The Human Menstrual Cycle (TY FN and FSQC)

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WHAT IS THE MENSTRUAL CYCLE?

- The process in which females ripen or release one mature egg.
- The average menstrual cycle will repeat itself about every 28 days, but normal menstrual cycles can range from 21 to 40 days.

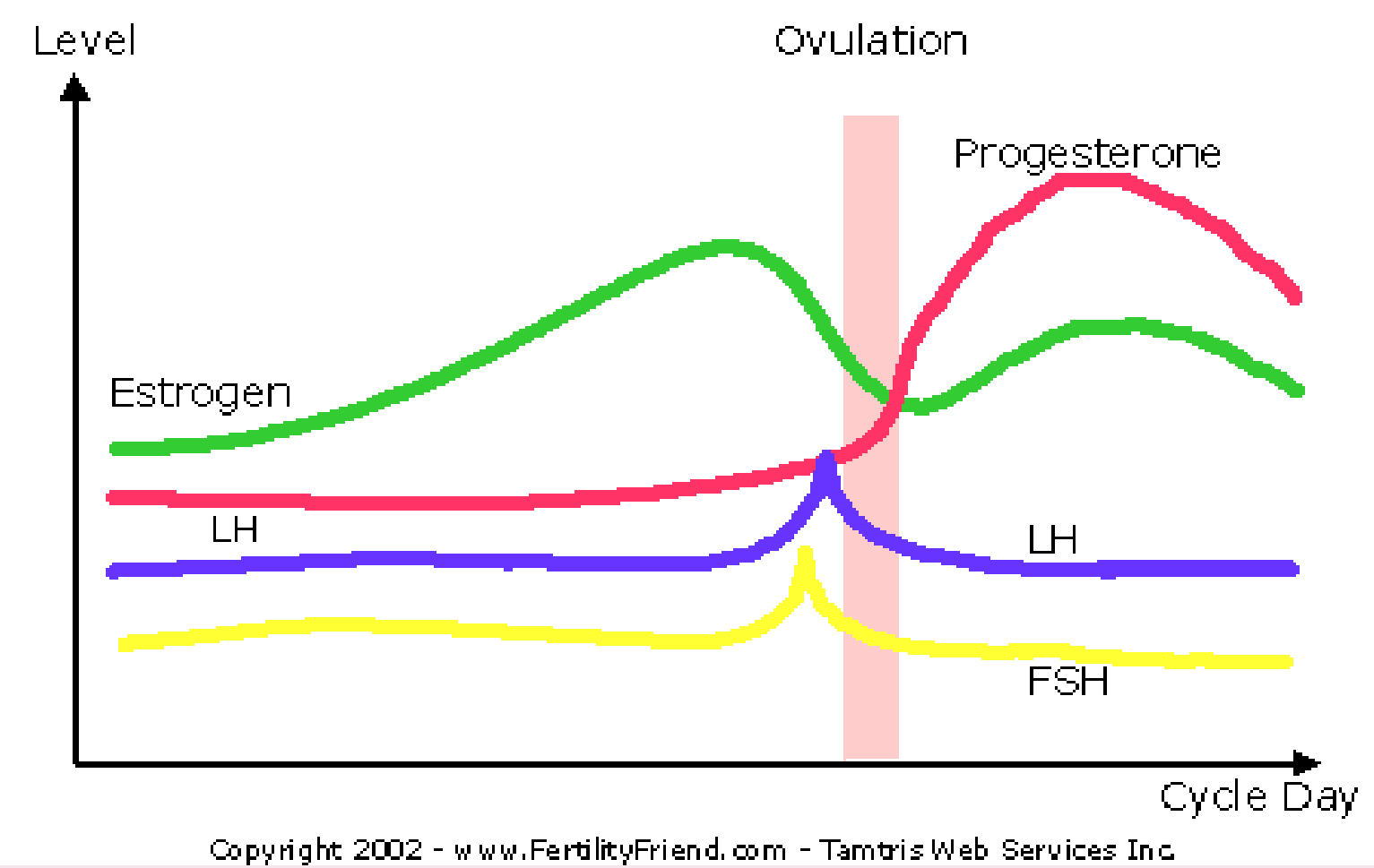
PURPOSE OF MENSTRUAL CYCLE

- Each month an egg matures in a female for possible pregnancy
- The menstrual cycle is the process that prepares for pregnancy every month through 4 stages, culminating with menstruation if the egg is NOT fertilized in that month

HORMONES THAT REGULATE THE MENSTRUAL CYCLE

- Progesterone: prepares uterus for pregnancy. “Pregnancy Hormone”
- Estrogen- secreted in ovaries
- FSH- Follicle Stimulating Hormone (pituitary gland)- stimulates development of ovum in a follicle
- LH- Lutenizing Hormone- develops the corpus luteum

MENSTRUAL CYCLE HORMONE FLUCTUATIONS



STAGES OF THE MENSTRUAL CYCLE

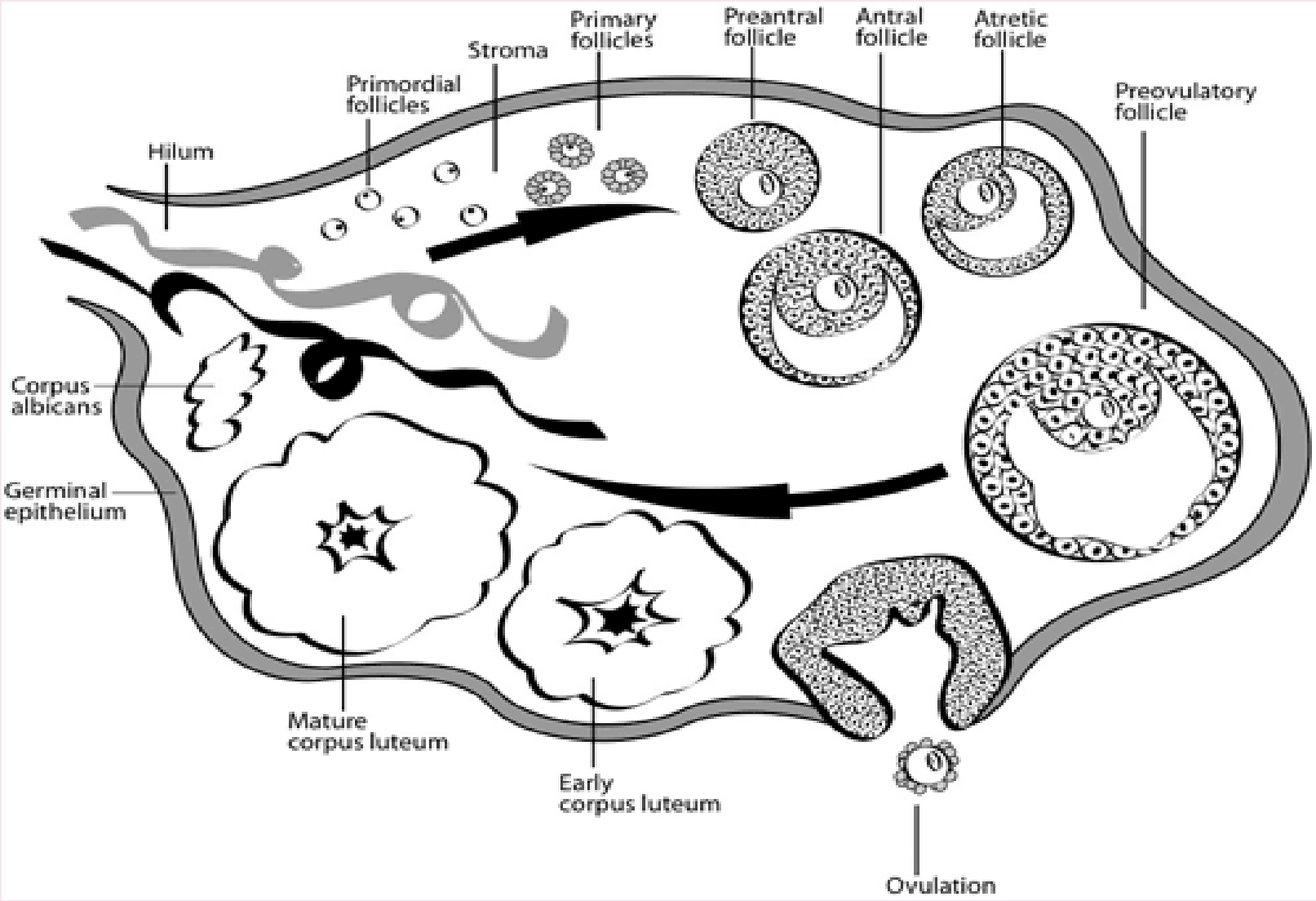
- Between a 28-30 day cycle

- **Four Stages**
- **Stage 1: Follicle Stage**
  - **Stage 2: Ovulation**
- **Stage 3: Corpus Luteum**
  - **Stage 4: Menstruation**

Stage 1: Follicle Stage (10-14 days)

- FSH is secreted
- Follicle develops in the ovary (usually 1)
- Follicle begins to secretes estrogen
- Increase in estrogen stimulates uterine lining to thicken→ preparation for possible pregnancy

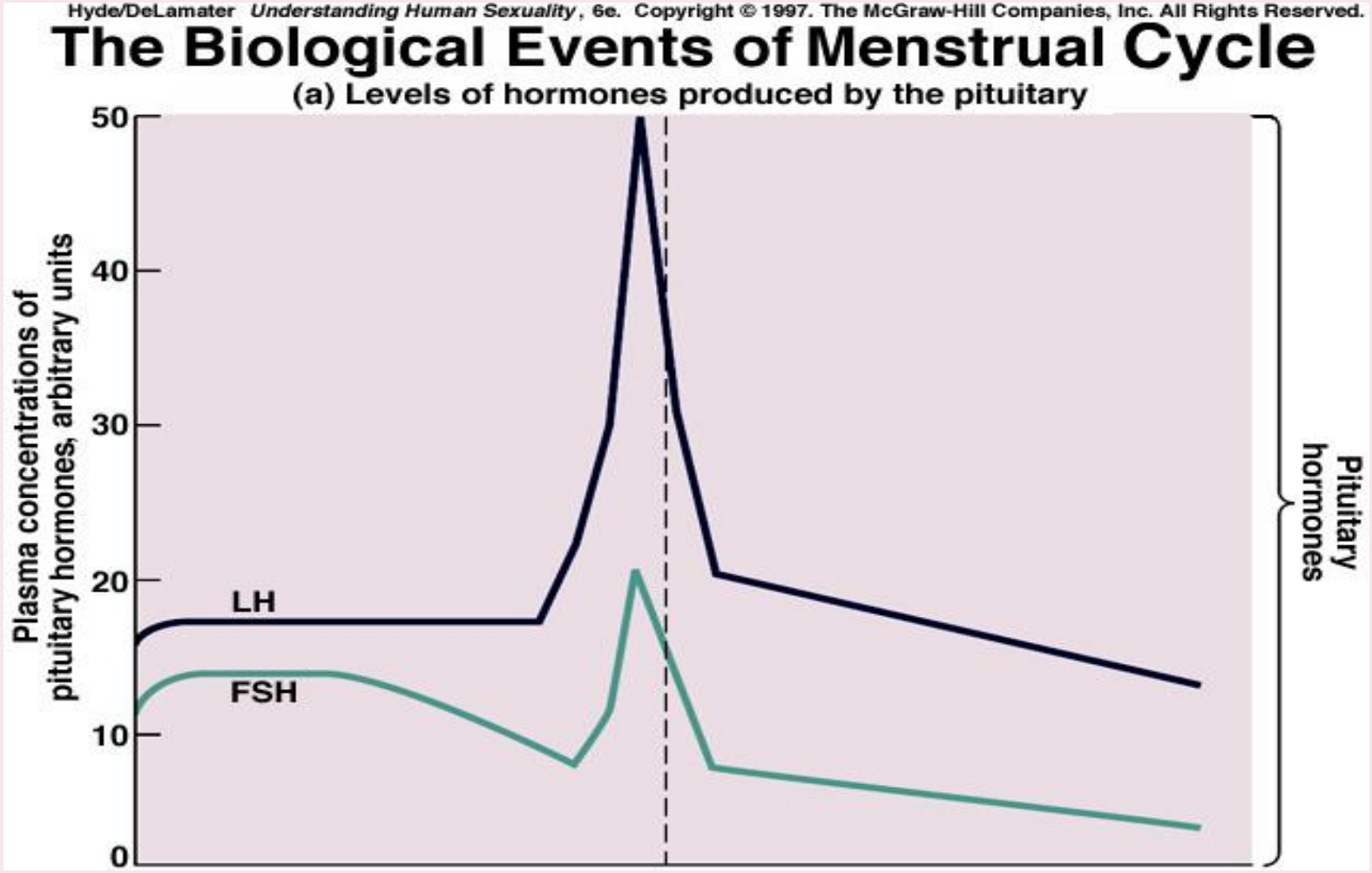
MATURATION OF FOLLICLE



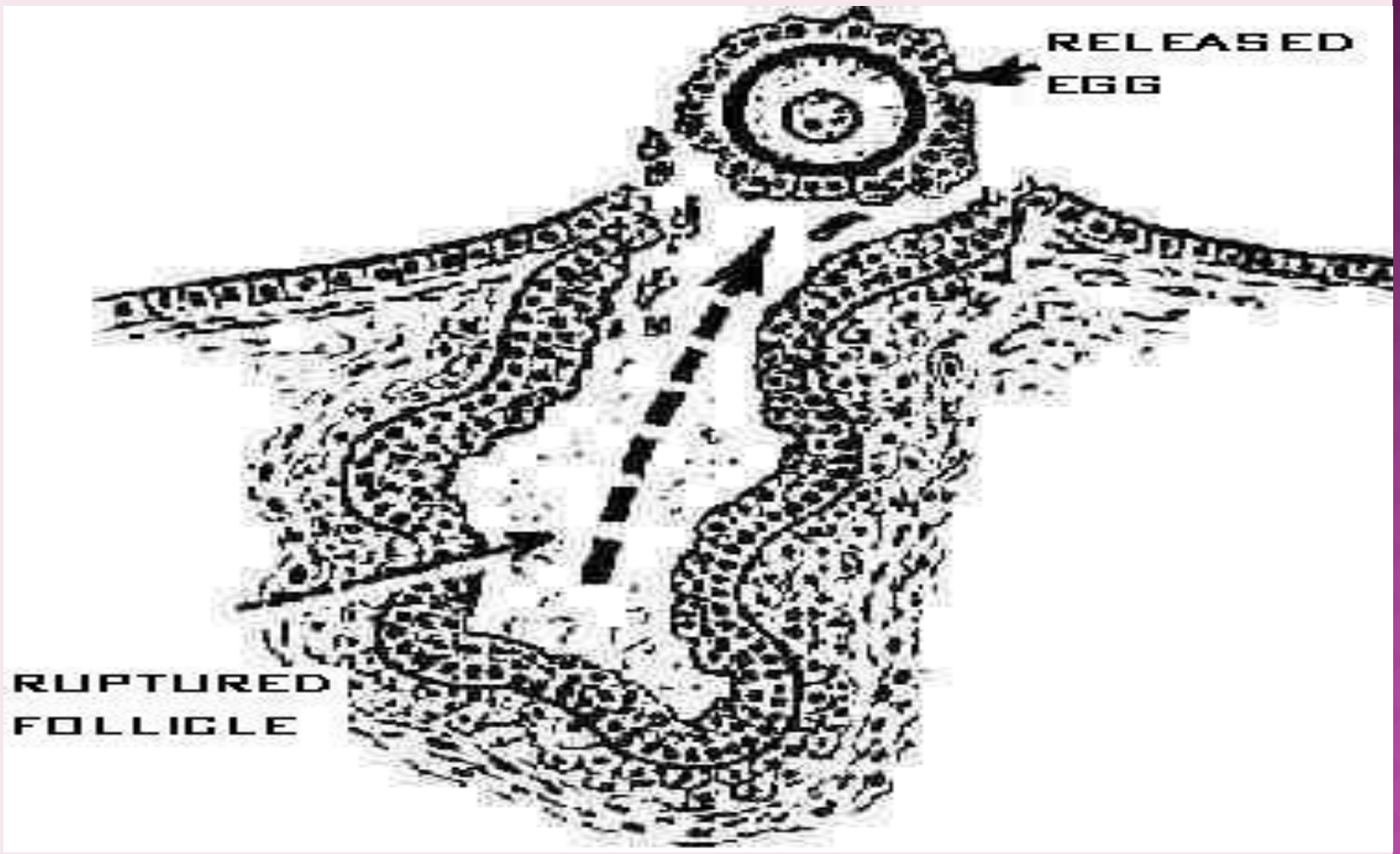
Stage 2: Ovulation (~Day 15)

- Estrogen causes decrease of FSH which stimulates the release of LH
- When LH is at peak (LH surge) ovulation takes place
  - Ovulation: release to mature egg into the Fallopian tube (oviduct)
  - Considered the middle of menstrual cycle

LH AND FSH ELEVATE AROUND OVULATION



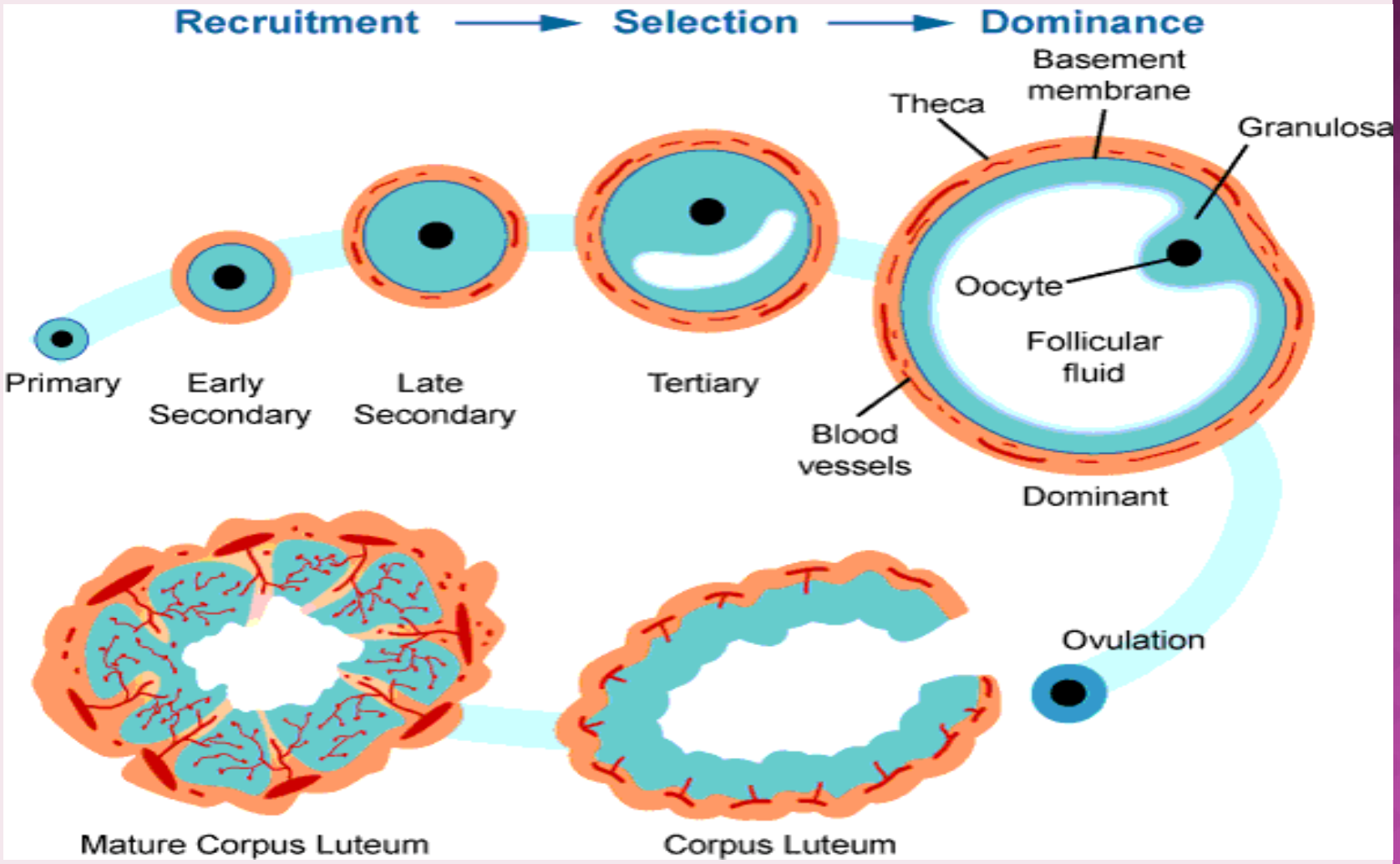
EGG RELEASING FROM FOLLICLE



Stage 3: Corpus Luteum Stage (10 -14 days)

- Yellow tissue fills up the broken follicle after ovulation. Tissue is called corpus luteum
- Corpus luteum secretes progesterone which allows for continued uterine lining and decrease of FSH

CORPUS LUTEUM TISSUE LEFT BEHIND AFTER OVULATION AND SECRETES HORMONES



Stage 4: Menstruation (3-5 days)

- Shedding of the uterine lining and egg if it is not fertilized
- LH is lowered
- Progesterone in lowered
- Estrogen drops
- Pituitary gland begins to secrete FSH again for the next cycle.

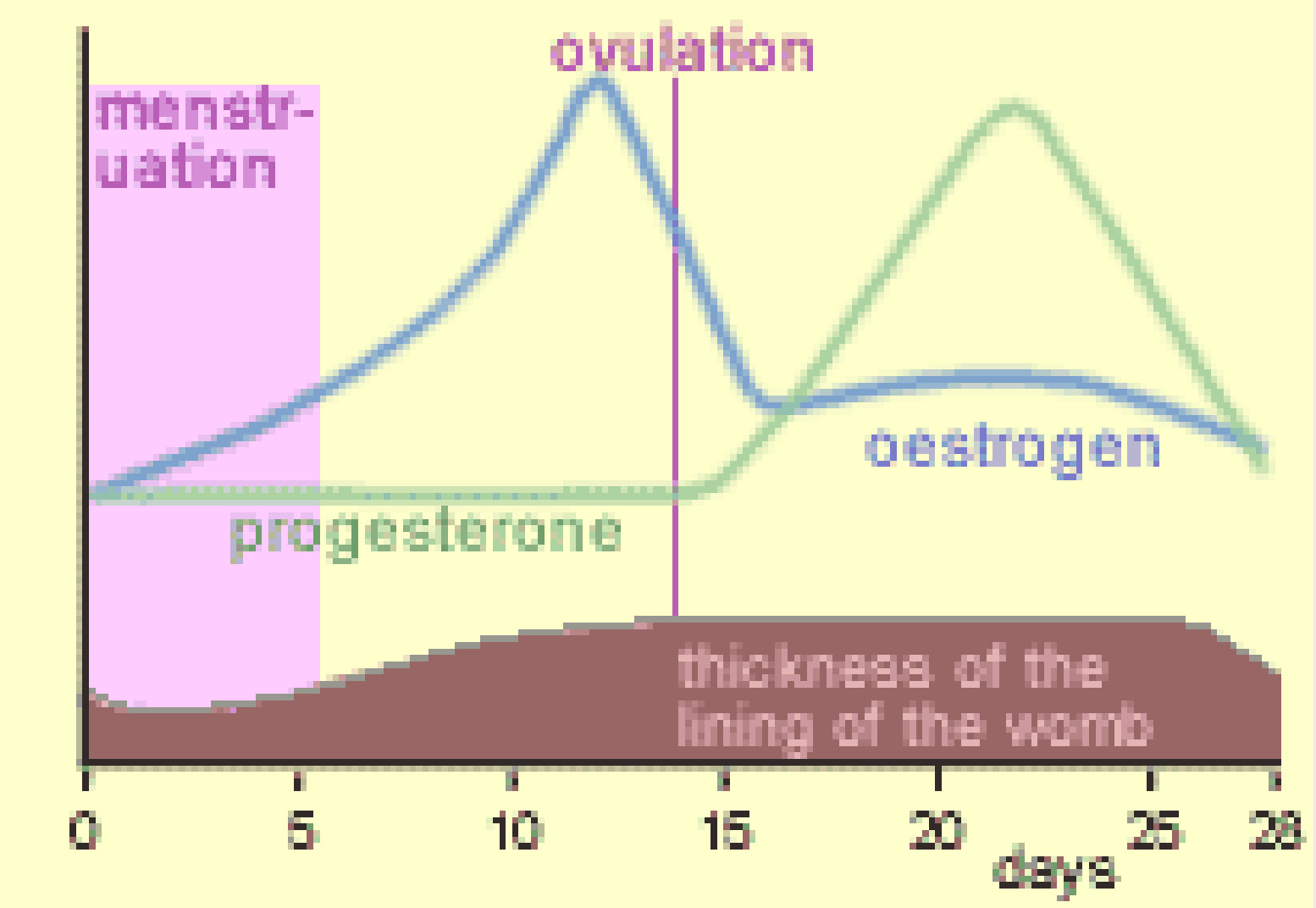
CHANGES IN THE OVARIES:

- **Stage 1** - An egg is beginning to mature within a cluster of cells called a follicle
- **Stage 2** - Rapid follicle and egg growth
- **Stage 3** - Ovulation occurs; fully mature egg bursts out of the follicle (fertile) empty follicle transforms into the corpus luteum
- **Stage 4** - Egg travels through fallopian tube (7 days) if not fertilized upon arrival in uterus the corpus luteum shrinks triggering menstruation and ripening of new egg.

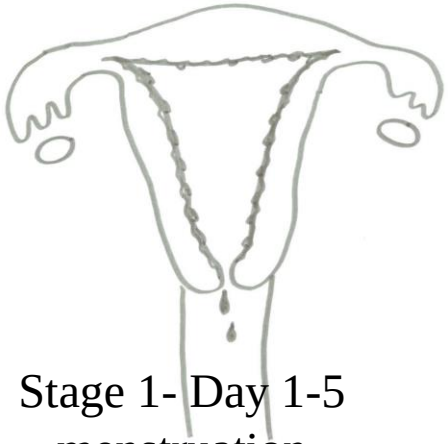
CHANGES IN OVARIAN HORMONES:

- **Estrogen** -gradually increases during days 1-14; signals body to thicken the lining of the uterus. Levels drop sharply after ovulation.
- **Progesterone** -Levels remain low during the first half of the cycle and then increase sharply during the second half of the cycle. Maintaining the growth of the endometrium lining.

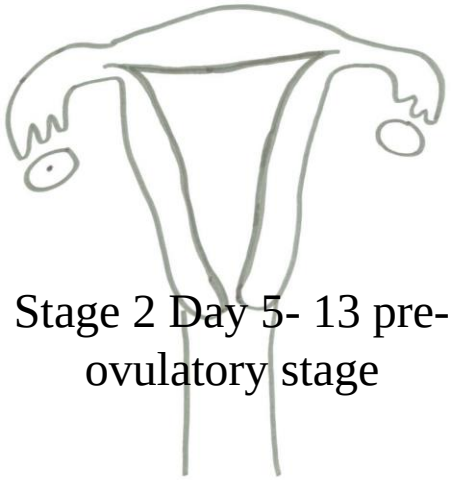
OVARIAN HORMONES



CHANGES IN THE UTERUS:

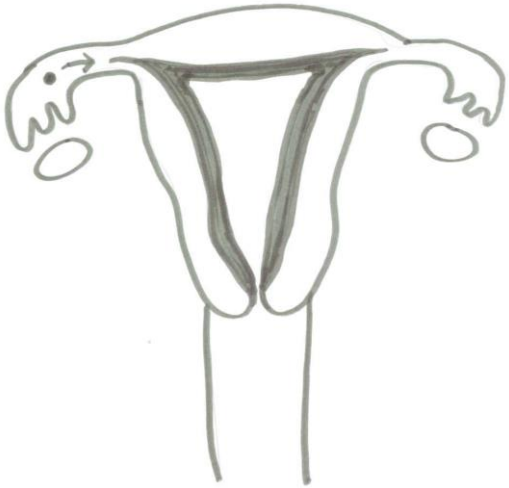


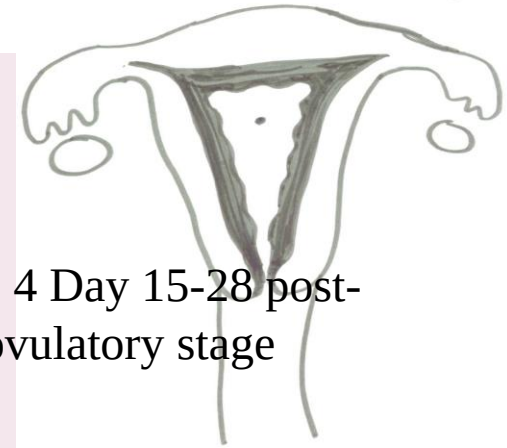
Stage 1- Day 1-5 menstruation



Stage 2 Day 5- 13 pre-ovulatory stage

Stage 3 Day 14 Ovulation

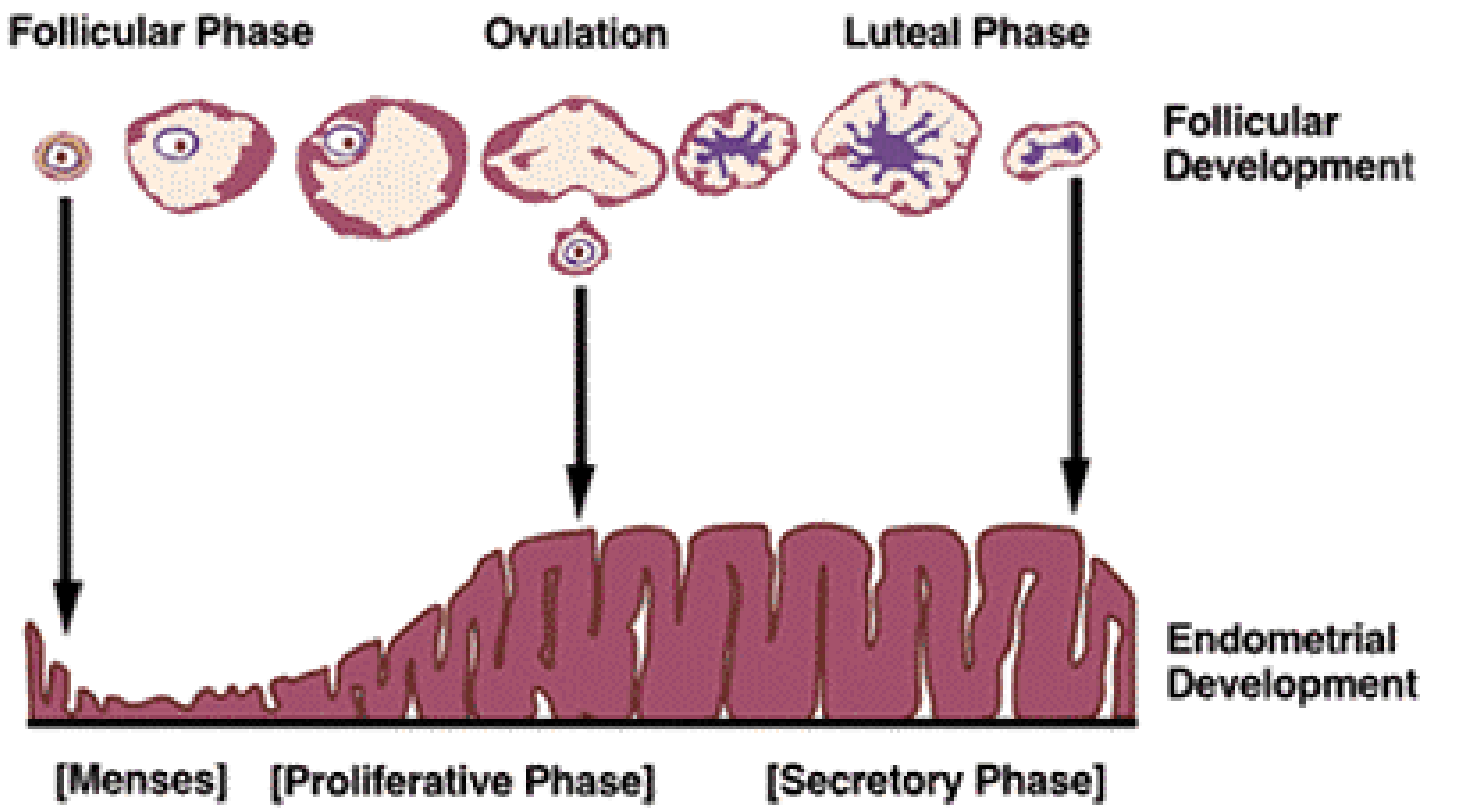




Stage 4 Day 15-28 post-ovulatory stage

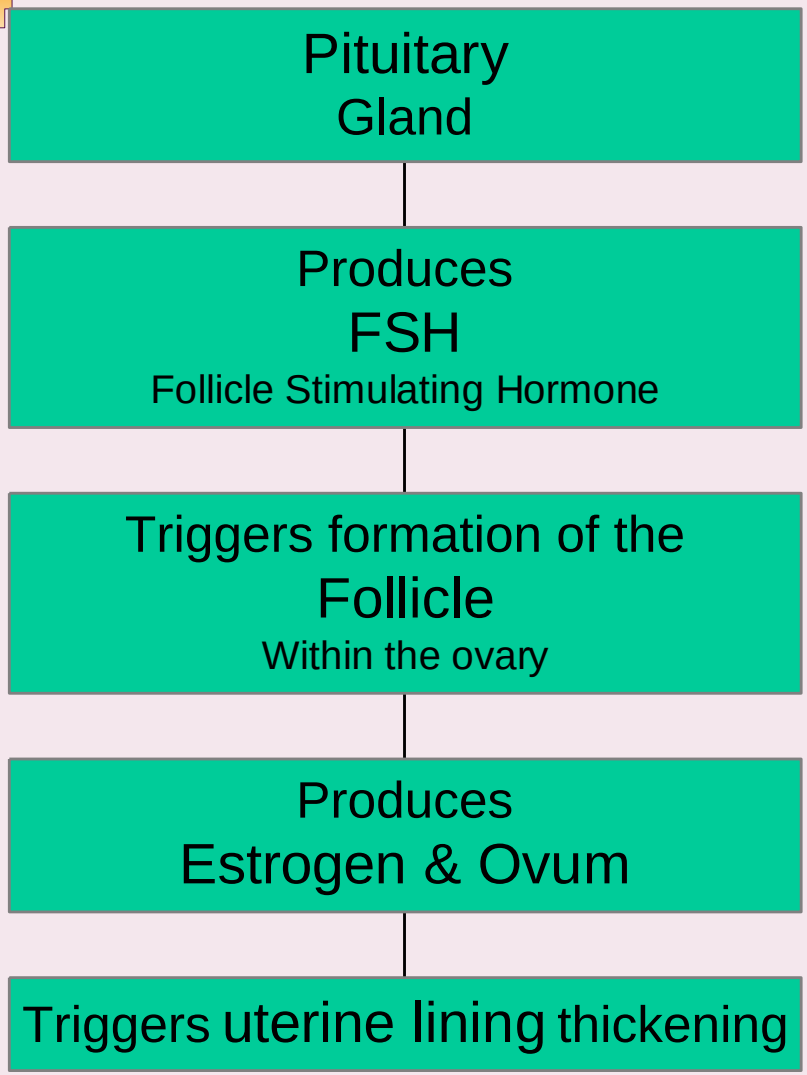
CHANGES IN THE UTERUS:

- **Stage 1**- Menstruation- Endometrium breaks down and blood, mucus, tissue, and the egg are shed through the vagina.
- **Stage 2**- Menstrual flow stops & endometrium begins to thicken.
- **Stage 3**- Endometrium continues to thicken.
- **Stage 4**- The endometrium is at it's thickest point.

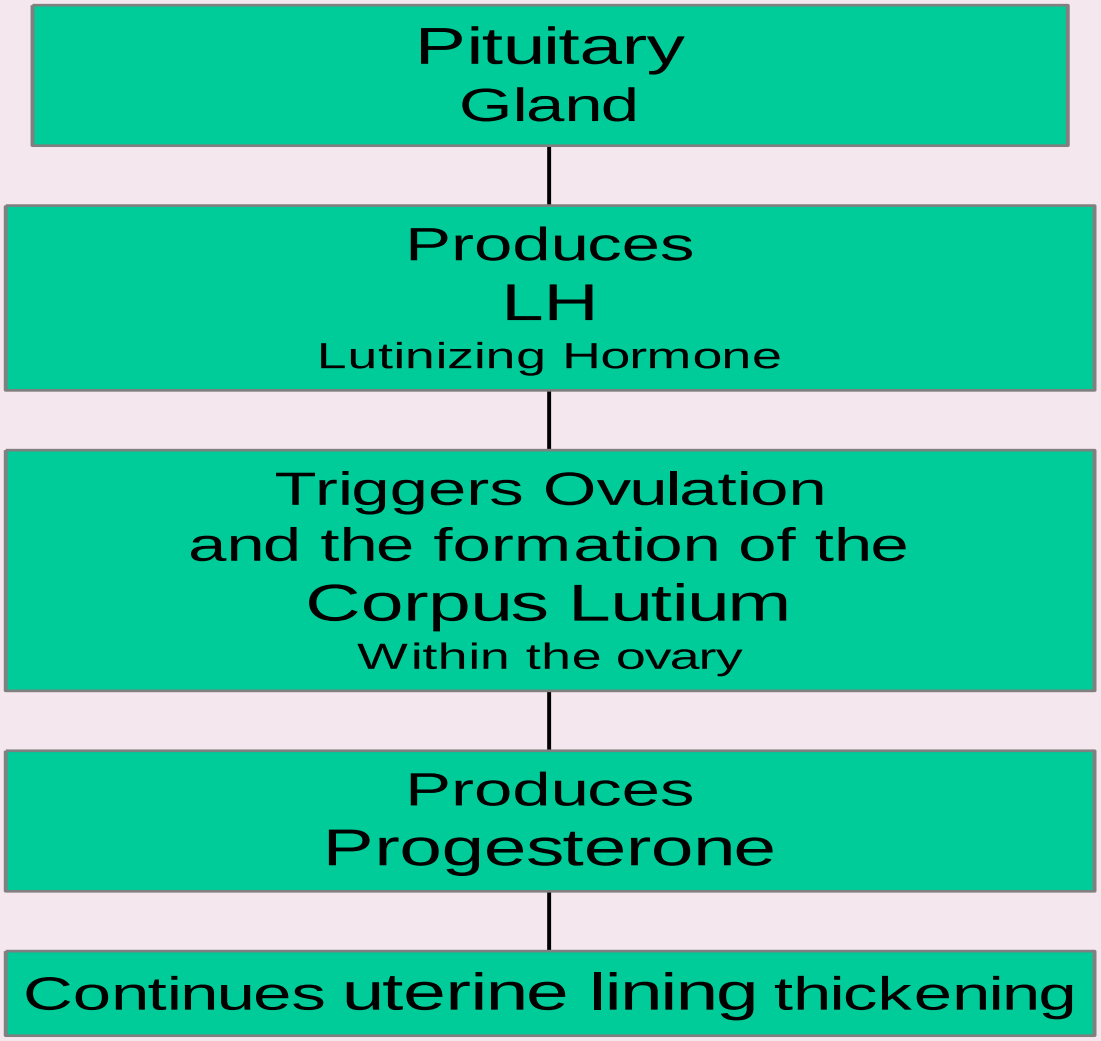


- Growth of Endometrial Lining Over The Month

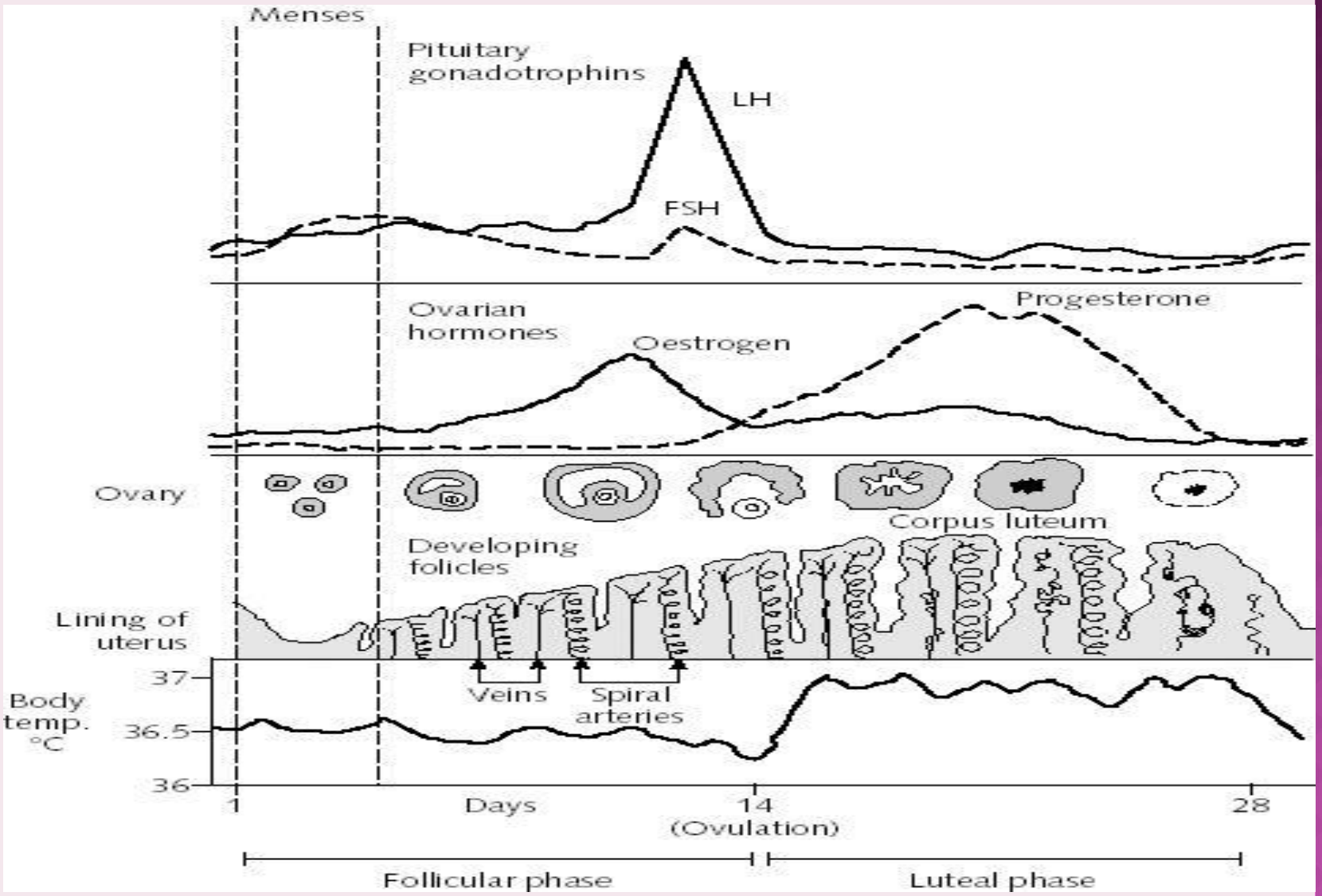
DAYS 1-14

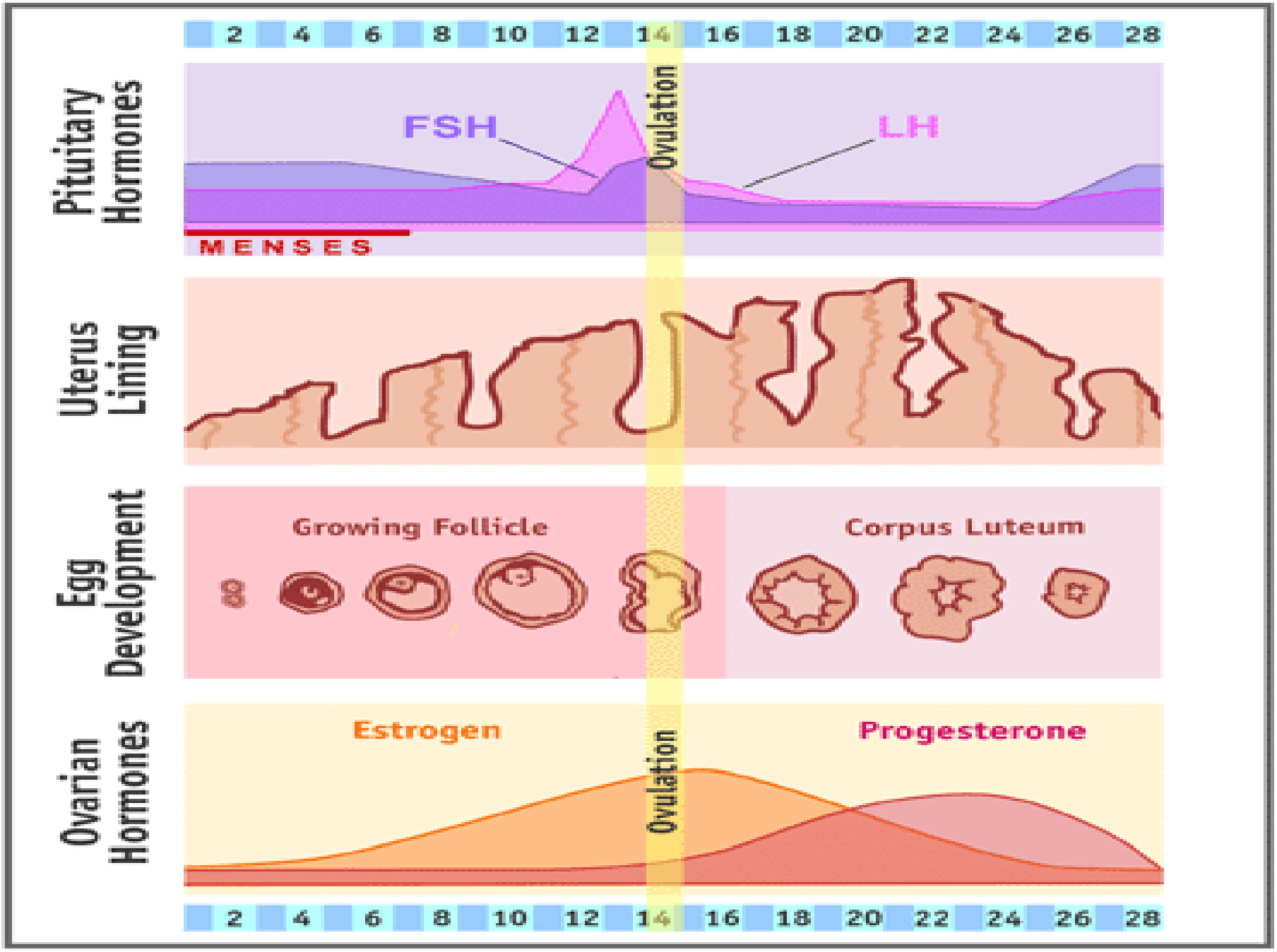

Pituitary
Gland
Produces
FSH
Follicle Stimulating Hormone
Triggers formation of the
Follicle
Within the ovary
Produces
Estrogen & Ovum
Triggers uterine lining thickening

DAYS 14 - 28


Pituitary
Gland
Produces
LH
Lutinizing Hormone
Triggers Ovulation
and the formation of the
Corpus Lutium
Within the ovary
Produces
Progesterone
Continues uterine lining thickening

ALL HORMONES AND CHANGES




2 4 6 8 10 12 14 16 18 20 22 24 26 28
Pituitary Hormones
FSH
LH
Ovulation
MENSES
Uterus Lining
Egg Development
Growing Follicle
Corpus Luteum
Ovarian Hormones
Estrogen
Progesterone
Ovulation
2 4 6 8 10 12 14 16 18 20 22 24 26 28