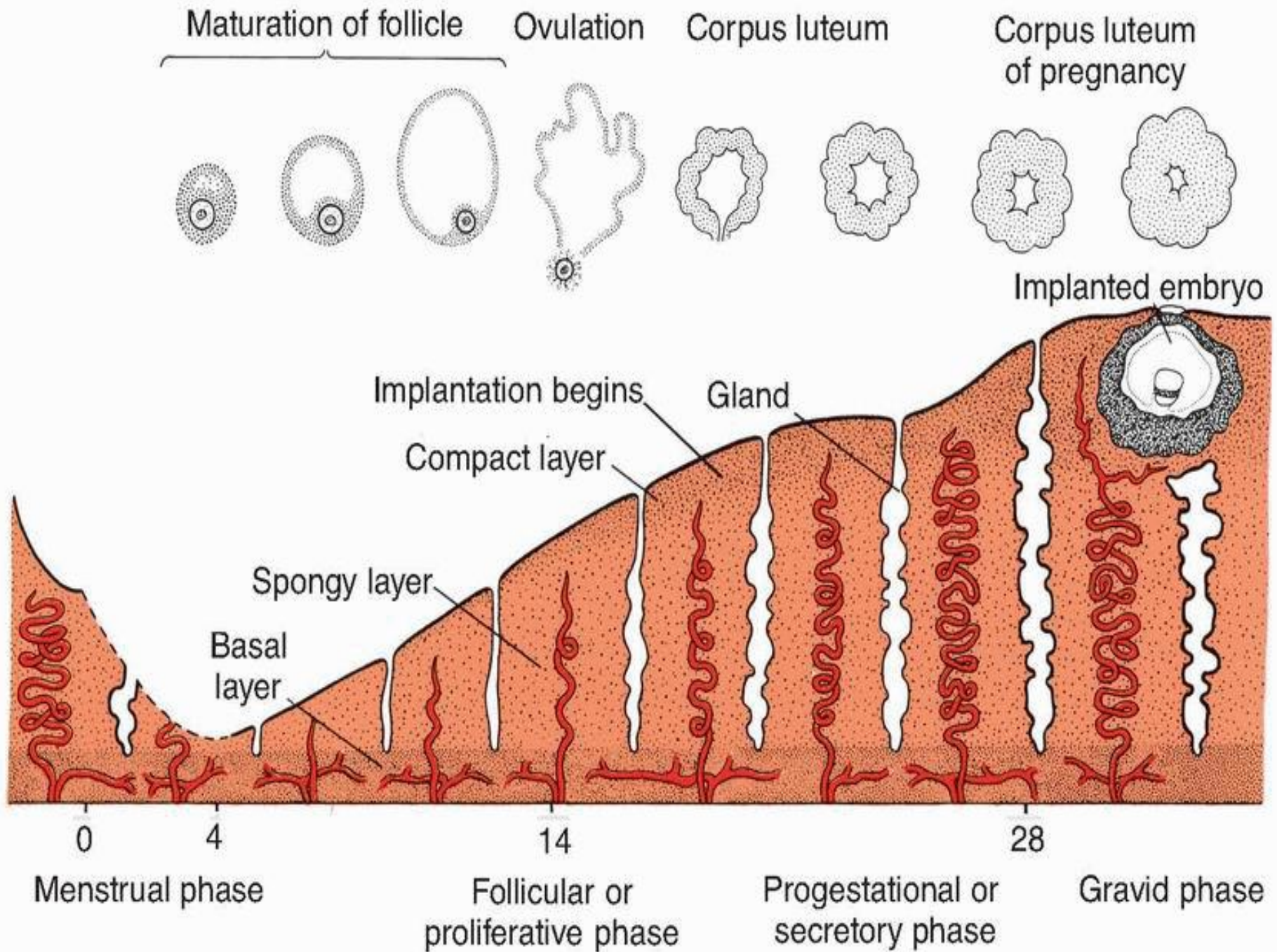
Menstrual cycle has three stages

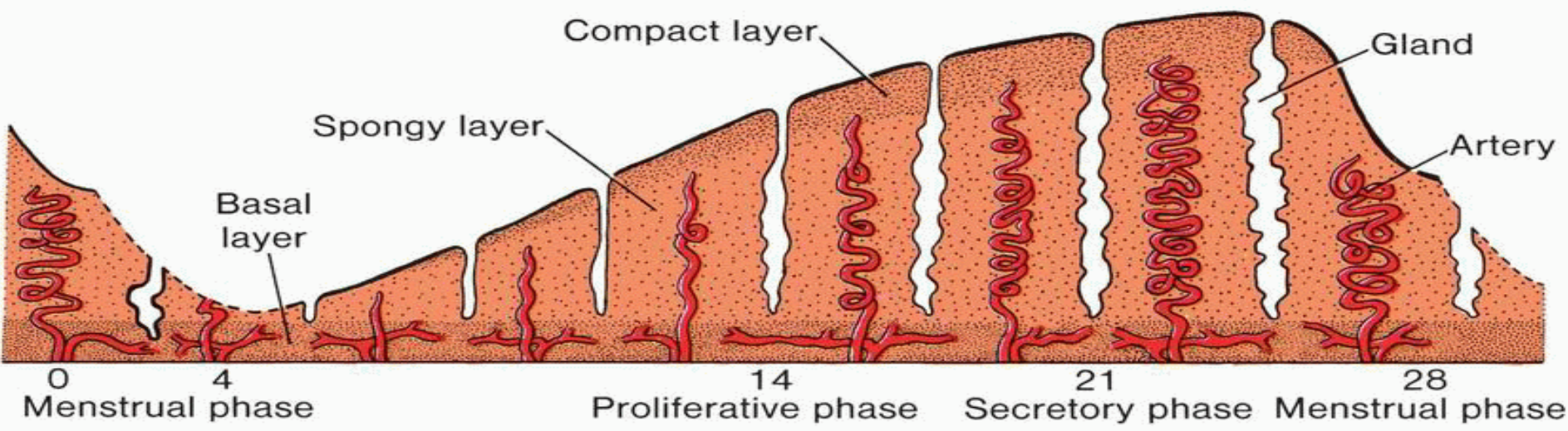
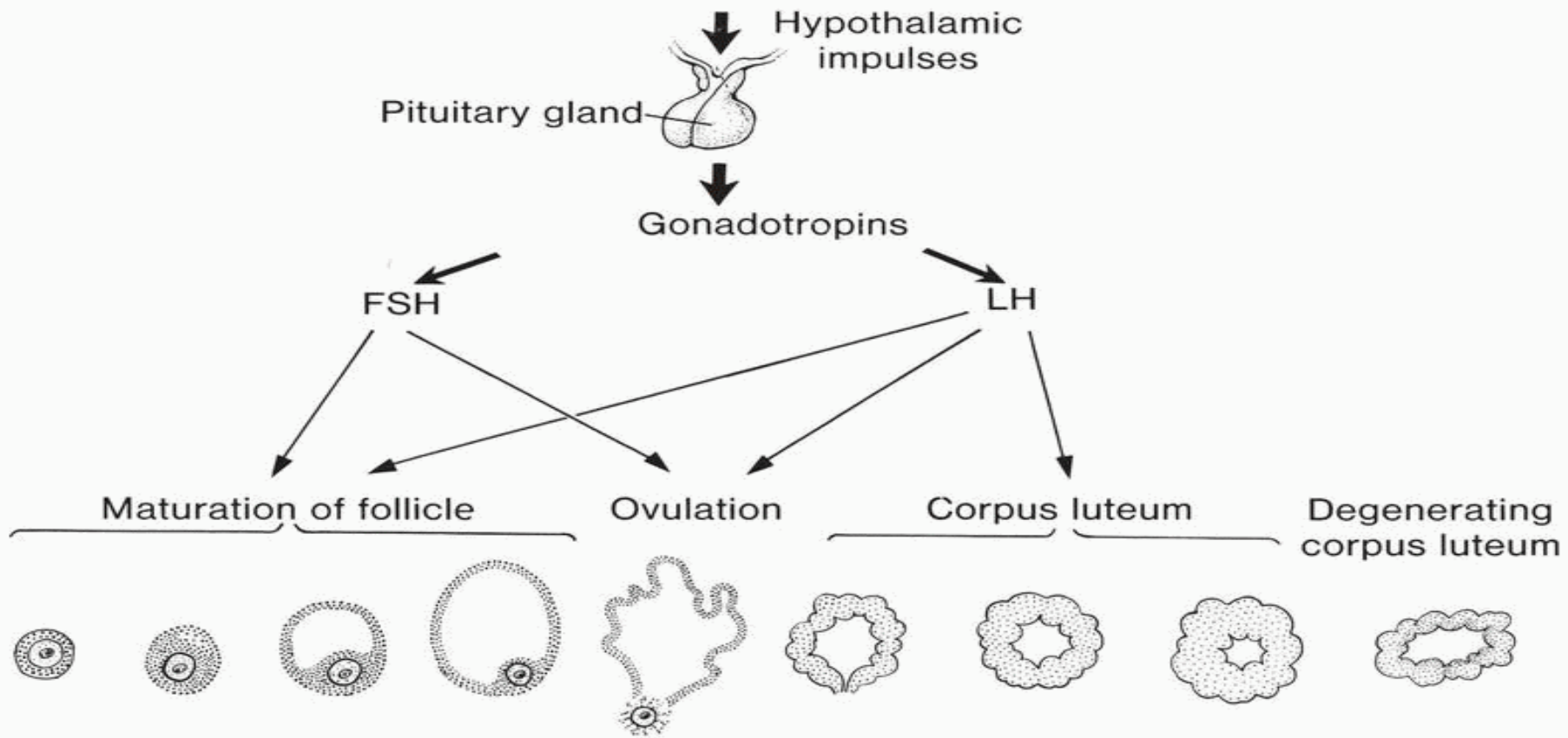
Follicular or proliferative phase,

Secretory or progesterational phase,

Menstrual phase .

- **The proliferative phase** begins at the end of the menstrual phase, is under the influence of **estrogen**, and parallels growth of **the ovarian follicles**.
- **The secretory phase** begins approximately 2 to 3 days after ovulation in response to **progesterone** produced by **the corpus luteum**.
- **No fertilization** → shedding of the endometrium.
- **Fertilization** → endometrium assists in implantation and formation of the **placenta**.
- Later in gestation, the placenta assumes the role of hormone production, and the **corpus luteum degenerates**.





**THANKS**