Menstrual Cycle & Oral Contraceptives

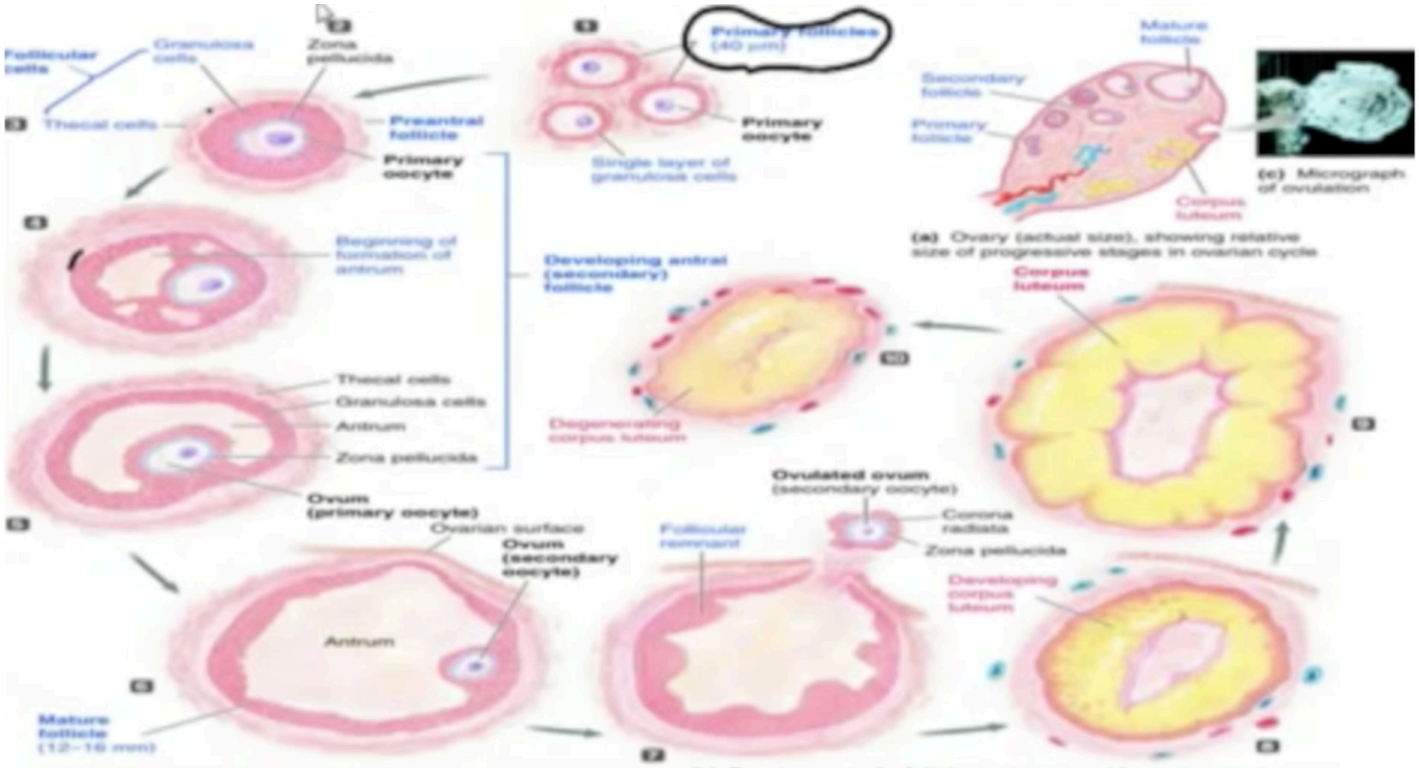
Abdullah AlAsaad

KSAU-HS

Phases (Basics)

- **Follicular phases (first 2 weeks)**
  - Variable
  - Estrogen
  - Endometrial proliferation
- **Ovulation (approximately day 14)**
  - LH surge induces ovulation
- **Luteal phase (14 days)**
  - Progesterone
  - Secretory endometrium
- **Menses**

Note: Total cycle length – 14 = Ovulation



1 In a primary follicle, a primary oocyte is surrounded by a single layer of granulosa cells.

2 Under the influence of local paracrines, granulosa cells proliferate and form the zona pellucida around the oocyte.

3 Surrounding ovarian connective tissue differentiates into thecal cells, converting a primary follicle into a preantral follicle.

4 Follicles reaching the preantral stage are recruited for further development under the influence of FSH at the beginning of the follicular phase of the ovarian cycle. A recruited follicle develops into an antral, or secondary, follicle as an estrogen-rich antrum starts to form.

5 The antrum continues to expand as the secondary follicle rapidly grows.

6 After about 2 weeks of rapid growth under the influence of FSH, the follicle has developed into a mature follicle, which has a greatly expanded antrum; the oocyte, which by now has developed into a secondary oocyte, is displaced to one side.

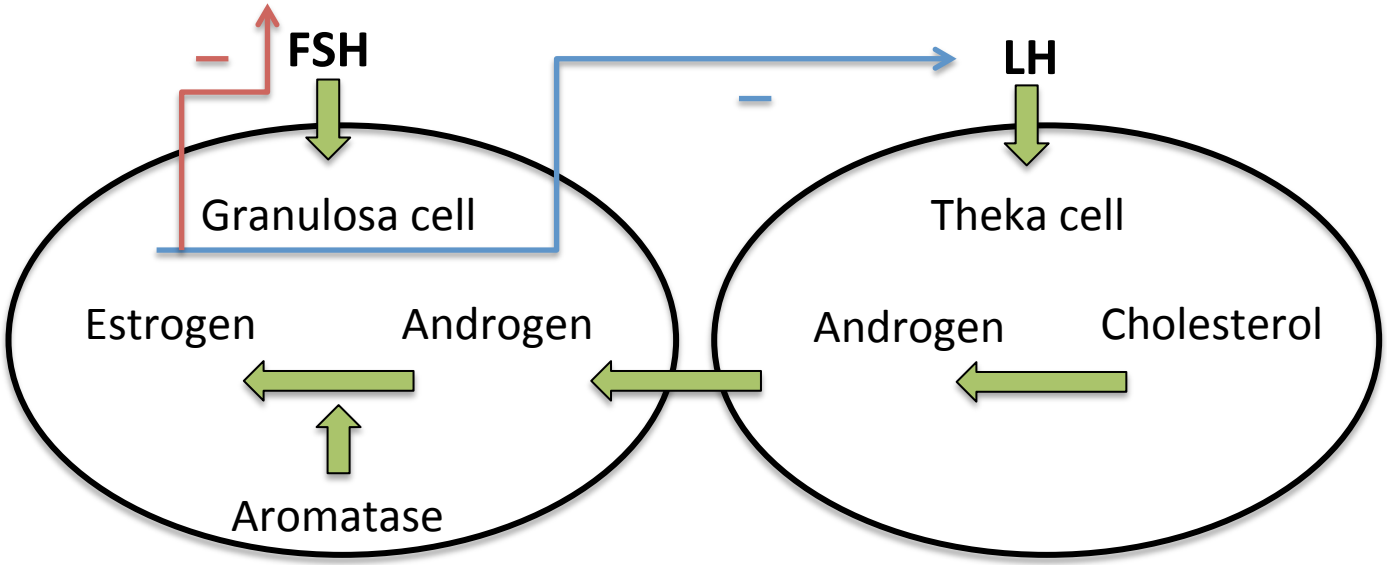
7 At midcycle, in response to a burst in LH secretion, the mature follicle, bulging on the ovarian surface, ruptures and releases the oocyte, resulting in ovulation and ending the follicular phase.

8 Ushering in the luteal phase, the ruptured follicle develops into a corpus luteum under the influence of LH.

9 The corpus luteum continues to grow and secrete progesterone and estrogen that prepare the uterus for implantation of a fertilized ovum.

10 After 14 days, if a fertilized ovum does not implant in the uterus, the corpus luteum degenerates, the luteal phase ends, and a new follicular phase begins under the influence of a changing hormonal milieu.

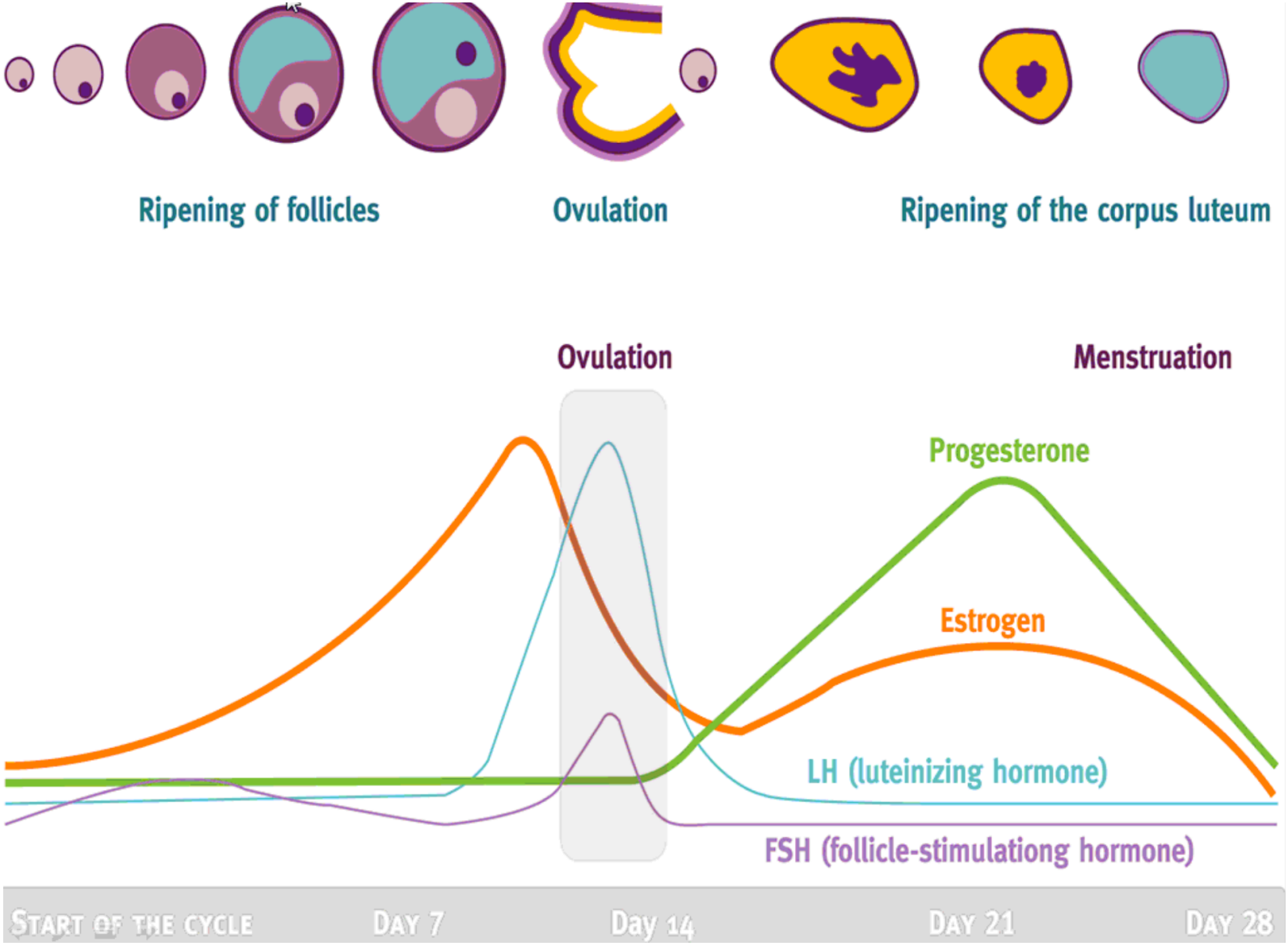
Follicular Phase



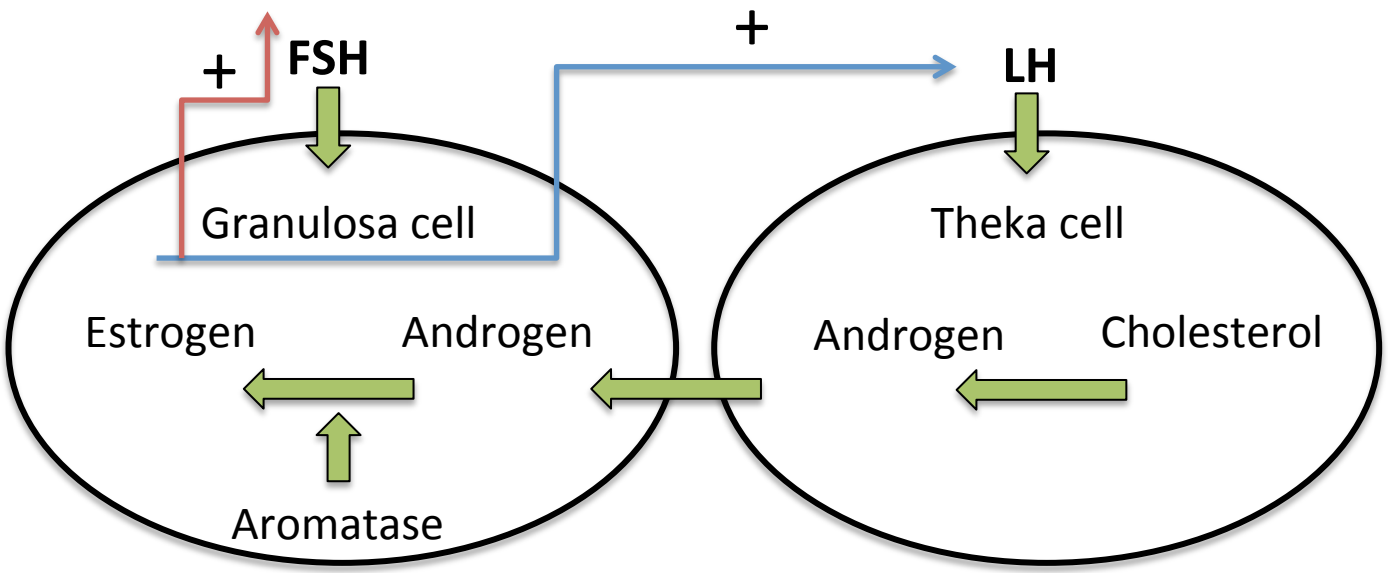
Follicular Phase

- Mensis is the first day of the cycle
- Hight FSH → more granulosa cells →more estrogen secretion
- Theca cells: make androgens
- Granulosa cells: make estrogen
- Estrogen:

1. Secondary sex characteristics
2. Endometrium proliferation
3. Cervical mucus becomes thin and watery


Ripening of follicles
Ovulation
Ripening of the corpus luteum
Ovulation
Menstruation
Progesterone
Estrogen
LH (luteinizing hormone)
FSH (follicle-stimulationg hormone)
Start of the cycle
Day 7
Day 14
Day 21
Day 28

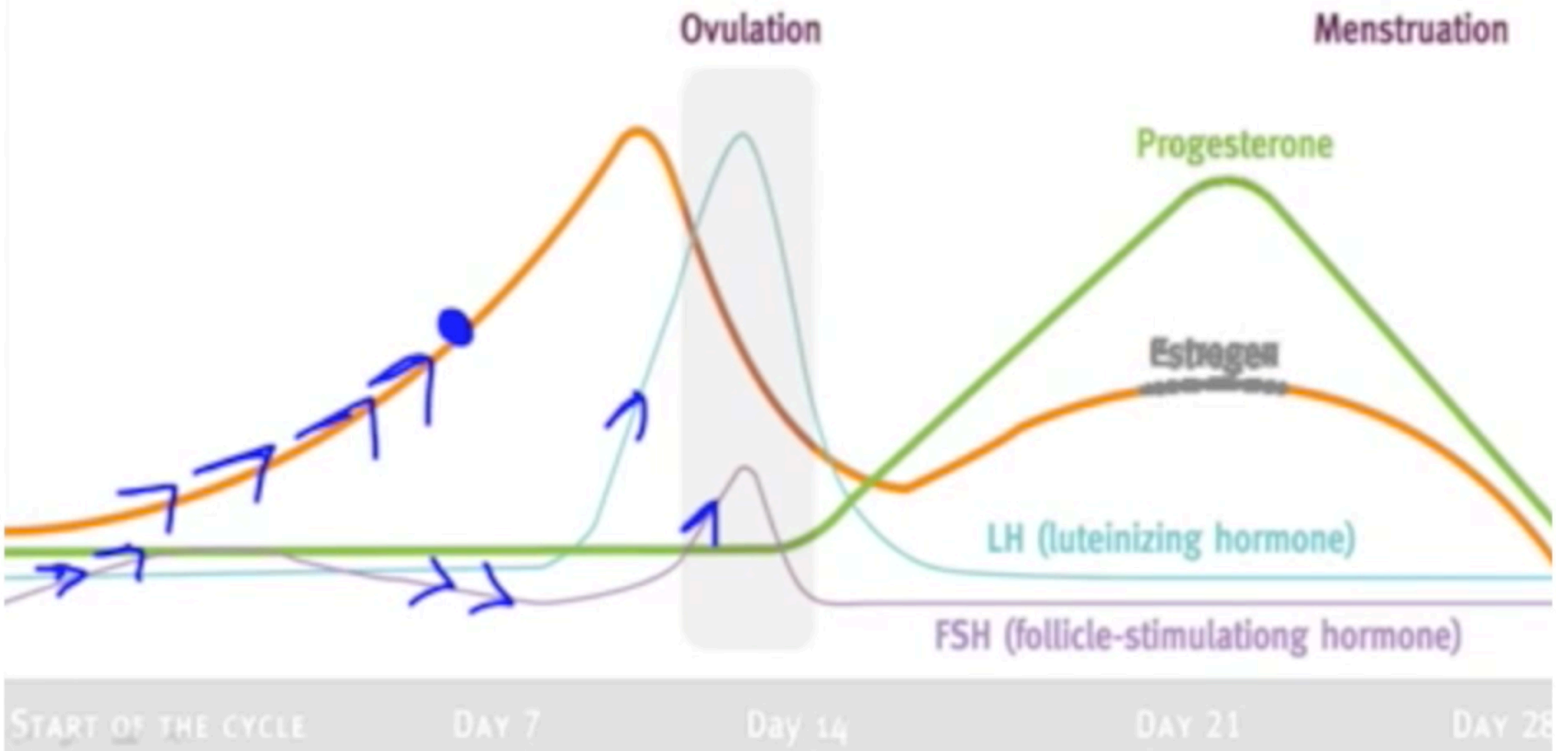
Follicular Phase



Ripening of follicles

Ovulation

Ripening of the corpus luteum



Ovulation

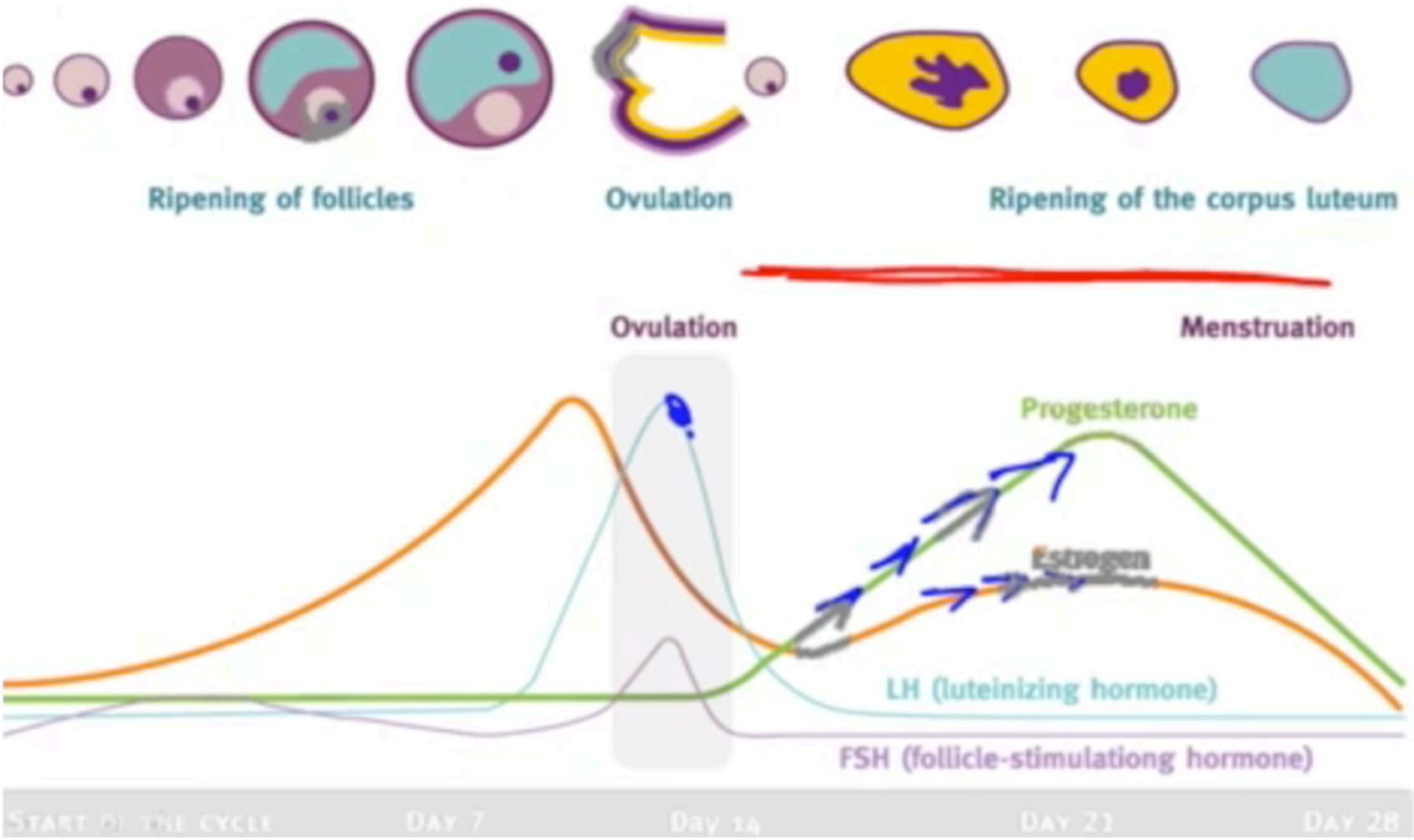
- When estrogen rises to a certain level they begin to stimulate the secretion of LH and FSH (positive feedback)
- LH surge and ovulation happens when estrogen peaks
- LH removes the restrain upon meiosis:

1. Completion of first meiotic division
2. Release of first polar body

Luteal Phase

- After LH surge the follicle turns into a corpus leteum (secretes progetrone and little estrogen)
- LH⇧→ Corpus luteum → progesterone ⇧→ LH ⇩
- Progesterone:

1. Endometrium becomes secretory (juicy)
2. Cervical mucus becomes thick
3. Body temperature increases


Ripening of follicles
Ovulation
Ripening of the corpus luteum
Ovulation
Menstruation
Progesterone
Estrogen
LH (luteinizing hormone)
FSH (follicle-stimulationg hormone)
Start of the cycle
Day 7
Day 14
Day 21
Day 28

Fertilization

- Happens in the ampulla
- 2nd meiotic division occurs
- Time frame:
- 14-15: ovulation
- 15: fertilization
- 15 → 20: implantation
- 25: Beta-hCG

Oral Contraceptives

- Combination of estrogen and progestins
- Progestins: suppress midcycle LH surge
- Estrogens: Suppress FSH, against some SE
- Decrease effectiveness with antimicrobial and enzyme inducers
- Benefits:

➢ Regulates menstrual cycle

➢ Decrease risk of endometrial and ovarian cancer

➢ Decreases osteoporosis

Side Effects

- Weight gain
- High LDL
- Increase BP
- DVT
- Abnormal liver Biochem
- Migraine
- Depression
- Liver adenoma

For any questions or comments please contact us at:

info@letstalkmed.com