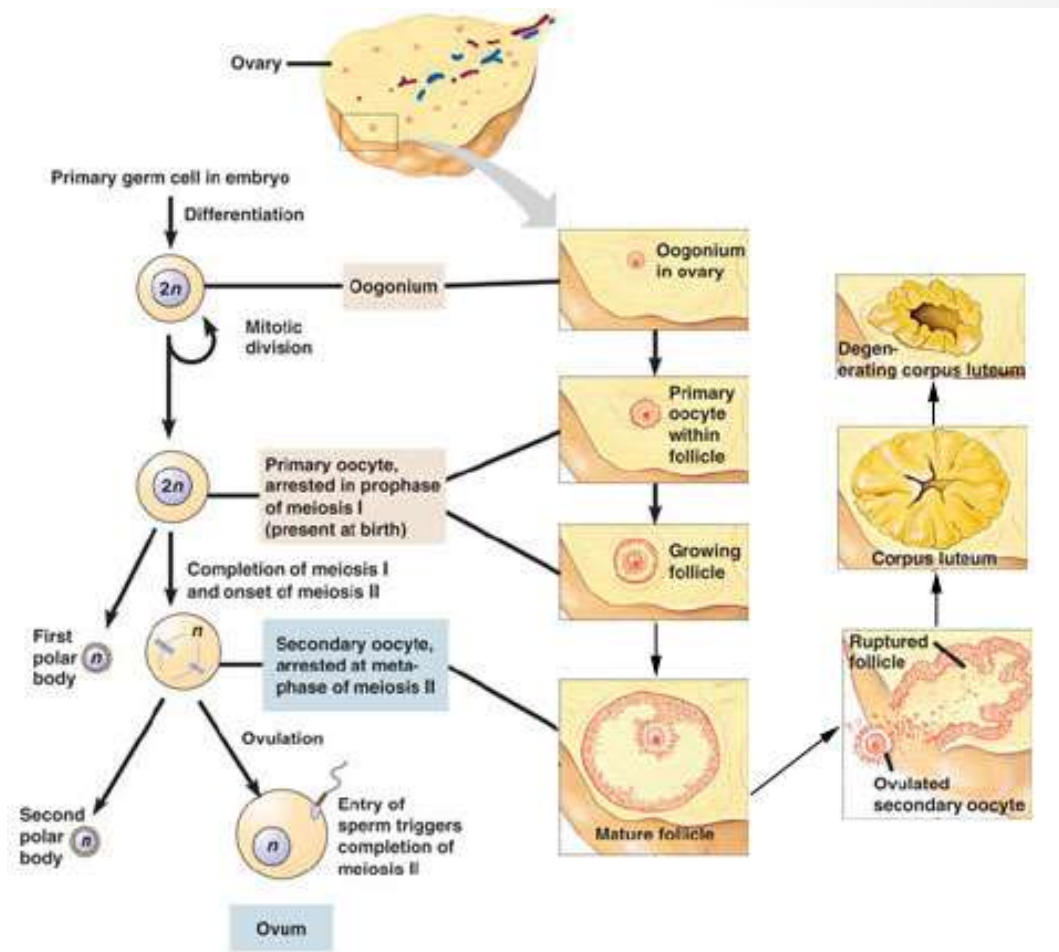


Hormones in the Female Reproduction System

Unlike other animals, humans can **CHOOSE** when they want to reproduce.



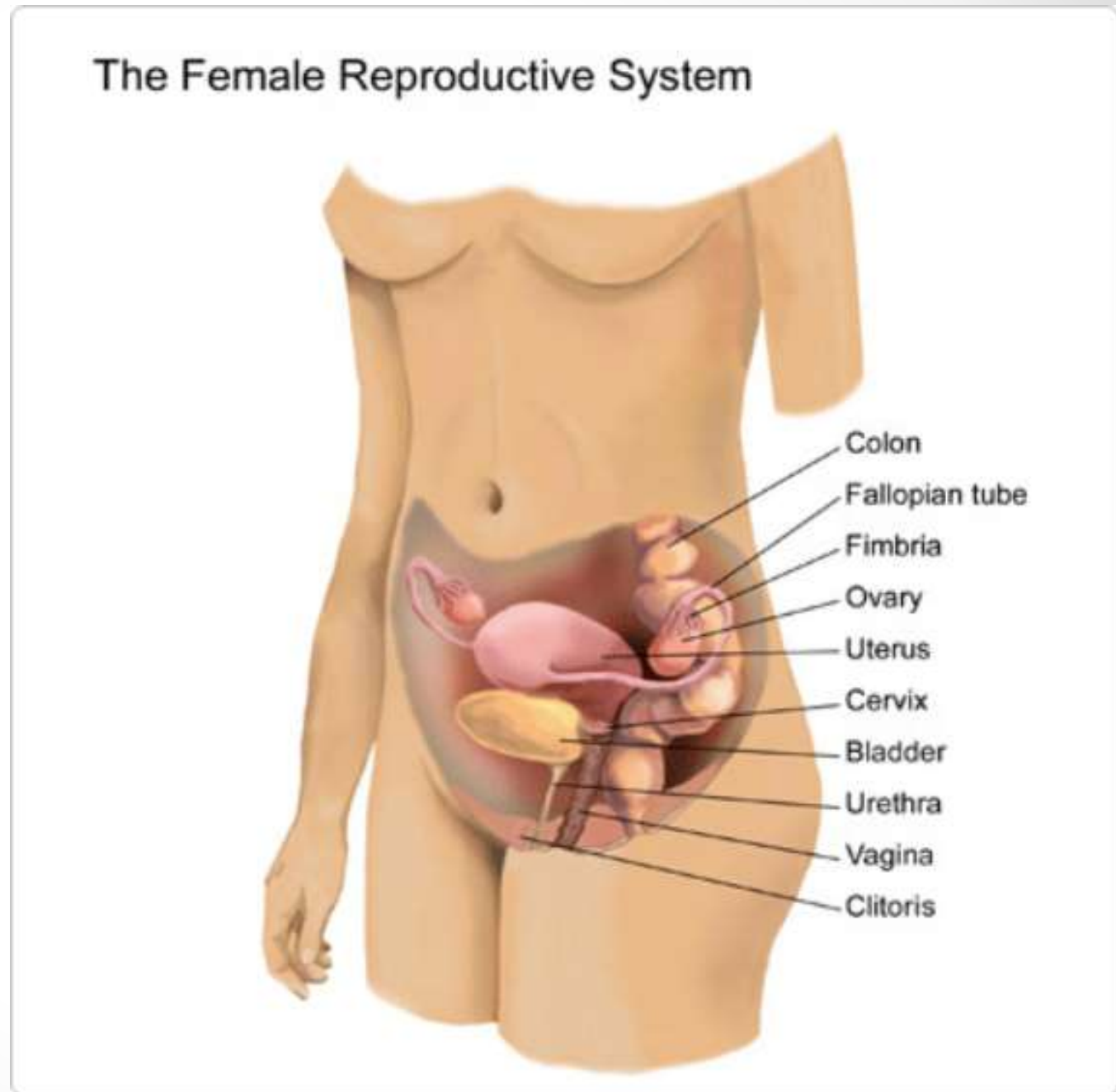
EQ: How do hormones balance through the female menstrual cycle?



FEMALE REPRODUCTION

Main Structures

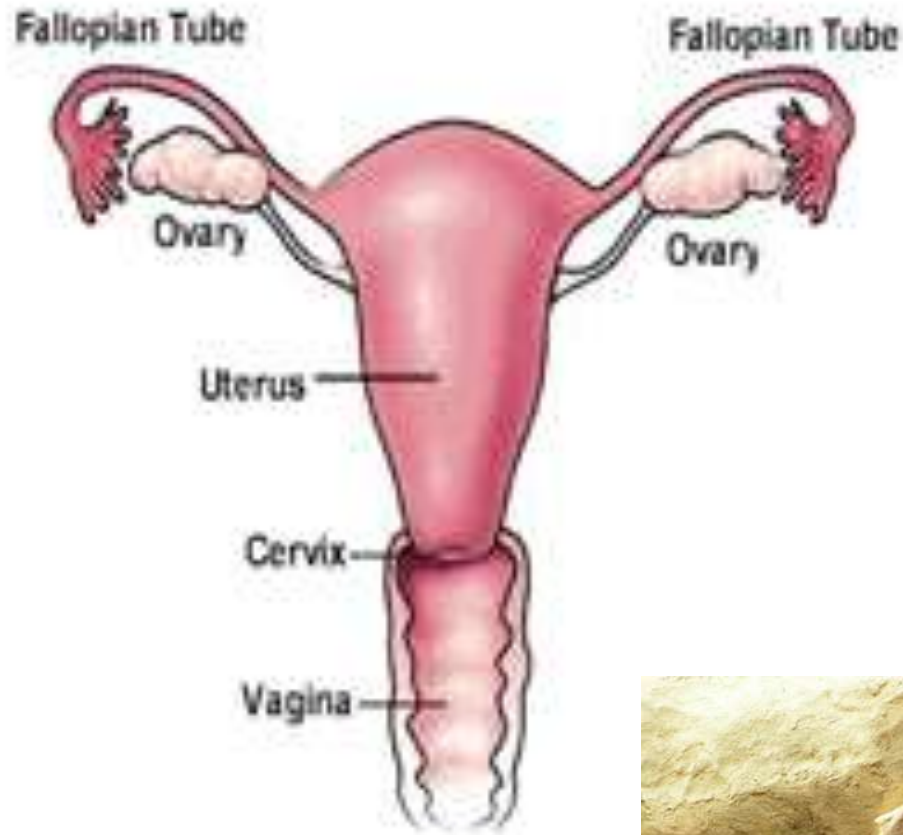
- Ovary
- Uterus
- Fallopian Tubes
- Vagina
- Cervix



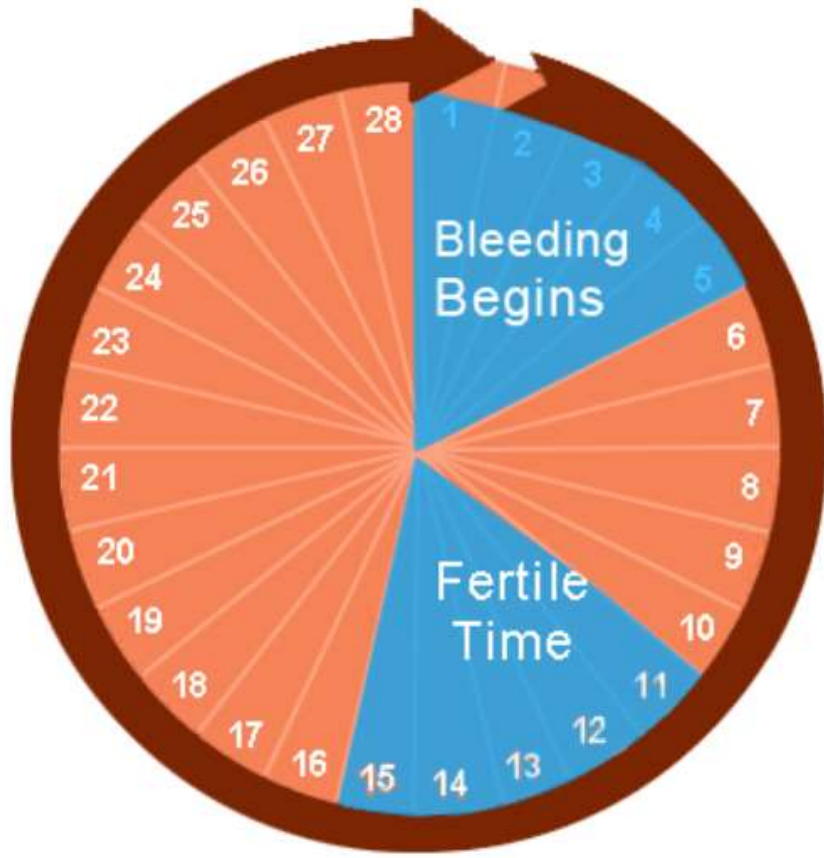
OVARY - this is where the eggs are produced through cell division (MEIOSIS)

- each ovary takes turns releasing eggs every month, twins occur if two eggs are released

Ovaries secrete both estrogen and progesterone.

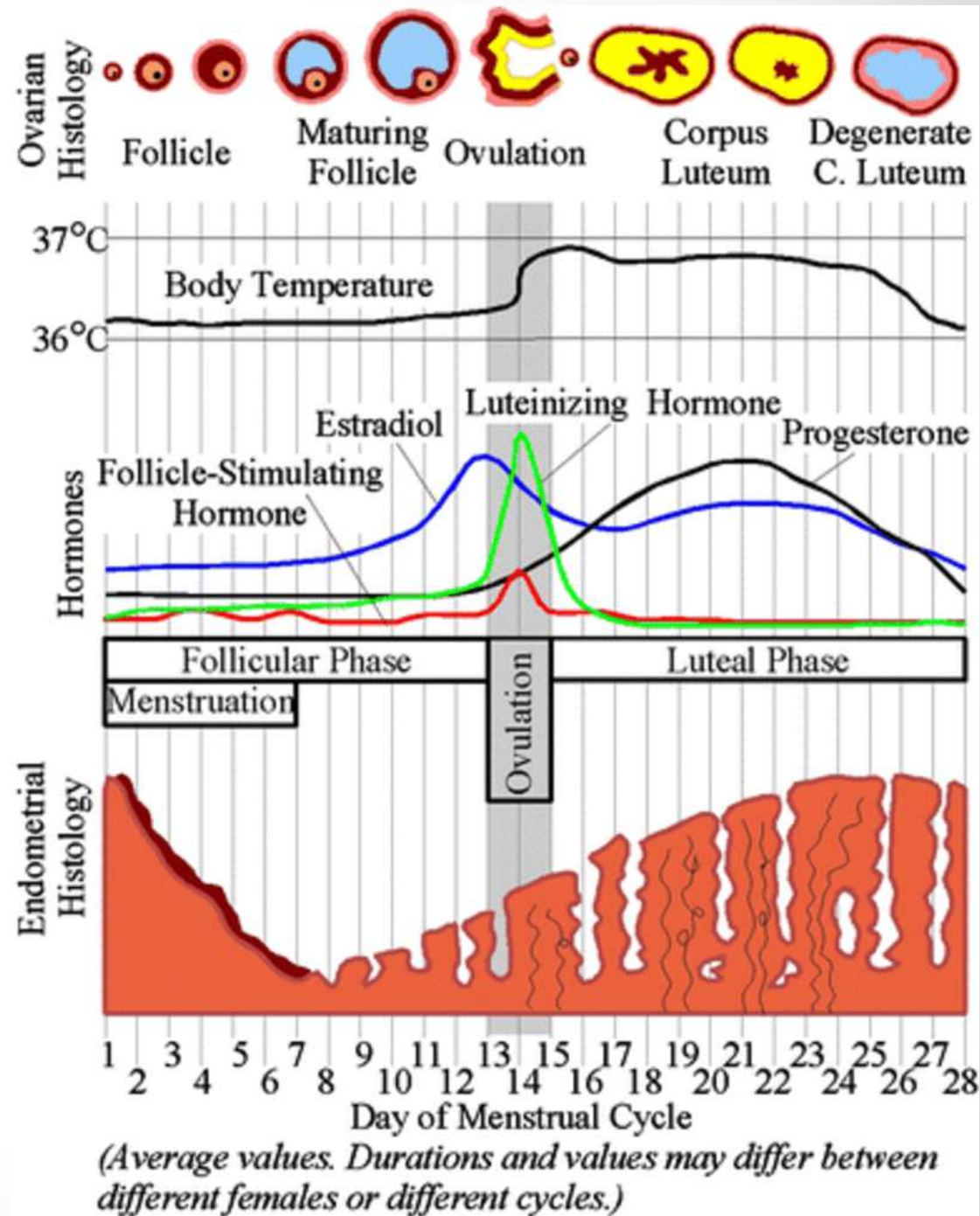


The Menstrual Cycle

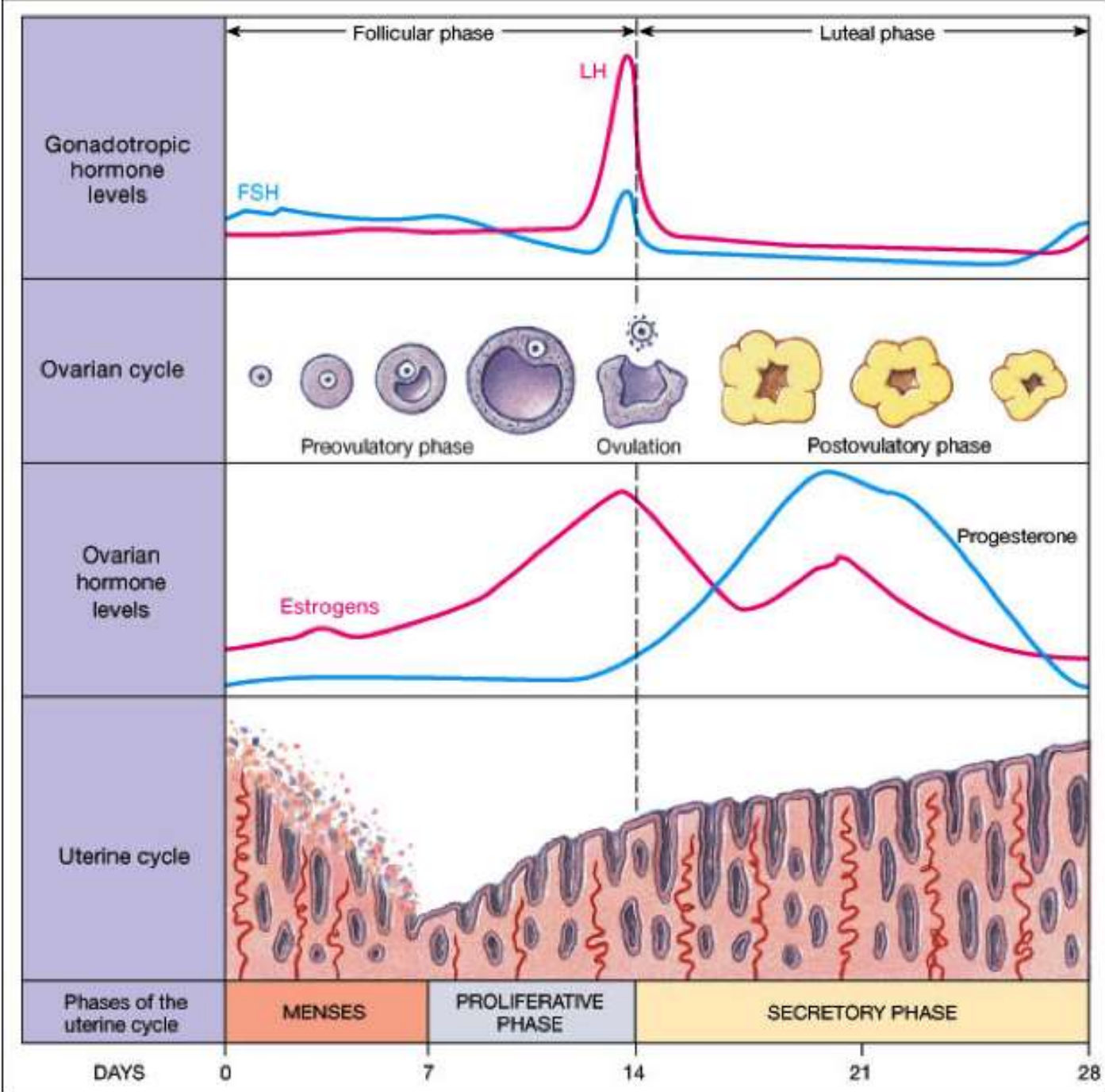


GnRH from the hypothalamus stimulates Anterior Pituitary Gland to produce FSH and LH

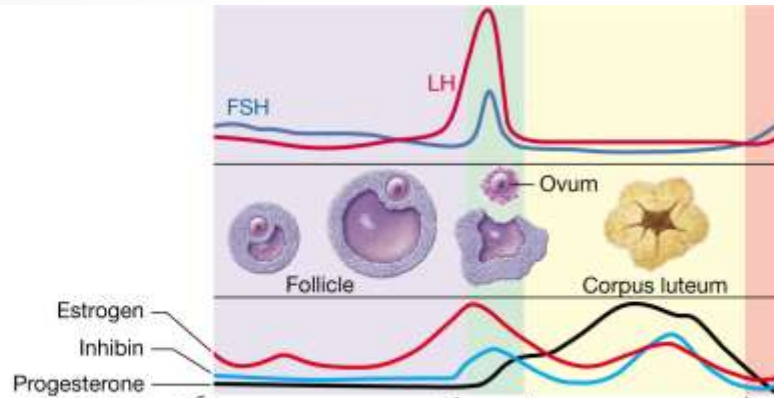
Female Sex Hormones



Female Menstrual Cycle



Female Menstrual Cycle



(a) Early to mid-follicular phase

Low levels of estrogen exert negative feedback to GnRH, FSH, LH. Estrogen promotes more estrogen secretion by the follicle. AMH prevents more follicles from developing.

(b) Late follicular phase and ovulation

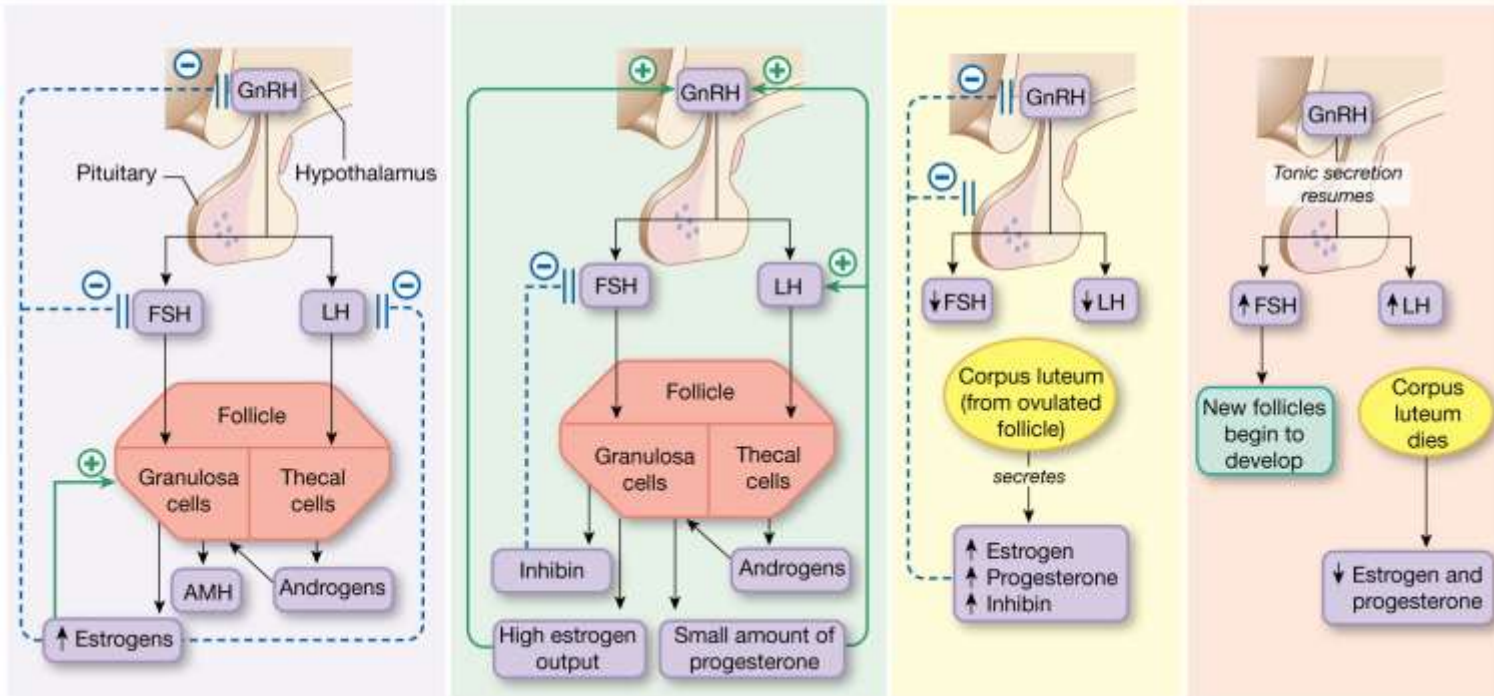
Rising levels of estrogen plus increasing progesterone cause the LH surge. FSH is suppressed by inhibin.

(c) Early to mid-luteal phase

Combined estrogen and progesterone shut off FSH and LH.

(d) Late luteal phase

Estrogen and progesterone fall when corpus luteum dies. Gonadotropins start follicular development for a new cycle.



Female Hormone Functions

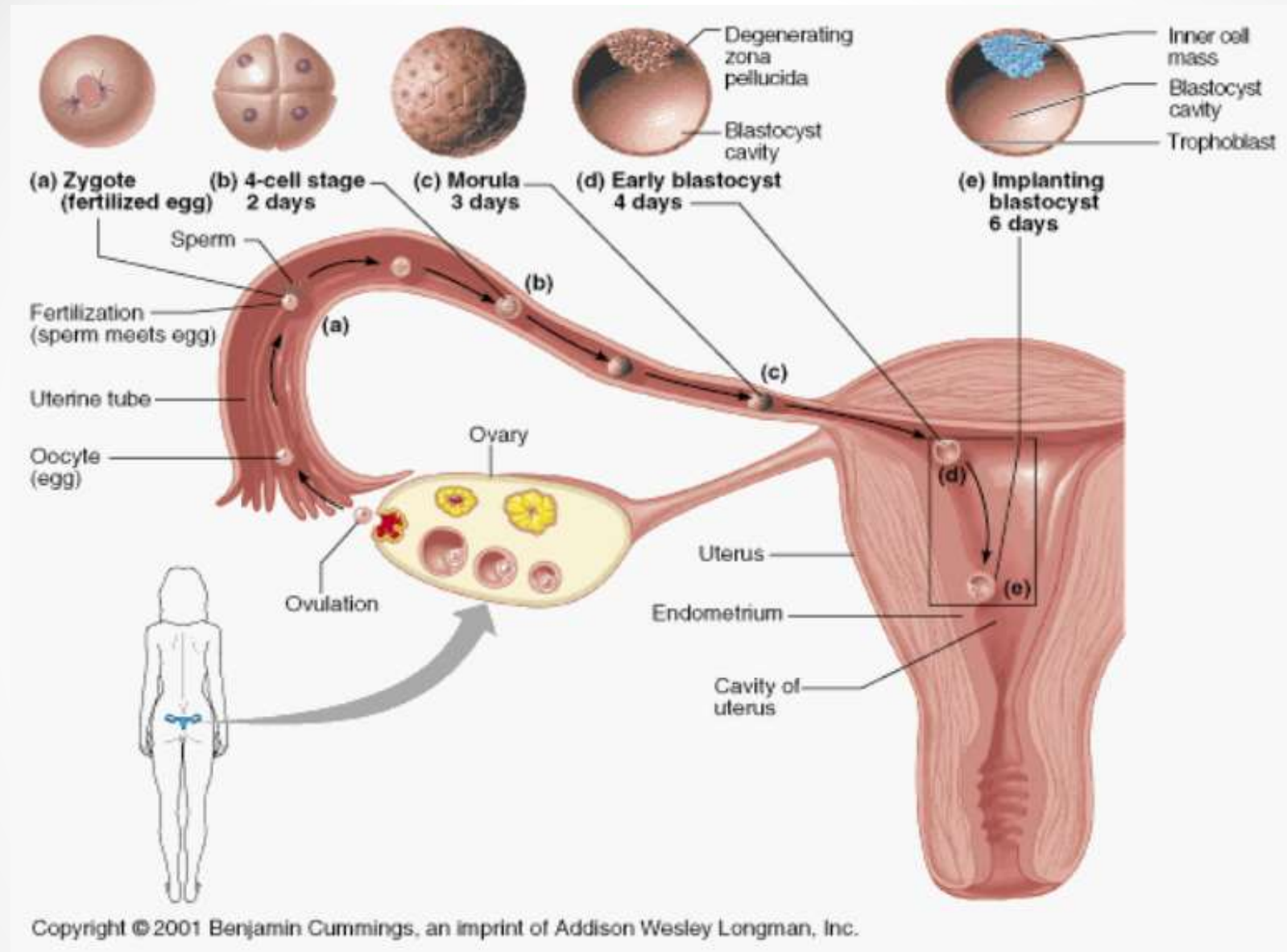
Estrogen

- Growth of ovary/follicles
- Primes smooth muscle and epithelium of repo tract
- In Puberty – Breast growth
- Female fat deposition
- Bone growth
- Stimulates Prolactin
- Protects against Atherosclerosis

Progesterone

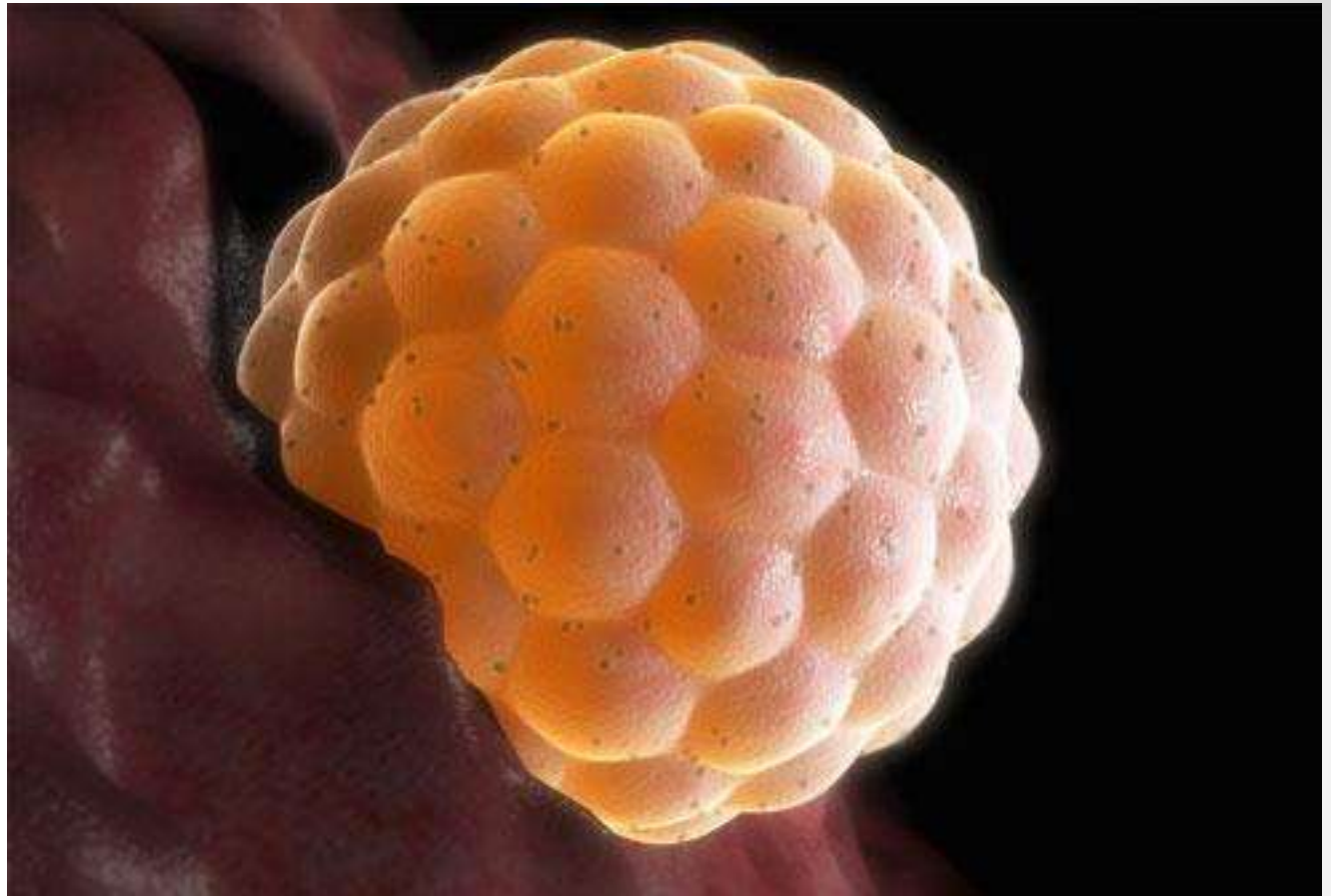
- Affects endometrium
- Induces thick, sticky cervical mucus
- Decreases smooth muscle contractions of repo tract
- Stimulates breast growth
- Inhibits prolactin (in breast tissue)

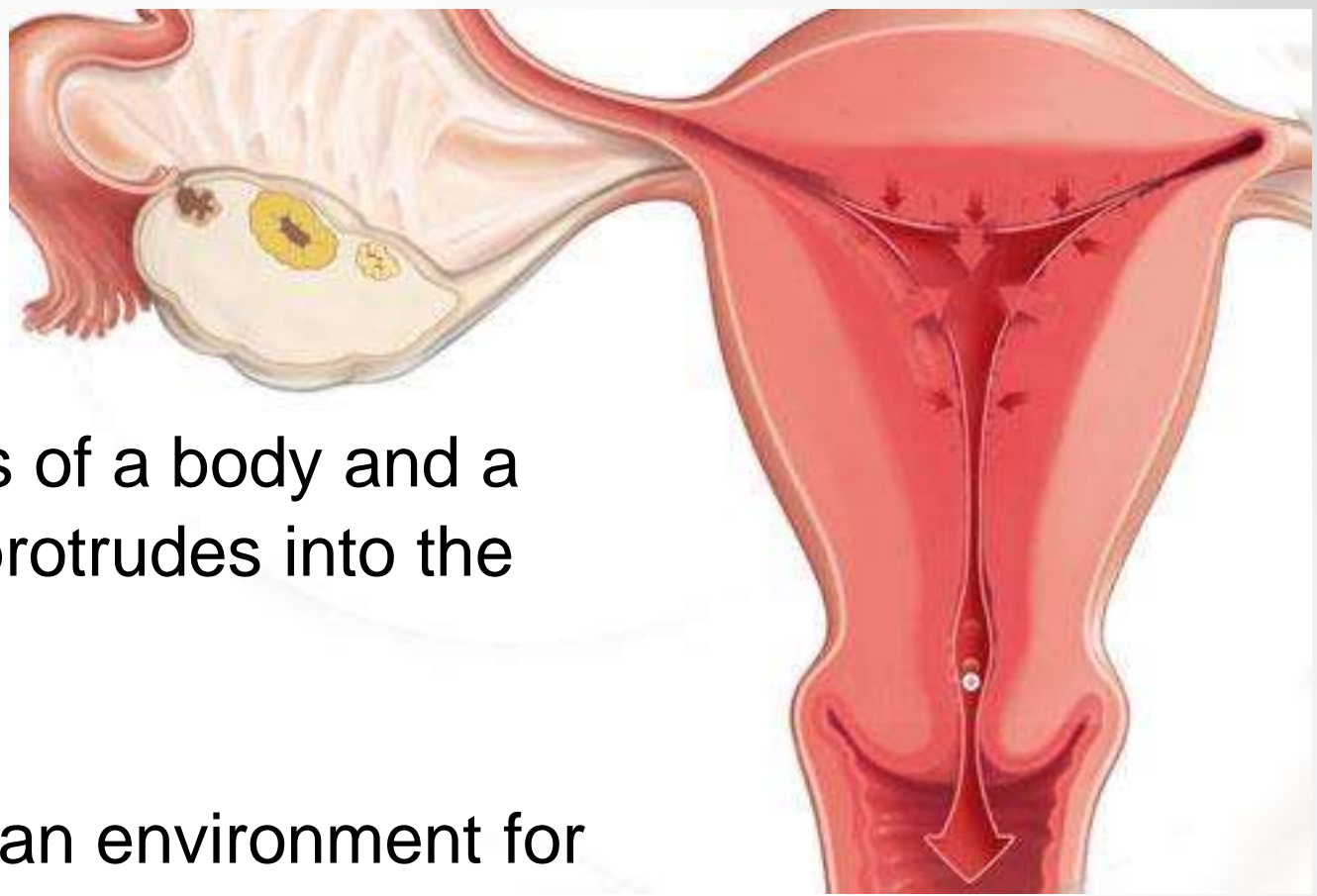
FERTILIZATION normally occurs in the Fallopian Tubes



The fertilized egg (zygote) implants in the uterus

An egg is usually a few days old before it implants in the uterus. At this point, it has already divided several times and is called a blastula.





The **uterus** consists of a body and a cervix. The cervix protrudes into the vagina.

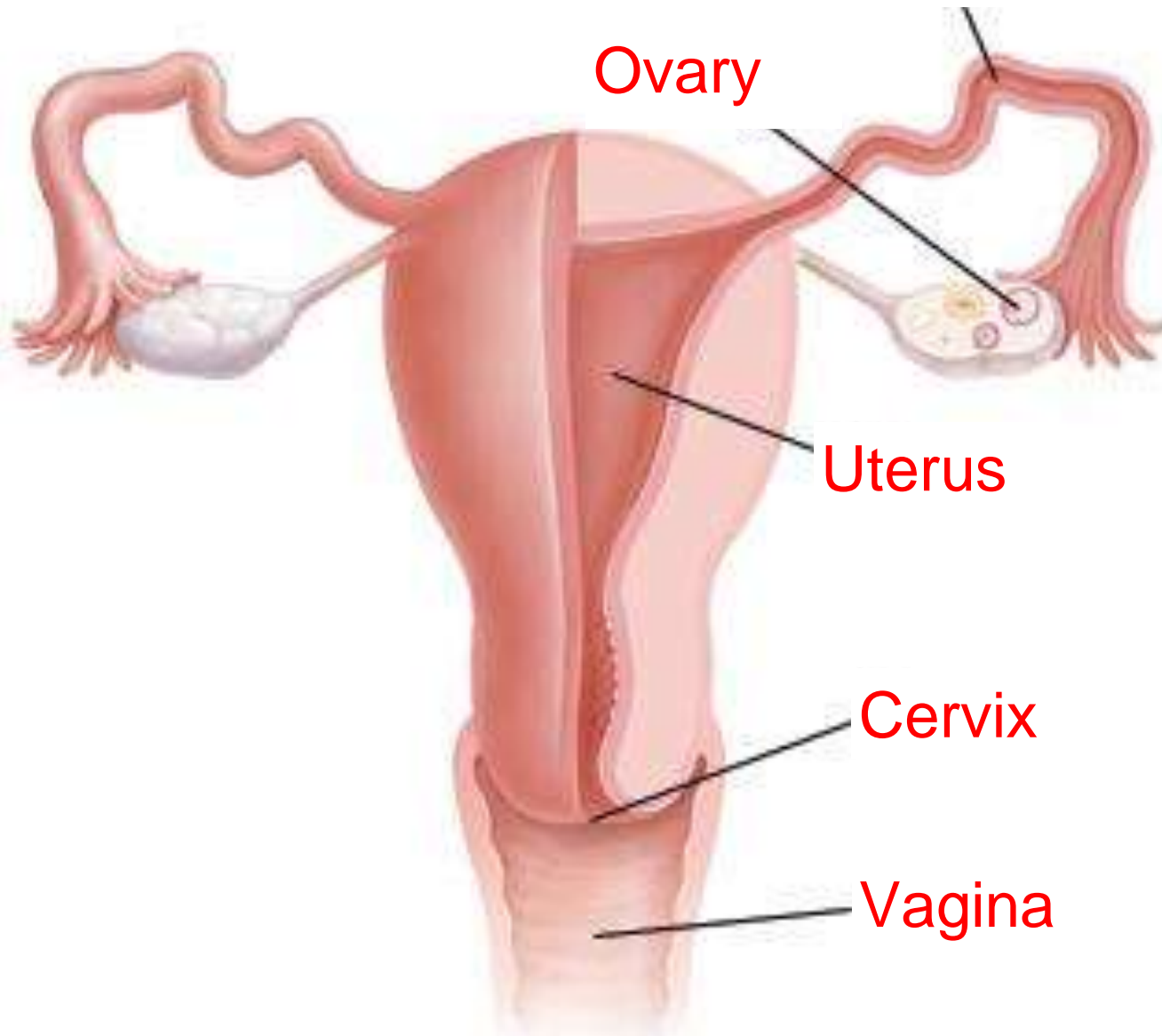
The uterus maintains an environment for accepting a fertilized egg.

The fertilized ovum becomes an embryo, attaches to a wall of the uterus, creates a placenta, and develops into a fetus (gestates) until childbirth.

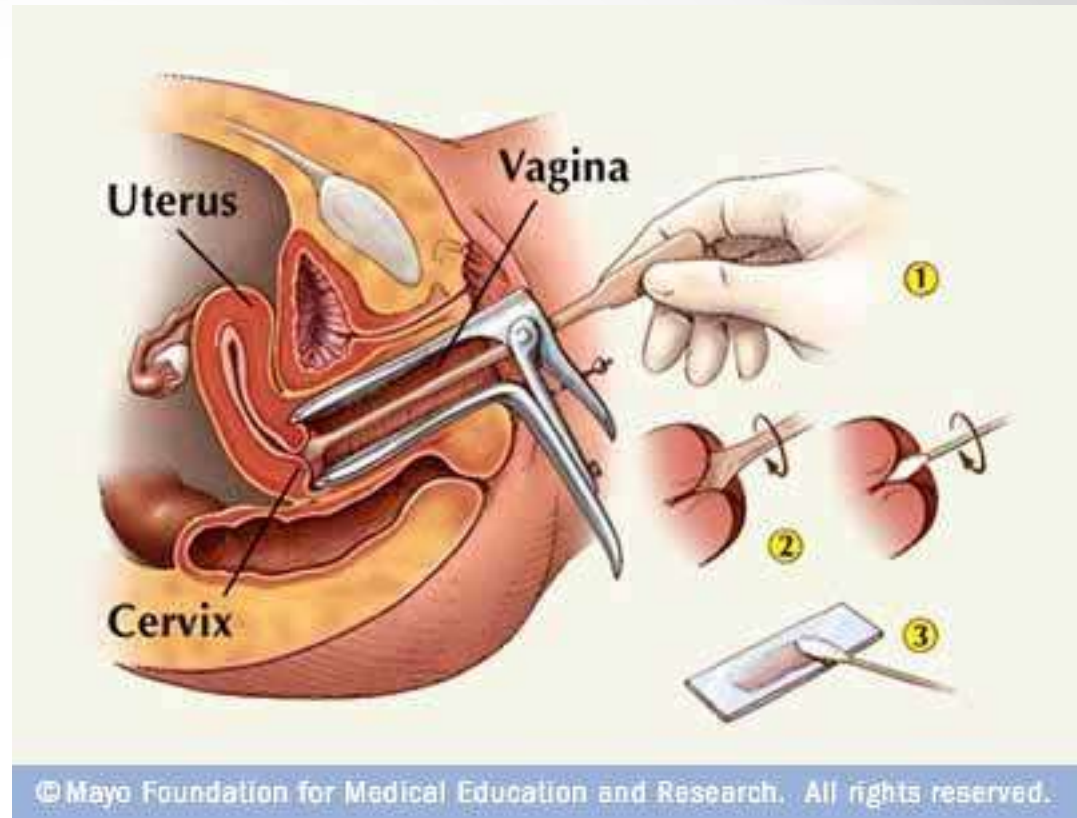
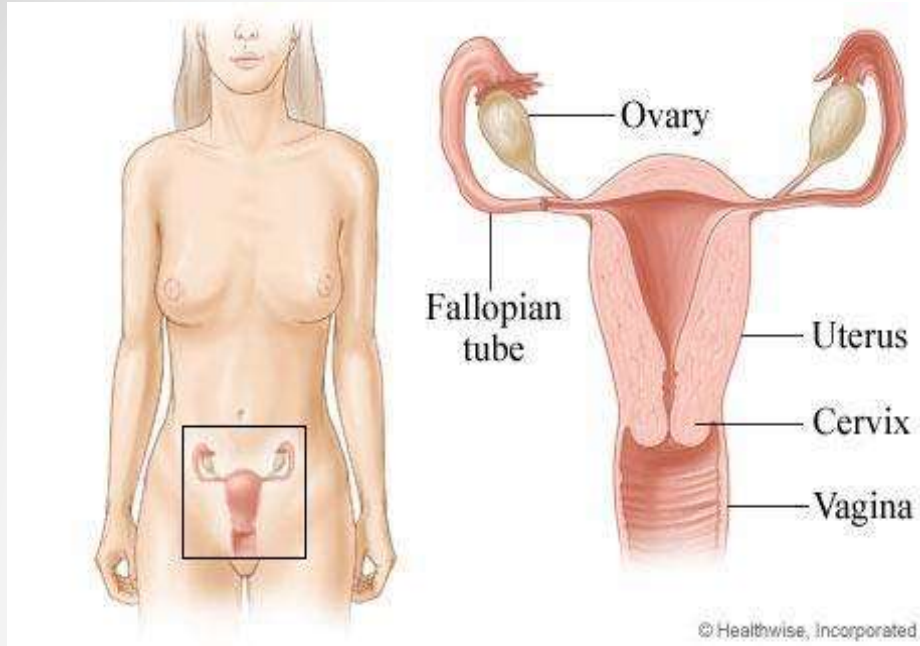
If no fertilized egg reaches the uterus, the lining is shed monthly in a process known as menstruation

Fallopian Tubes

WORD BANK



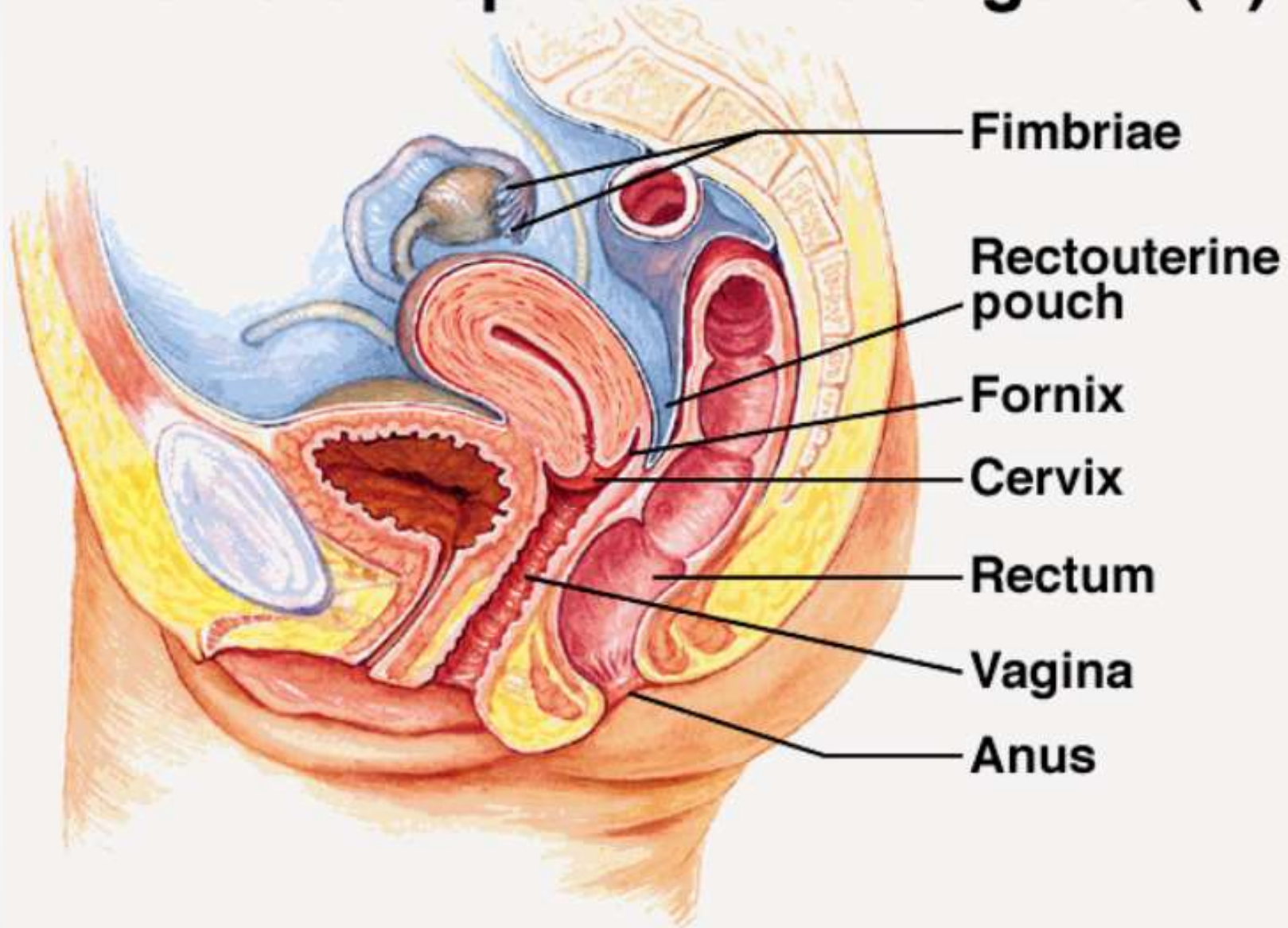
- Cervix
- Fallopian Tubes
- Vagina
- Ovary
- Uterus



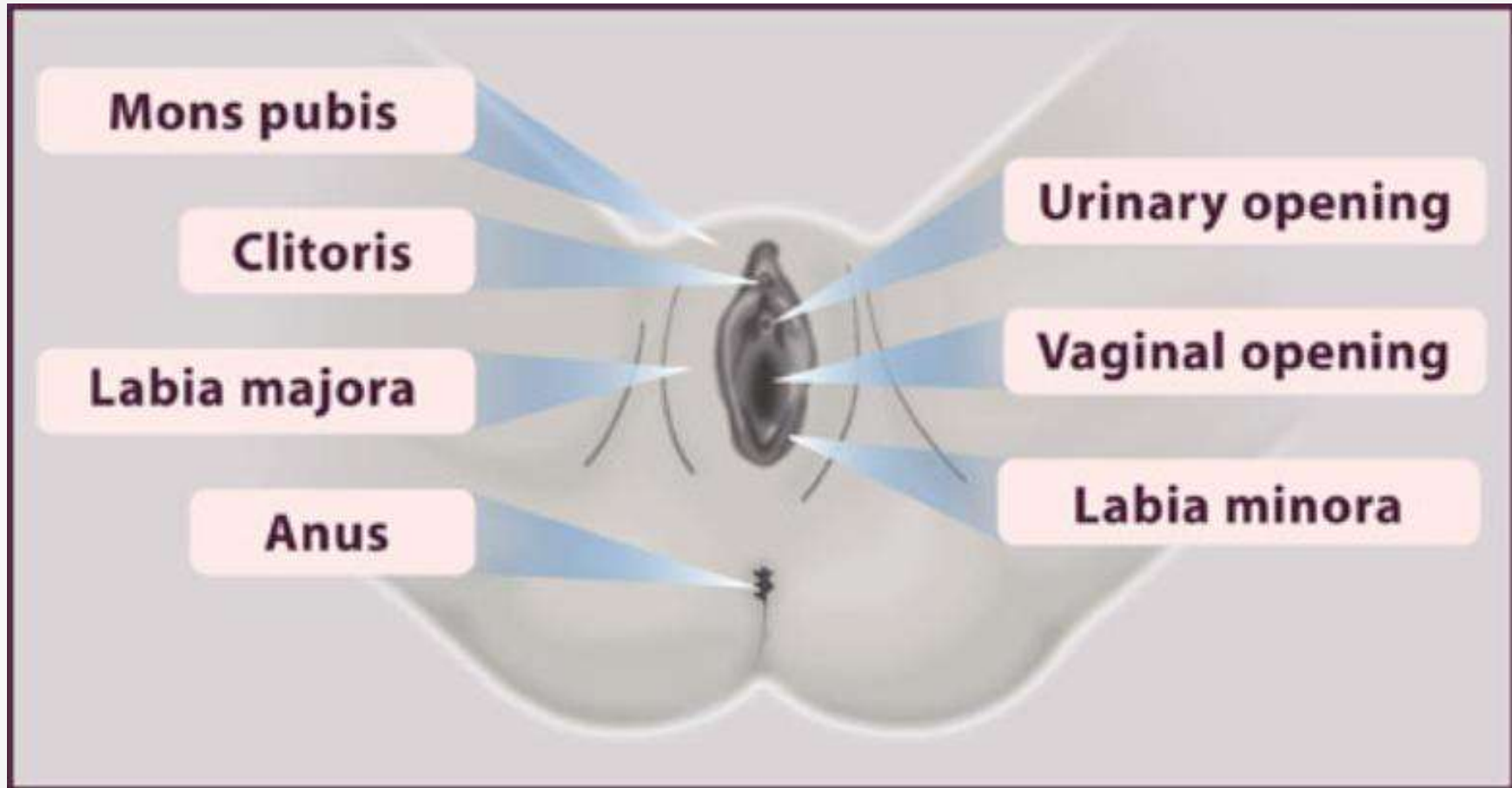
Women should receive an annual PAP test. A doctor removes cells from around the cervix and a lab checks them for abnormalities.



Female Reproductive Organs (2)



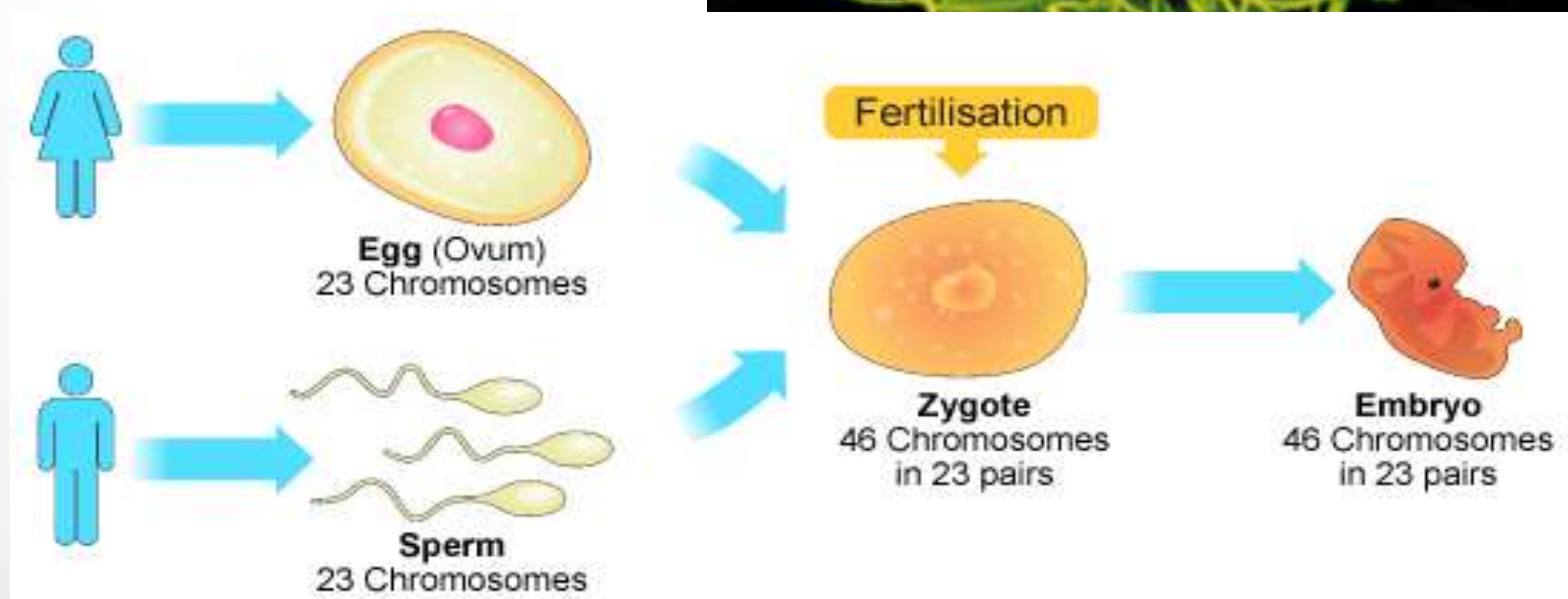
Female External



FERTILIZATION & PREGNANCY

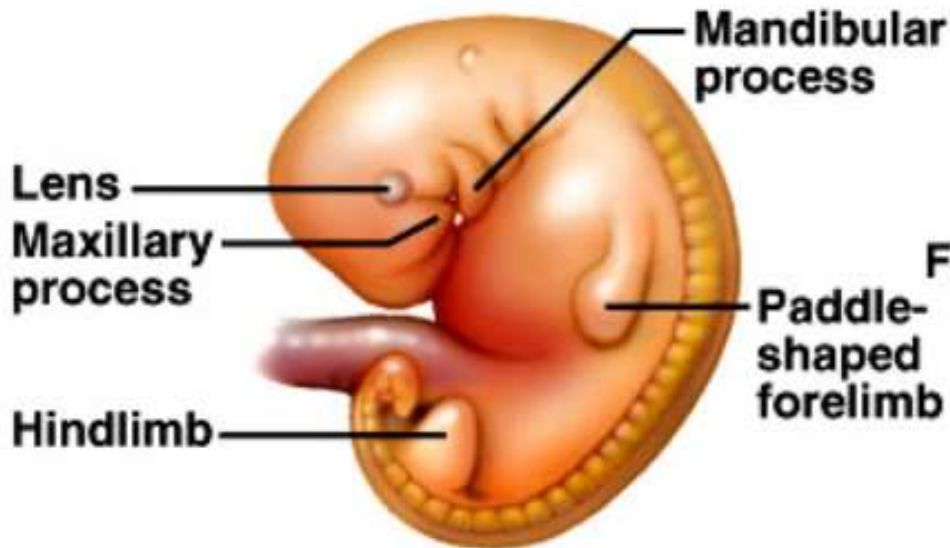
Sperm must travel to the egg and penetrate to combine the DNA from both parents -- this creates the first cell after fertilization: the **ZYGOTE**

23 chromosomes from each parent; zygote has a total of 46 chromosomes

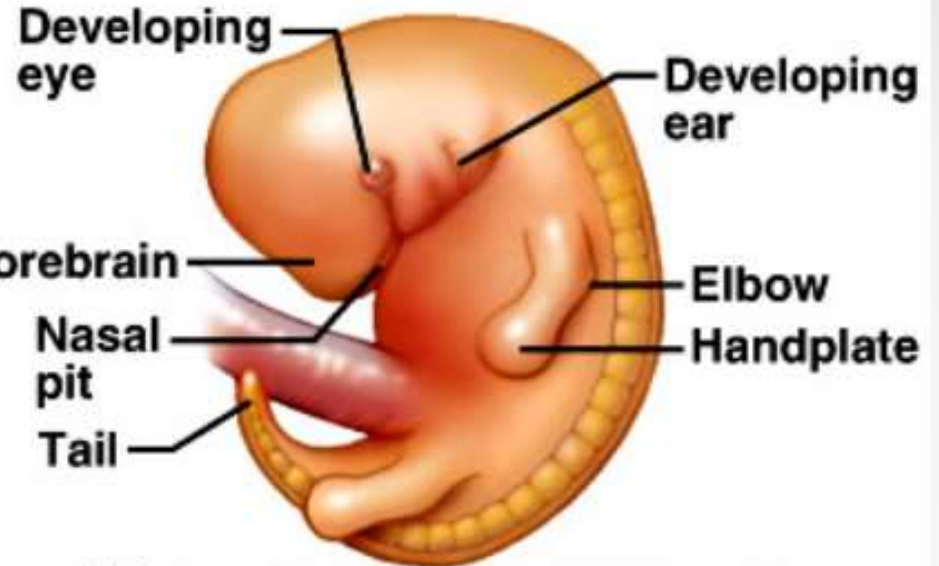


Fetal Development

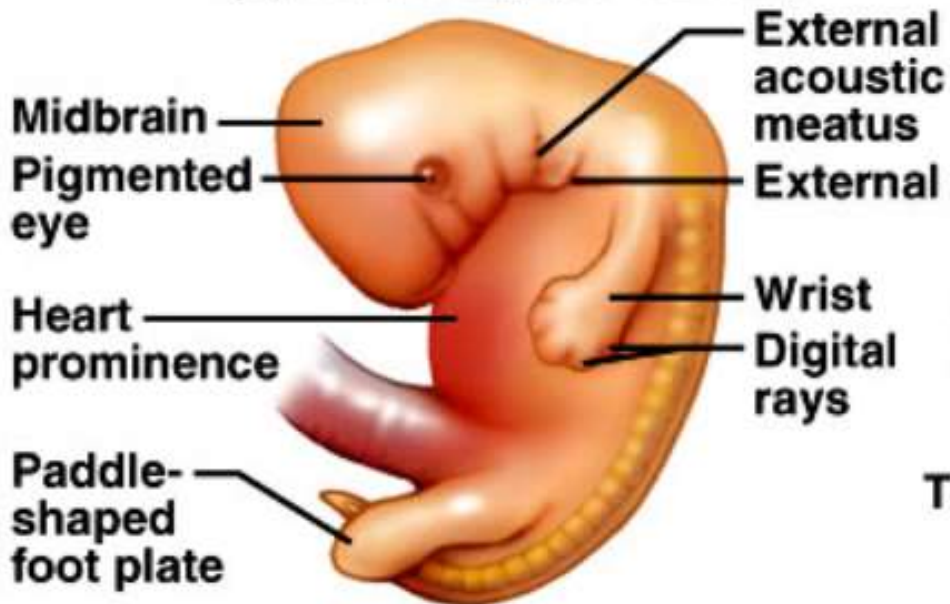
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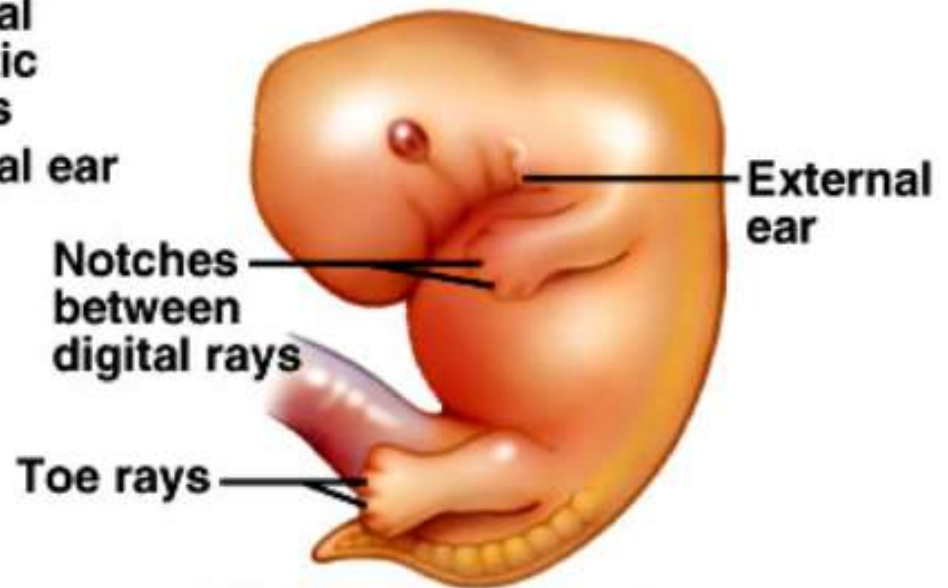
(a) 35 ± 1 day (10–12 mm)



(b) 37 ± 1 day (12.5–15.75 mm)



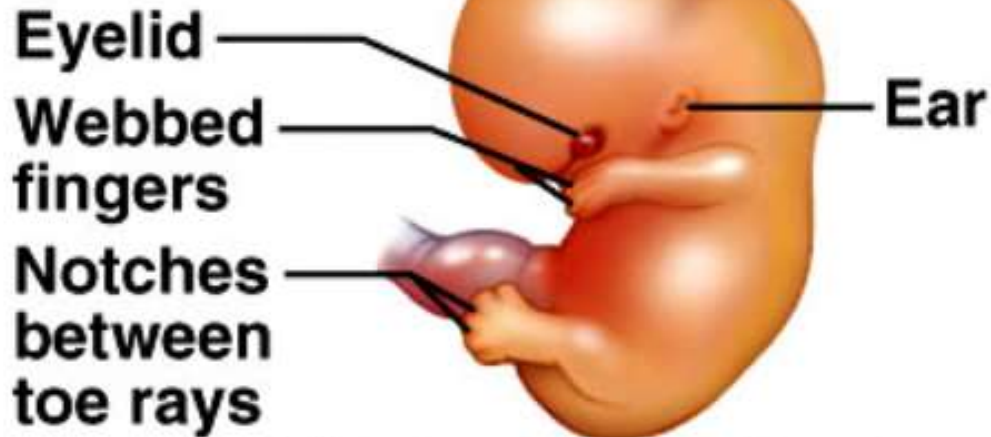
(c) 40 ± 1 day (16–21 mm)



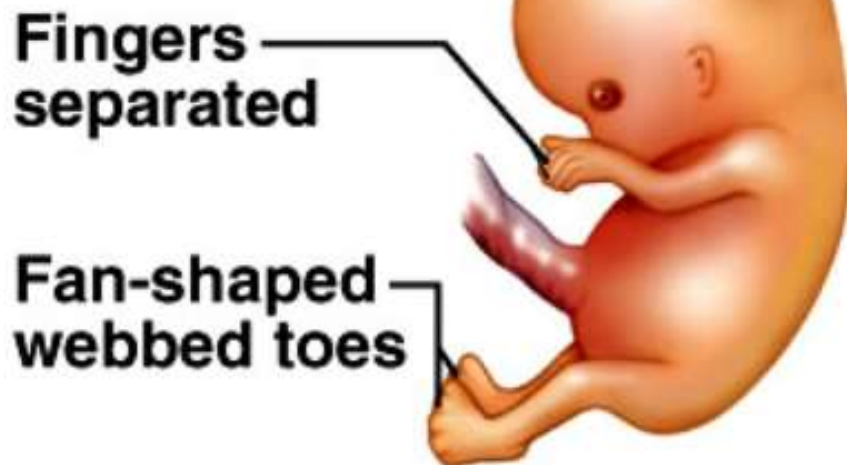
(d) 45 ± 1 day (22–24 mm)

Fetal Development

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(e) 49 ± 1 day (28–30 mm)



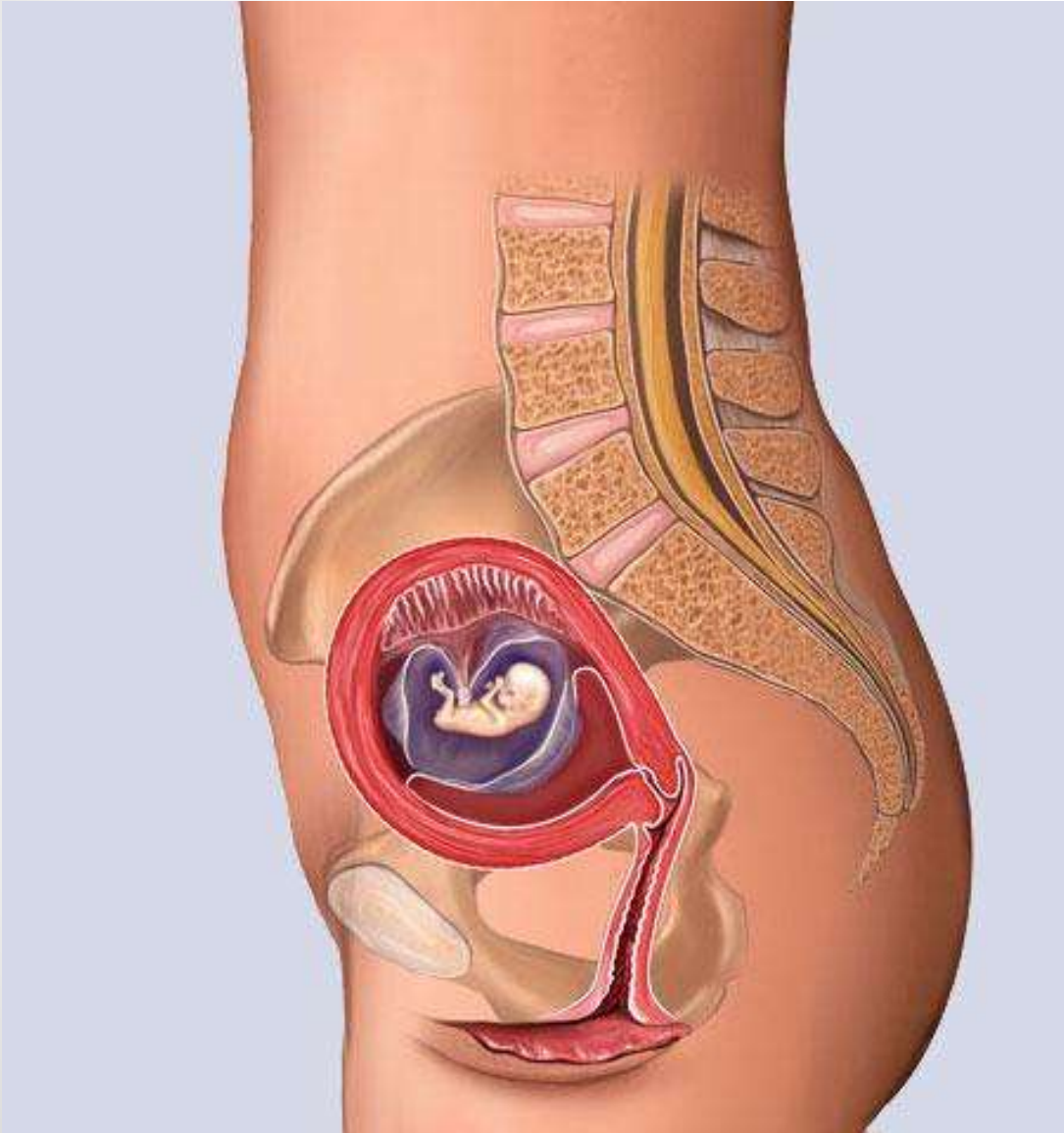
(f) 52 ± 1 day (32–34 mm)



(g) 56 ± 1 day (34–40 mm)

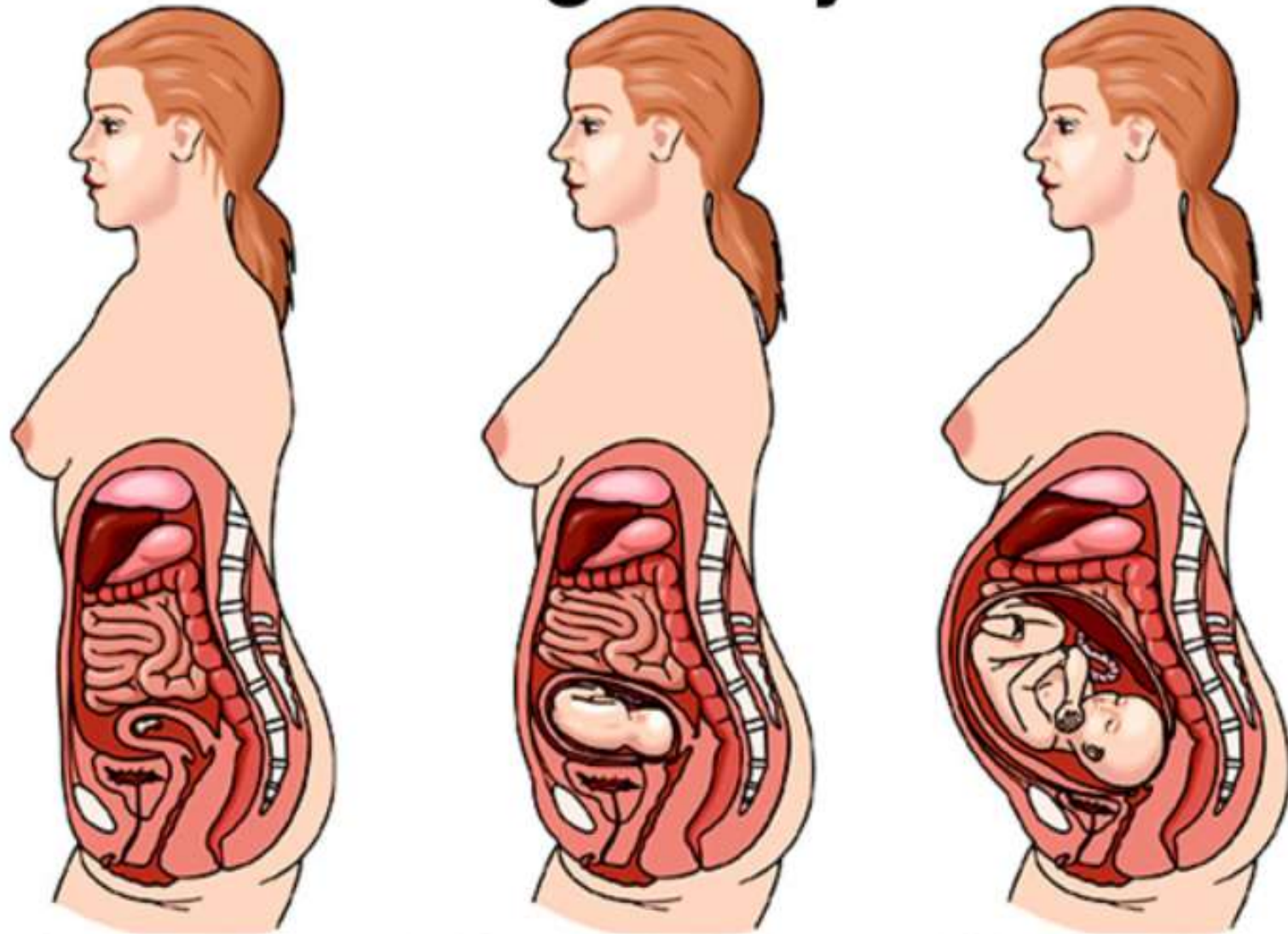
At the 8th week, the embryo is called a FETUS

At 8 weeks



<http://www.flickr.com/photos/lunarcaustic/3385925240/>

Changes in Woman's Body During Pregnancy

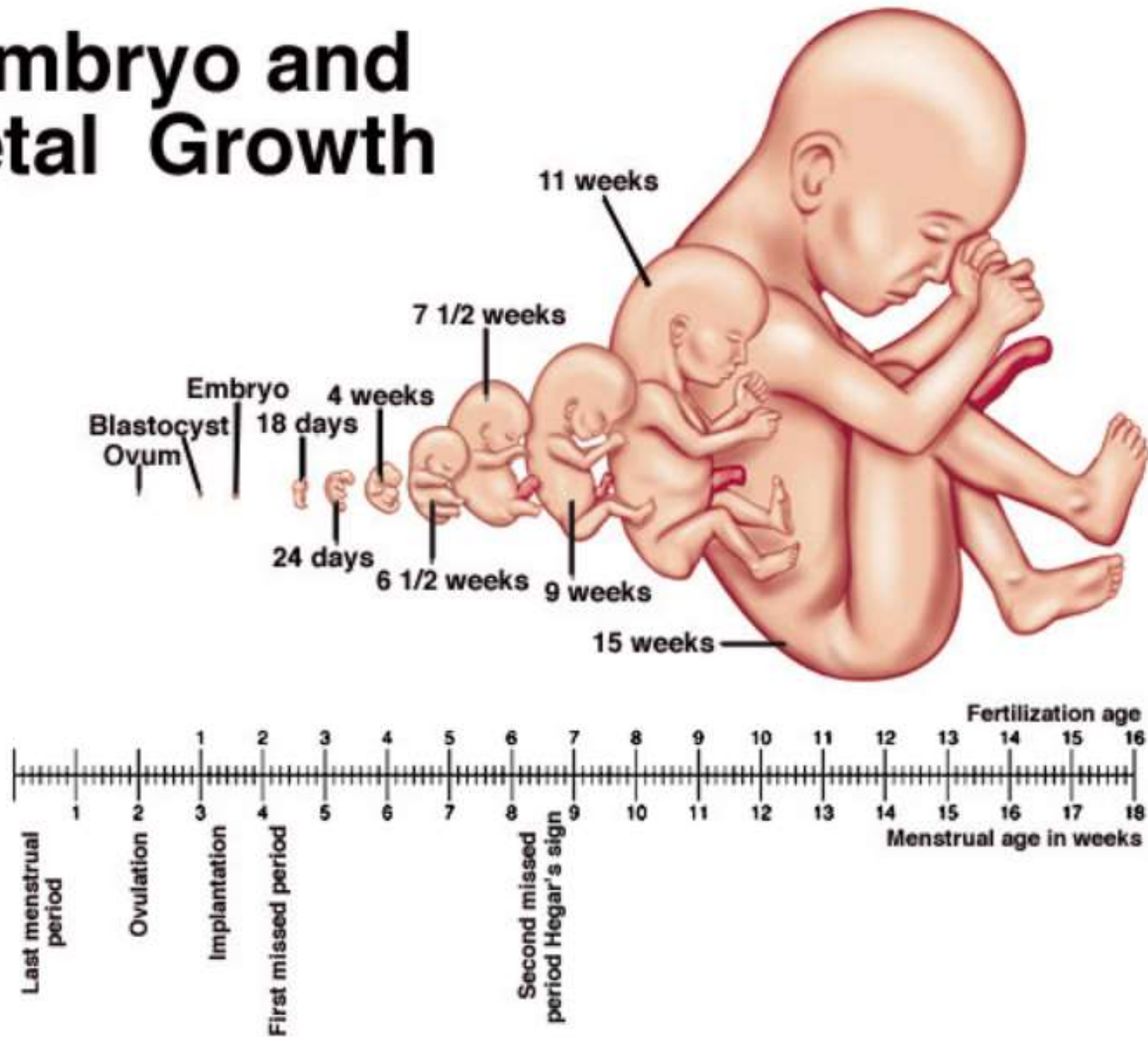


(a) First trimester

(b) Second trimester

(c) Third trimester

Embryo and Fetal Growth



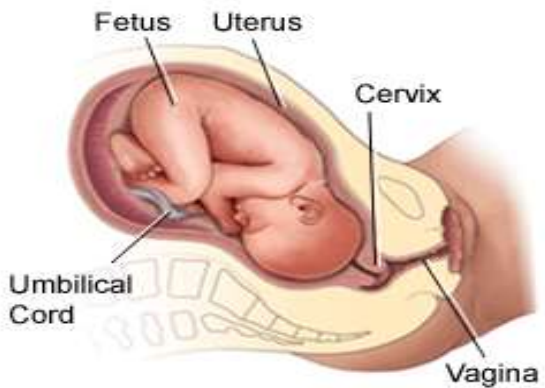
What Causes Morning Sickness?

It is likely hormones that rise rapidly with most incidences occurring in the first trimester

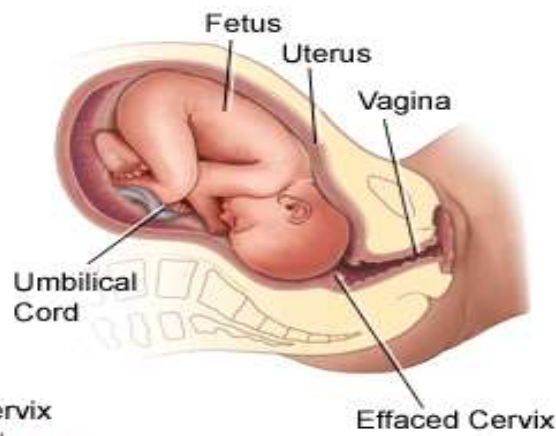
Human chorionic gonadotropin (hCG): This hormone rises rapidly during early pregnancy. No one knows how hCG contributes to nausea, but it's a prime suspect because the timing is right: Nausea tends to peak around the same time as levels of hCG. What's more, conditions in which women have higher levels of hCG, such as carrying multiples, are associated with higher rates of nausea and vomiting.



Initial (Latent) Phase Stage 1



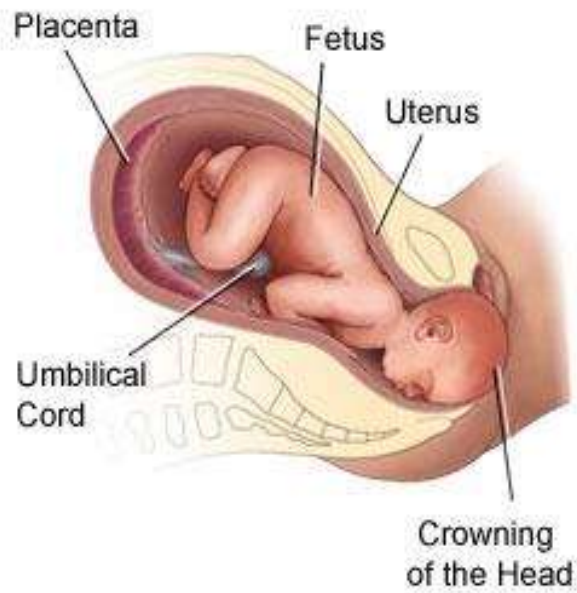
Active Phase



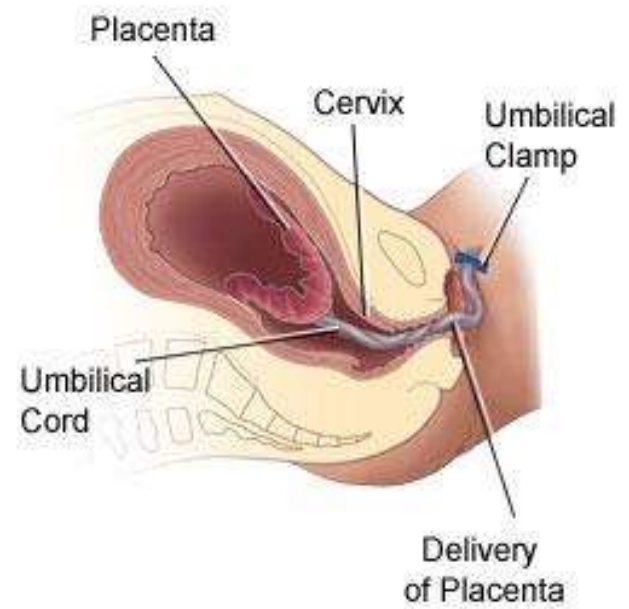
Transition Phase



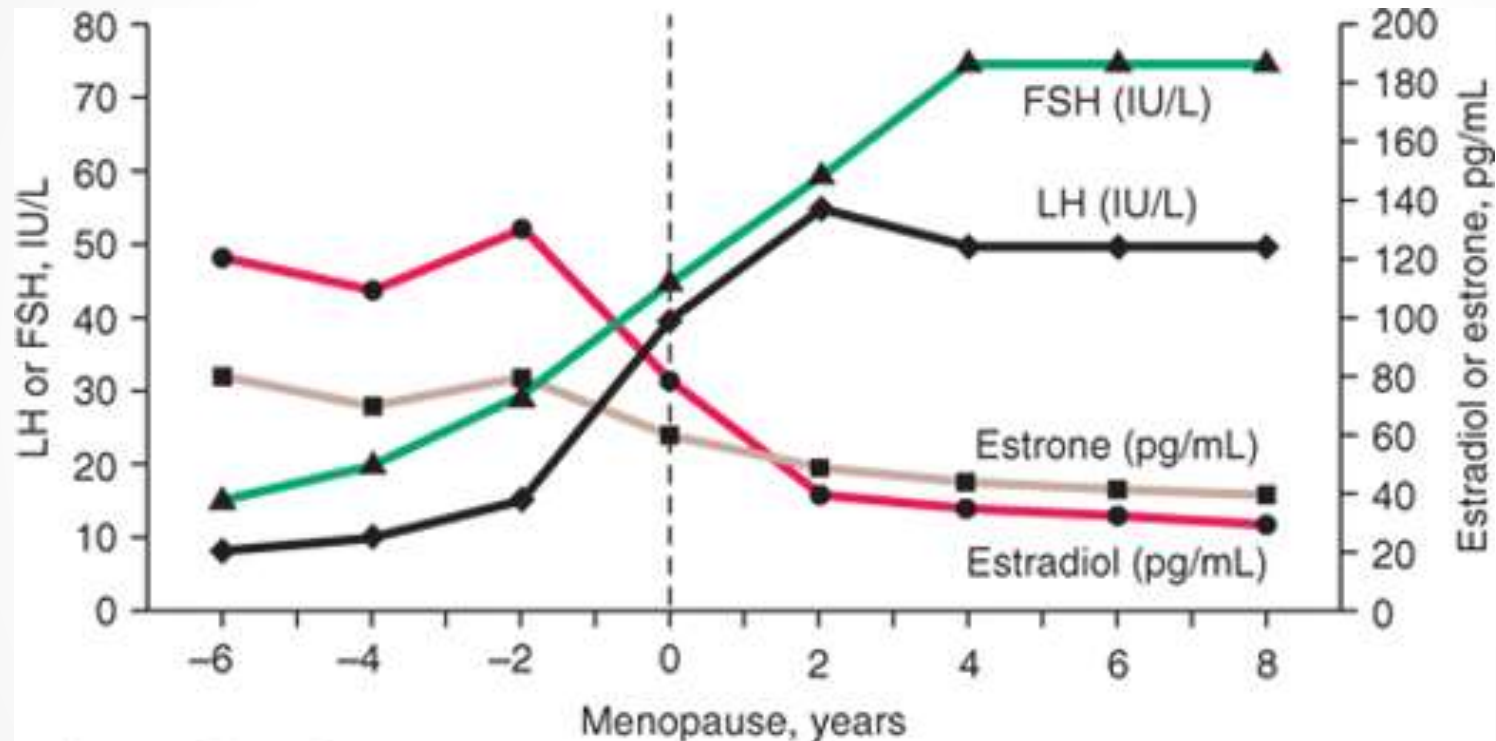
Stage 2



Stage 3



Menopause (~2 year process)



Source: J. Larry Jameson,
Harrison's Endocrinology, Fourth Edition
www.accessbiomedicalsscience.mhmedical.com
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