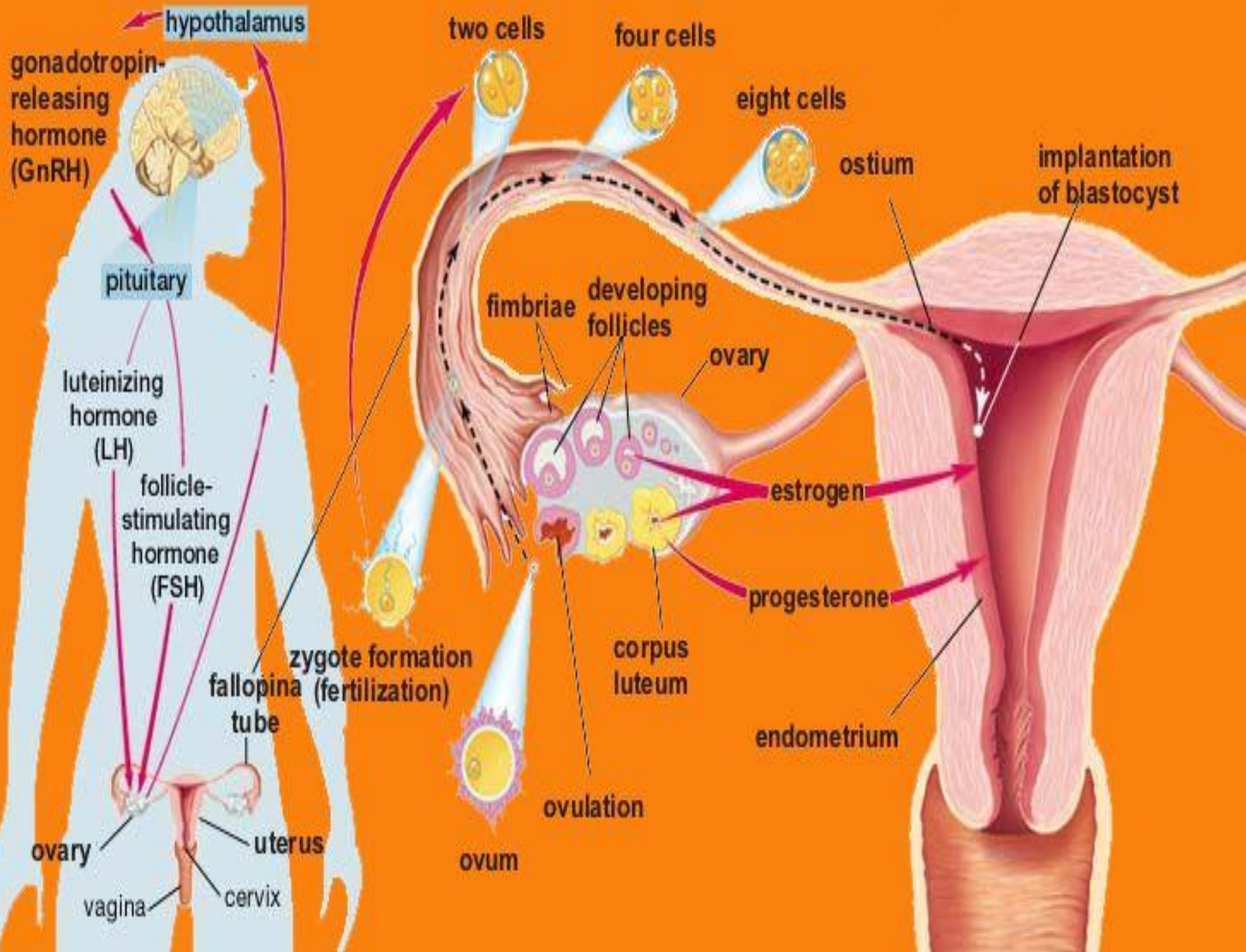


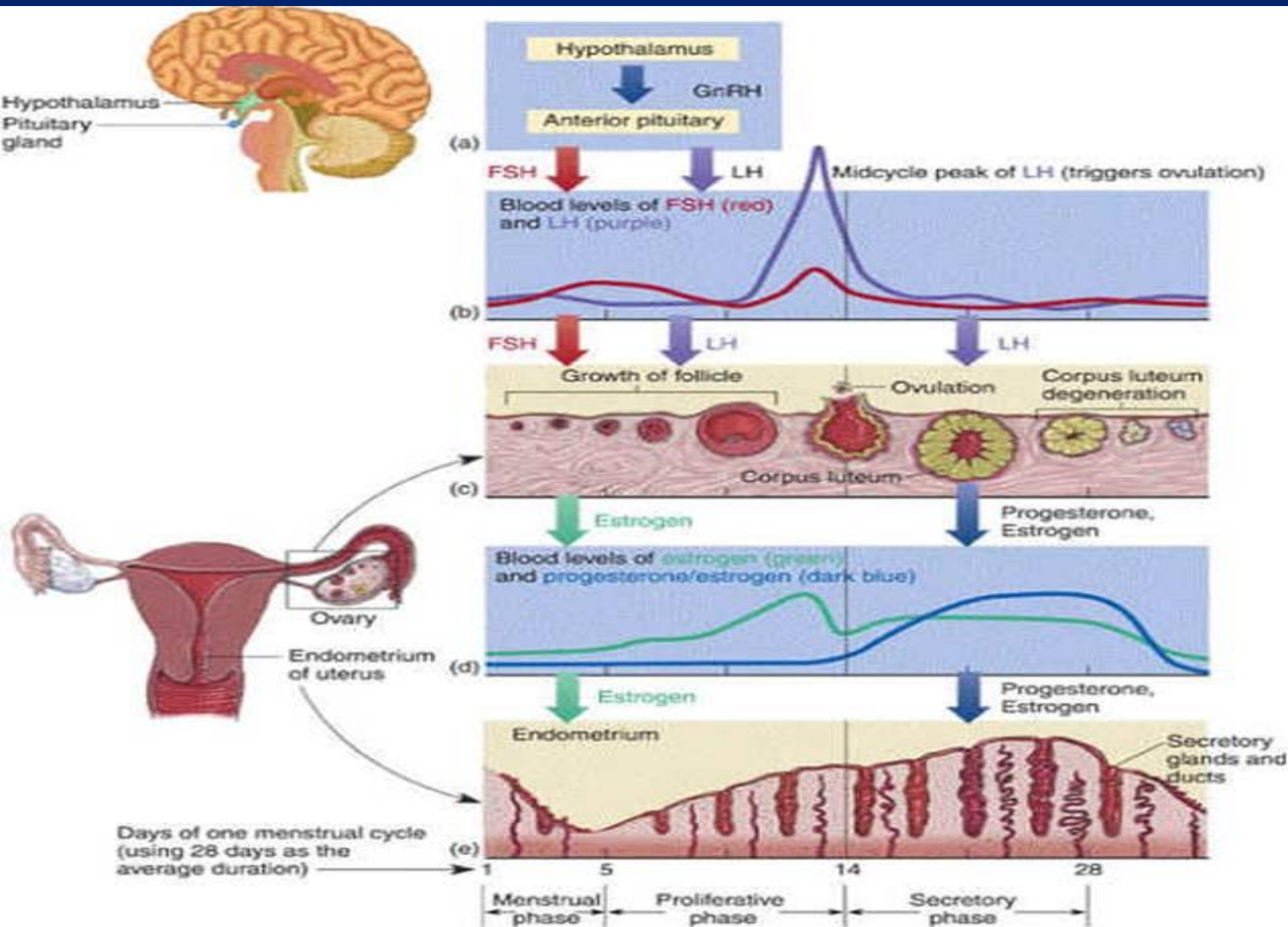
بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



# Physiology of Menstruation







# I- Onset of Puberty

- Due to **hypothalamic maturation** with insensitivity of hypothalamus to the inhibitory effect of estrogen. This leads to stimulation of pituitary gland with cyclic secretion of gonadotropins resulting in establishment of Ovarian Cycle.



# II- Ovarian Cycle

## 1- 1<sup>st</sup> half of the cycle (Follicular Phase):

- Under effect of FSH
- It includes:
  - Primordial follicle
  - Pre-antral follicle
  - Antral follicle
  - Pre-ovulatory follicle (MGF)



## 2- The middle of the cycle (Ovulation):

**Def.:** Rupture of MGF with release of the oocyte

**Timing:** Middle of cycle (14<sup>th</sup> day)

**Mech.:**

- MGF → estrogen → +ve feed back → LH surge  
→ 1) reduction division of oocyte.  
2) luteinization of granulosa (steroidogenesis)  
with synthesis of progesterone and **PGs**.

**\*\*PGF<sub>2α</sub>** → 1) ++proteolytic enzymes  
(collagenase) & 2) intrafollicular tension



## 3- 2<sup>nd</sup> half of the cycle (Luteal Phase)

- Under effect of LH

- It includes:

- 1-Proliferation stage: Lutein & paralutein cells

- 2-Vascularization stage: Corpus hngicum

- 3-Maturity stage: max. E.& P. secretion

- 4-Degeneration stage: if no pregnancy occurs

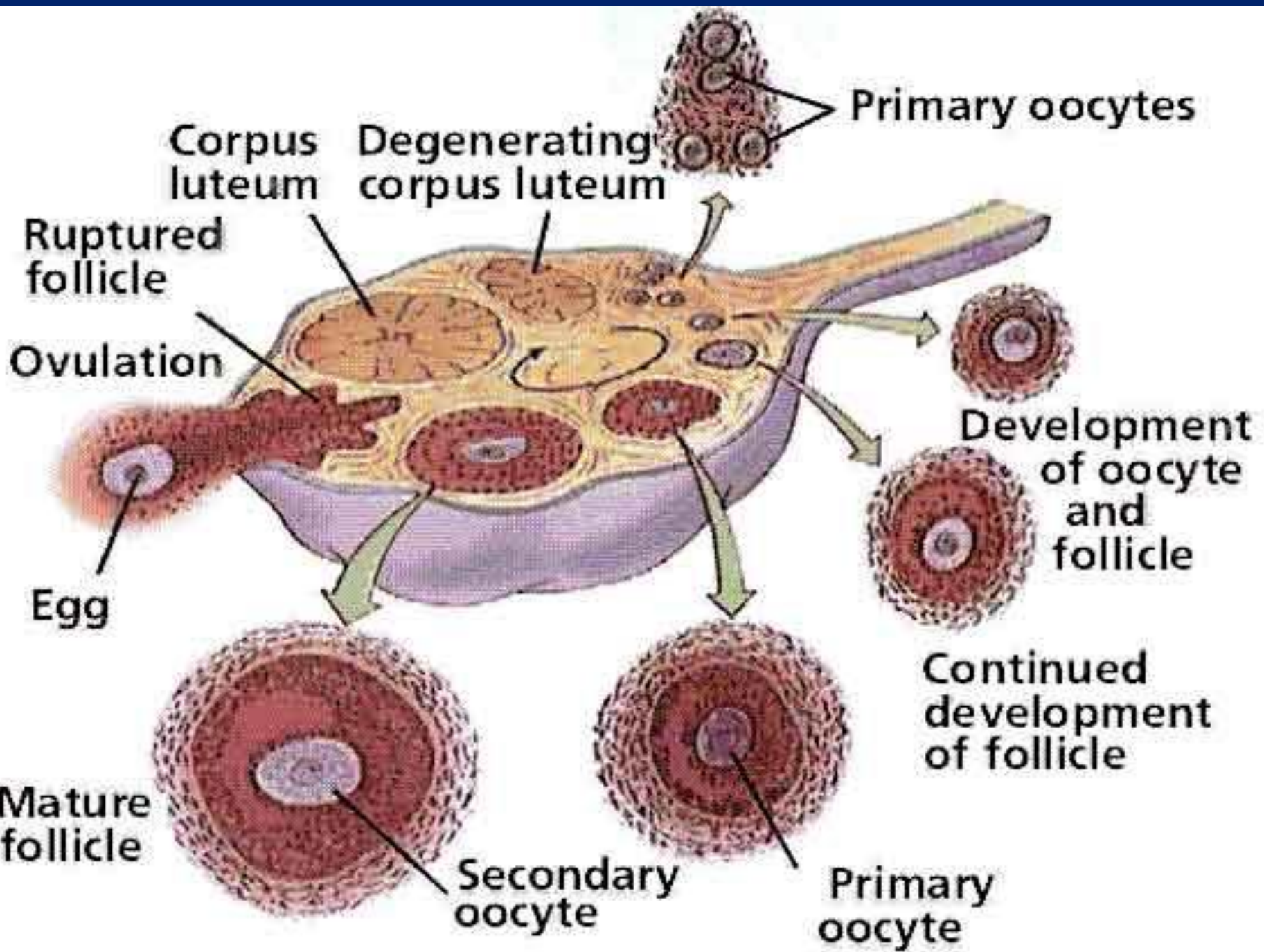


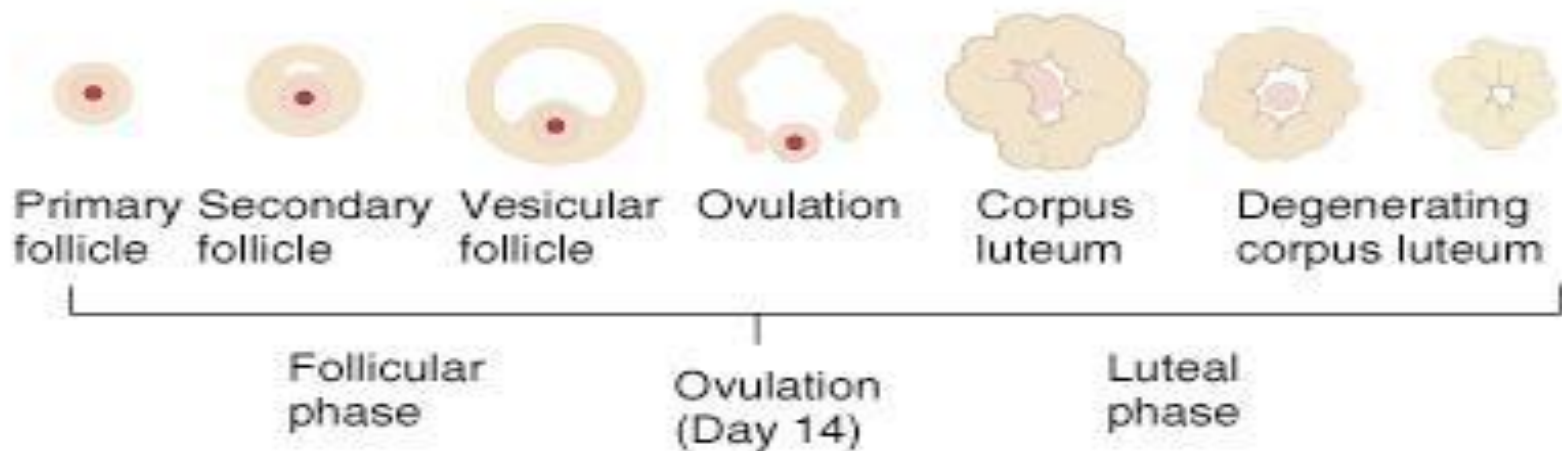


# Fate of C.L.

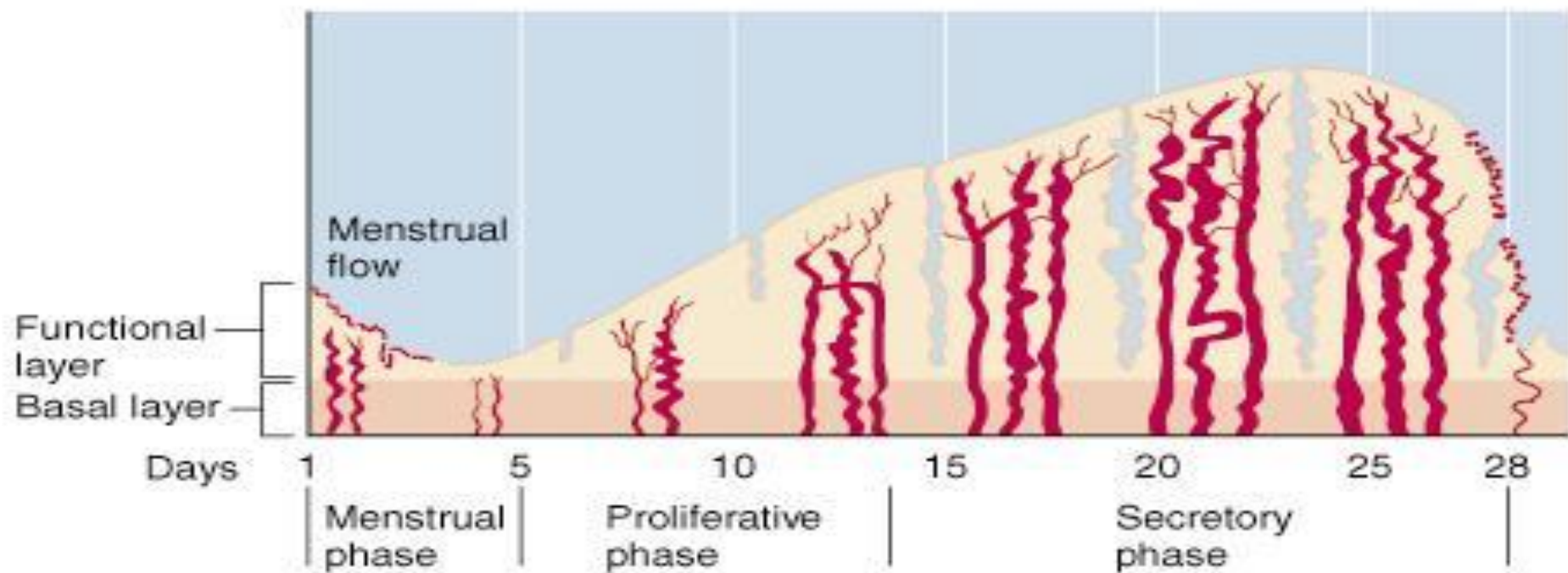
If NO pregnancy occurs	If pregnancy occurs
<p>P → -ve feedback on LH → degeneration of C.L. → hyaline degeneration (corpus albicans)</p>	<p>Fertilized ovum → hCG (LH like action) → maintenance of CL till 10<sup>th</sup> week gestation when placenta is formed</p>







**(c) Ovarian cycle**

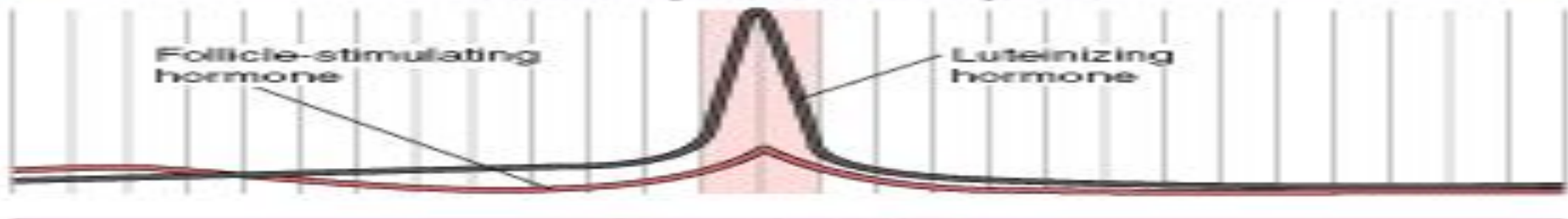


**(d) Uterine cycle**

### Pituitary Hormone Cycle

Follicle-stimulating hormone

Luteinizing hormone



### Ovarian Cycle

Follicle

Corpus luteum

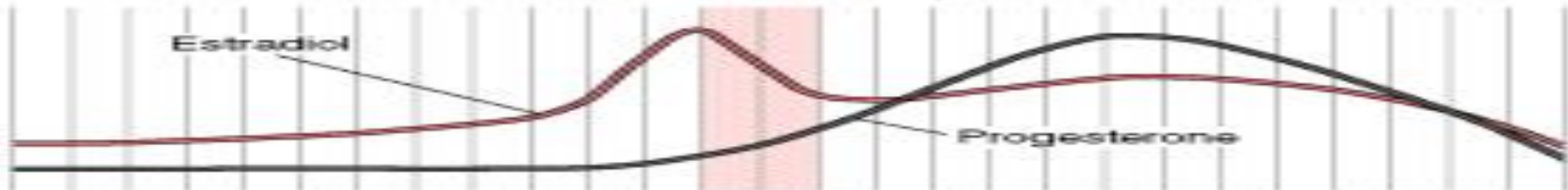
Ovulation



### Sex Hormone Cycle

Estradiol

Progesterone



### Endometrial Cycle

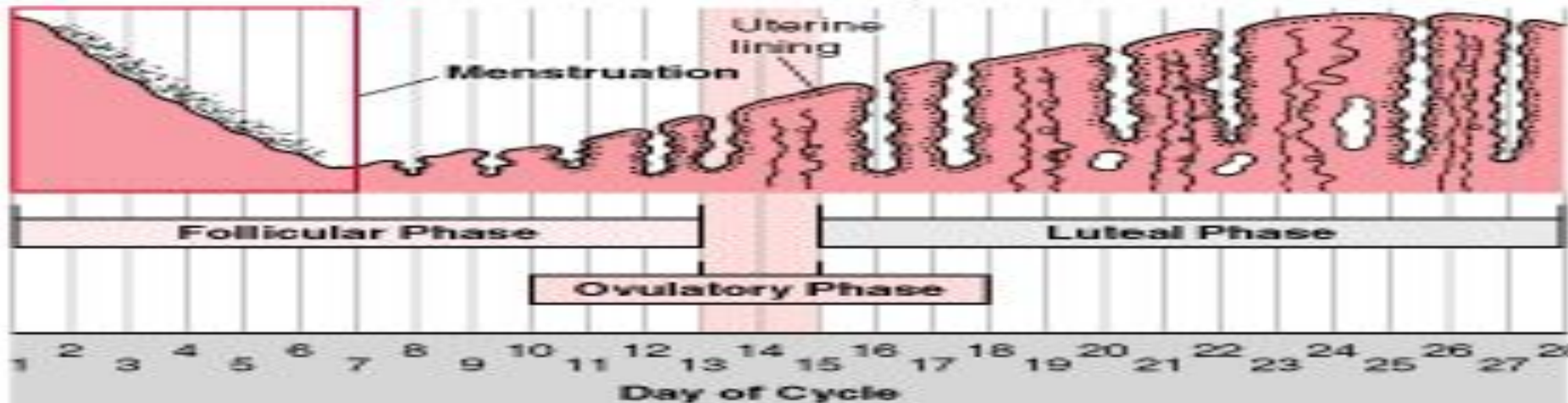
Uterine lining

Menstruation

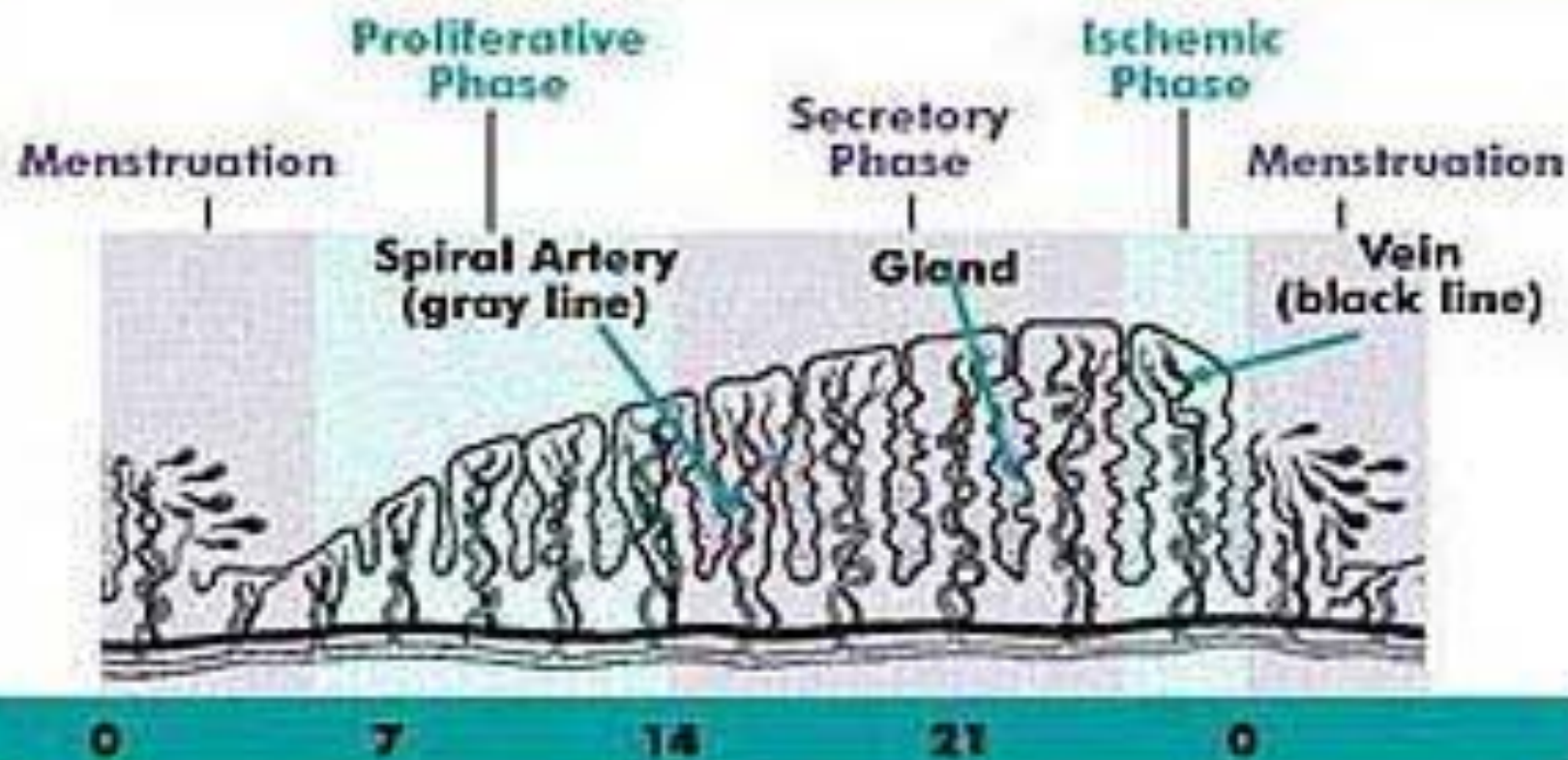
Follicular Phase

Luteal Phase

Ovulatory Phase



# Endometrial Cycle



Days

[coolnurse.com](http://coolnurse.com)

# III- Changes in the endometrium

## 1- 1<sup>st</sup> half of the cycle (Proliferative phase)

## 2- 2<sup>nd</sup> half of the cycle (Secretory phase)

• Under effect of: E (MGF)

P&E (CL)

• Duration: 10 days

14 days

### • *Endomet . changes:*

-BVs: straight

Spiral

-Glands: straight

Corkscrew

-Thickness: 1-4 mm

4-8 mm

### 3- Menstrual phase (Menstruation):

**Def.:** cyclic shedding of compact and spongy endometrium

**Mech.:** When NO pregnancy occurs

P (from CL) → - LH → ↓ P&E (CL) → shrinkage of endometrium → tightening of spiral arterioles → ischemic necrosis of endomet. → destruction of lysosomes of endometrial cells → release of  
1) phospholipase (formation of PGs:  $F_{2\alpha} > E_2$ ) &  
2) plasminogen activator (formation of plasmin = fibrinolysin) → arrest of bleeding

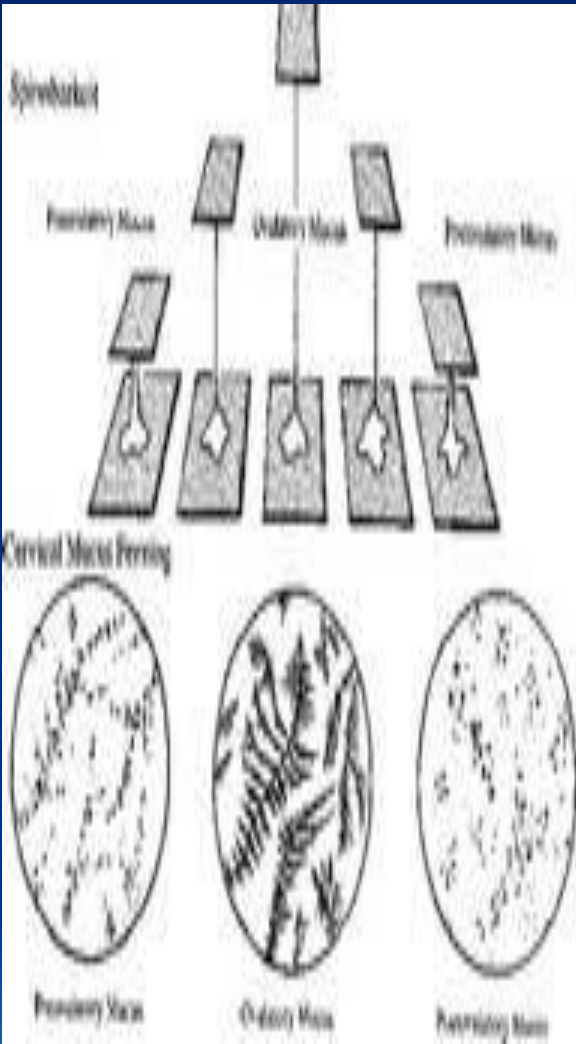


# IV- Changes of cervical mucus

<b>1<sup>st</sup> half of the cycle</b> (under effect of estrogen)	<b>2<sup>nd</sup> half of the cycle</b> (under effect of progesterone.)
<ul style="list-style-type: none"><li>- Profuse and watery</li><li>- ++ mucin → +ve thread</li><li>- ++NaCl → +ve fern</li></ul>	<ul style="list-style-type: none"><li>- Scanty and viscid</li><li>- -ve thread test</li><li>- -ve fern test</li></ul>

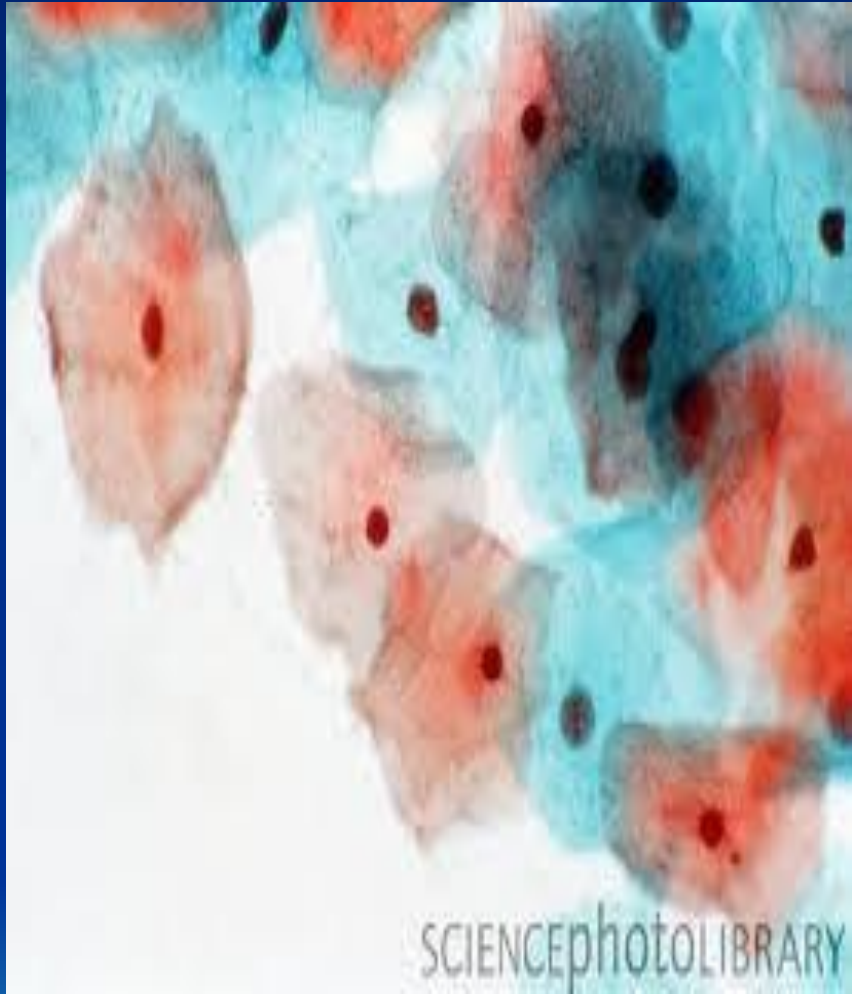






# V- Changes in vaginal epithelium

1 <sup>st</sup> half of the cycle	2 <sup>nd</sup> half of the cycle
<p data-bbox="112 482 879 639">Clear smear formed by <b><u>Superficial cells:</u></b></p> <ul data-bbox="98 676 832 1158" style="list-style-type: none"><li data-bbox="98 676 421 743">• Separate</li><li data-bbox="98 776 624 843">• Nonrolled edge</li><li data-bbox="98 876 832 943">• Eosinophilic cytoplasm</li><li data-bbox="98 976 678 1043">• Pyknotic nucleus</li><li data-bbox="98 1076 691 1158">• Few lymphocytes</li></ul>	<p data-bbox="981 482 1725 639">Dirty smear formed by <b><u>Intermediate cells:</u></b></p> <ul data-bbox="962 676 1682 1158" style="list-style-type: none"><li data-bbox="962 676 1296 743">• Clumping</li><li data-bbox="962 776 1383 843">• Rolled edge</li><li data-bbox="962 876 1682 943">• Basophilic cytoplasm</li><li data-bbox="962 976 1566 1043">• Vesicular nucleus</li><li data-bbox="962 1076 1605 1158">• Many lymphocytes</li></ul>



*THANK YOU*

