

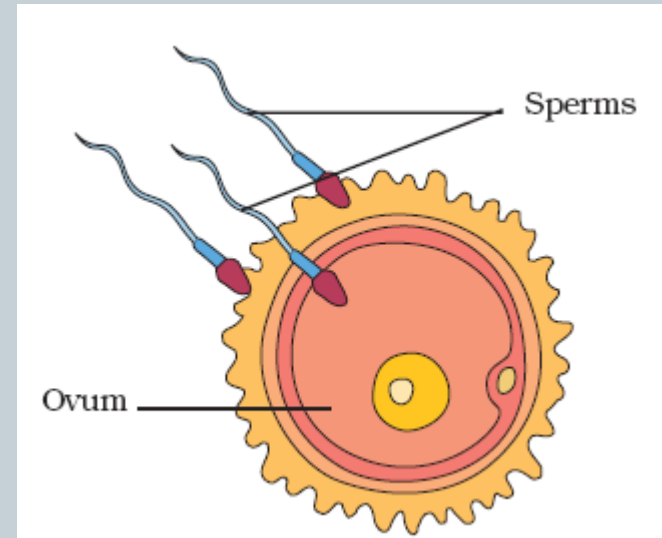
Human Reproduction



Human Reproductive System



- Fertilization occurs when the ova (egg) and sperm cell (spermatozoa) fuse together.
- Fertilizations results in the formation of a zygote.
- The zygote contains the genetic information of both the mother and father.



Puberty



- Puberty is characterized by the changes that prepare the human body for the ability to reproduce. This stage generally occurs between the ages of 10 and 14 years old.

Sex hormones



- Human reproduction possible due to sex hormones (found in male testicles and female ovaries) which tells those organs to produce gametes
- Sex hormones begin at puberty
- Hormones are chemical messengers, which are transported by the blood and control the activity of one or more organs.



- At puberty your pituitary glands (located in brain) start releasing hormones
- → ovaries (maturation of ova)/ testicles (production of spermatozoa)
- → stimulates the production of female/male sex hormones

Sex hormones

- Male (testosterone)
- Females (progesterone, estrogen)
- Puberty also leads to physical changes.



Primary and secondary sexual characteristics

Primary

- Female: menstrual cycle begins and genital organs mature

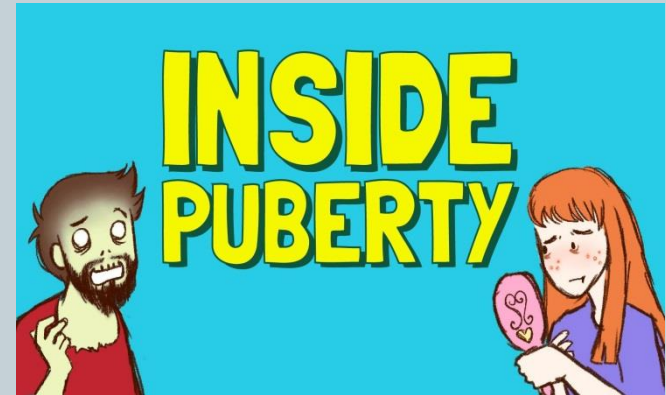
- Male: maturation of genital organs

Secondary

- Female: Breasts develop, pelvis widens, pubic hair appears, fatty tissue accumulates mainly on hips and breasts

- Male: Facial hair, larynx enlarges, skeletal muscles grow, bone density increases, pubic hair appears and hairiness generally increases.

- Psychological changes occur for both genders



Stages of human development



- When one sperm cell succeeds in fertilizing the ovum.
- Implants in the uterus.
- Zygote takes shape (from fertilization to ~ 2 weeks)
- Embryo forms (~2 weeks to 9 weeks)
- Fetus forms (~9 weeks to birth)

Female Reproductive System

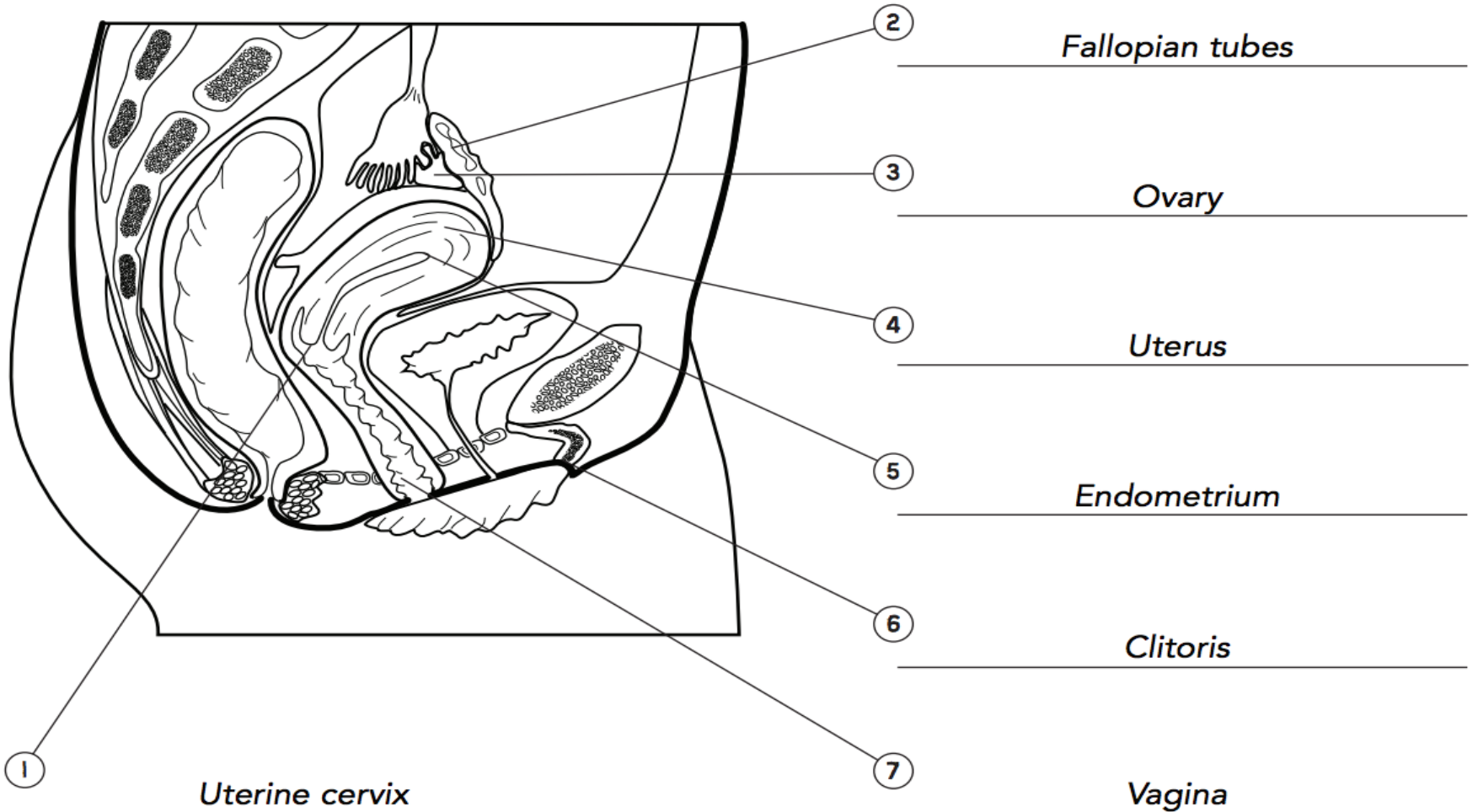
The body prepares for fertilization of an ovum over a 28-day period. (This is an average menstrual)

Cycles can range anywhere from 21 to 35 days in adults and from 21 to 45 days in young teens.

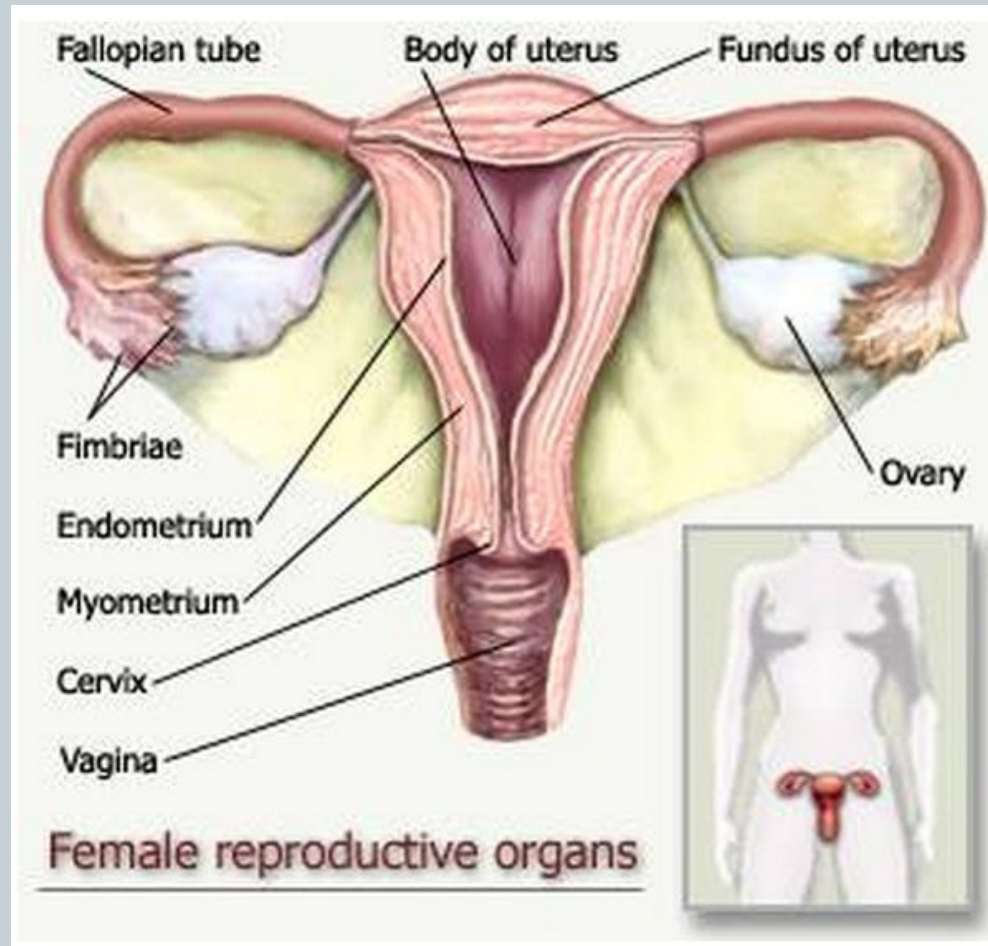
There are two important cycles:

- 1) Ovarian cycle, which prepares the ovum for fertilization
- 2) Menstrual cycle, which prepares the uterus for ovum implantation

Anatomy of the Female Reproductive System



Frontal View of Female Reproductive System

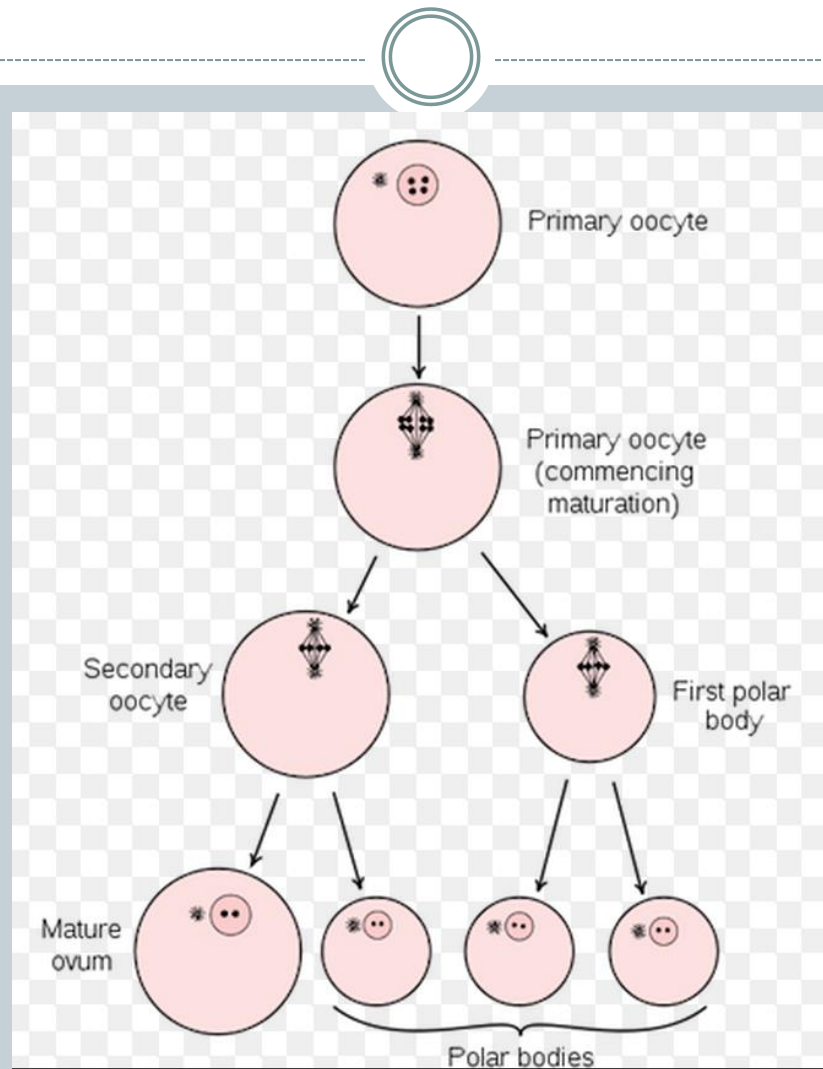


Interesting Facts



- Baby girls enter the world with about 2 million eggs cells in their ovaries.
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- These eggs cells are called oocytes and are diploid cells containing 23 pairs of chromosomes.
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- By the time they reach puberty, girls have approximately 700 000 oocytes capable of becoming ova.
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- Over the course of a woman's life approximately 400 oocytes become ova.
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- Oogenesis- the process of ovum production through meiosis.

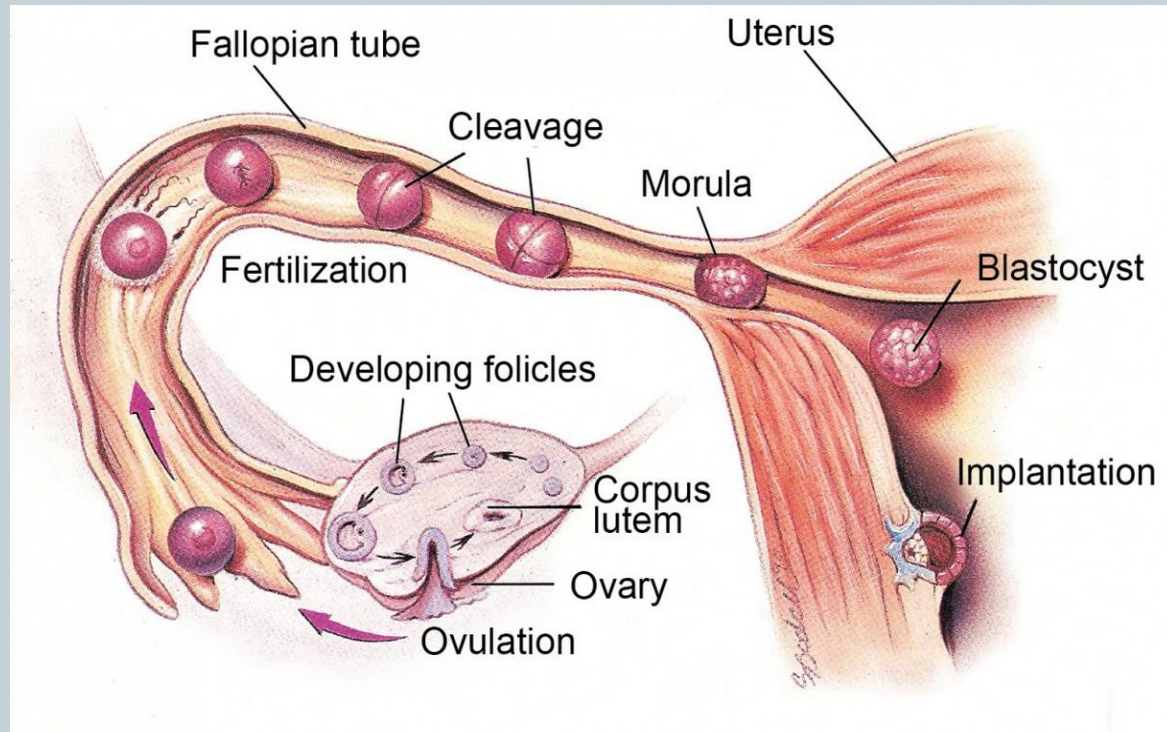
Recall Meiosis



The Ovarian Cycle



- The process by which an ovarian follicle releases an ovum for fertilization and implantation in the uterus



Ovarian Cycle



- Days 1-13-First half of cycle
- 1) The pituitary gland secretes a greater amount of FSH which stimulates the development and growth of an ovarian follicle.
- 2) Oocyte inside ovarian follicle undergoes meiosis I.
- 3) The ovarian follicle secretes estrogen which stimulates the pituitary gland to produce more LH and FSH.



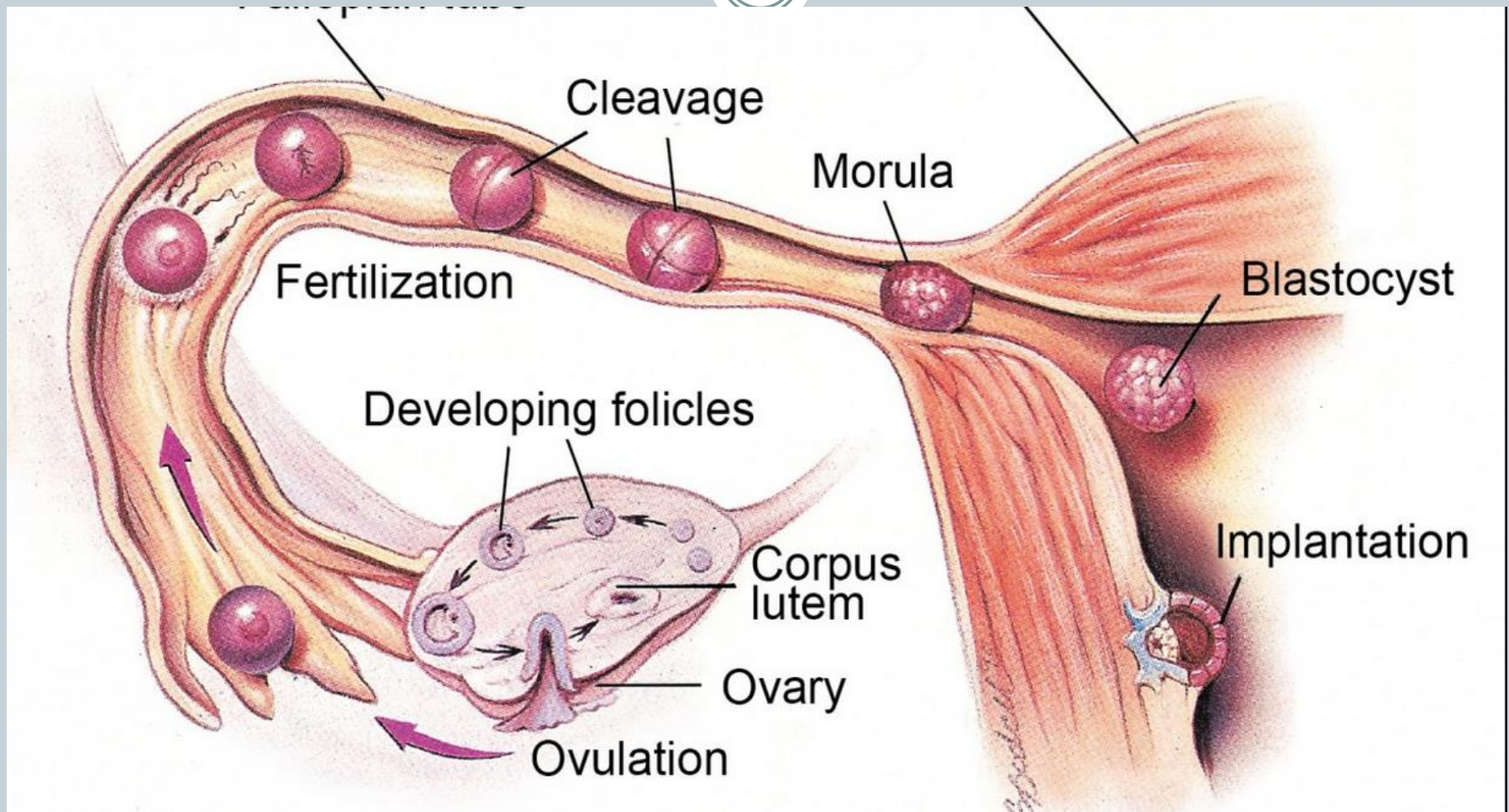
- Day 14-Ovulation- Mid point of cycle
- 1) Maximum levels of LH and FSH are released from pituitary gland creating a hormonal surge.
- 2) Hormonal surge causes ovarian follicle to burst releasing the haploid oocyte from the ovary.
- 3) Ovarian follicle transforms into the corpus luteum.



Day 15-28 (second half of cycle)

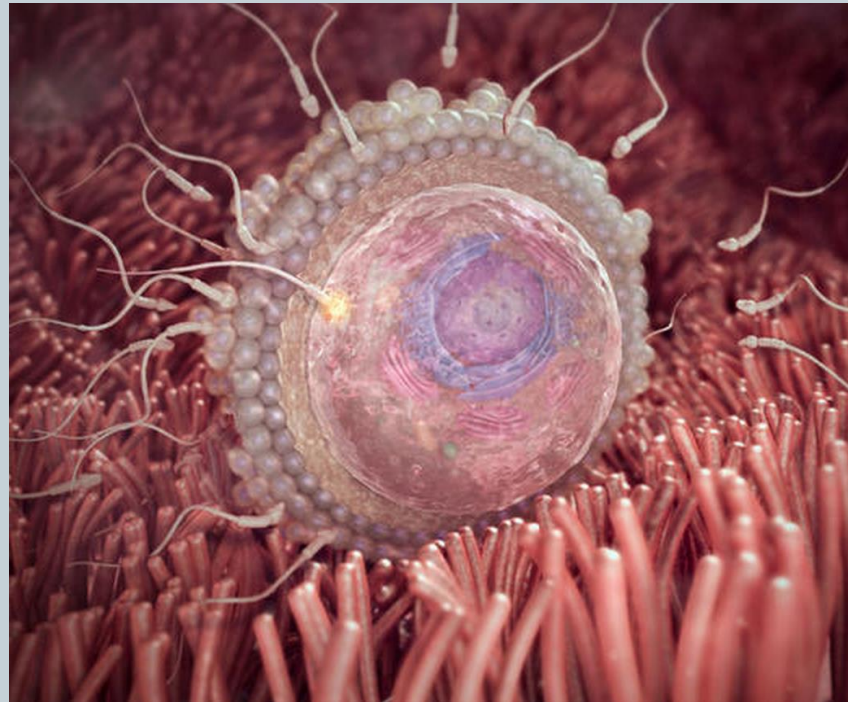
- 1) Corpus luteum secretes progesterone, inhibiting FSH and LH production by the pituitary gland.
- 2) Oocyte travels into the fallopian tube, undergoes meiosis II and produces the ovum.

Oogenesis and the Ovarian Cycle





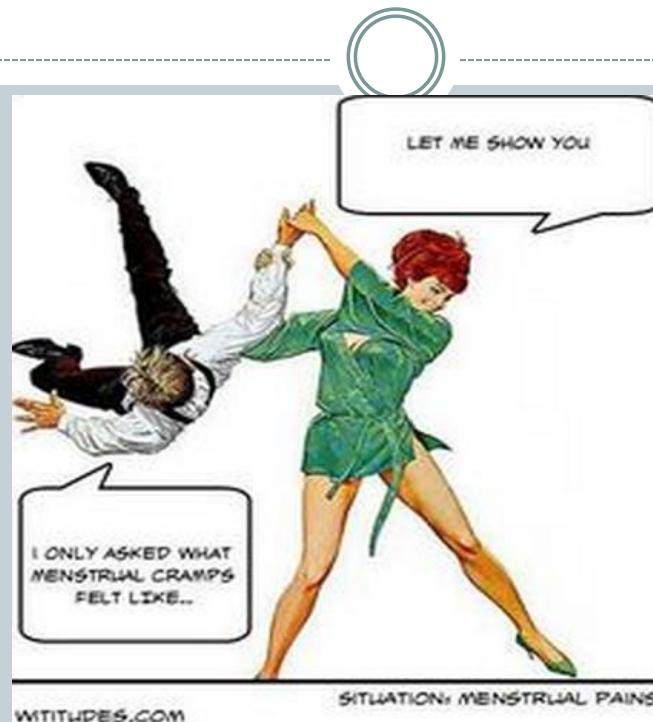
- IF fertilization occurs, the corpus luteum continues to secrete progesterone in order to prepare the body to receive a fertilized ovum





- IF there is no fertilization, the corpus luteum disintegrates, progesterone production decreases while FSH production increases in order to begin the cycle again.
- The lining of the uterus detaches and is shed through menstruation.

The Menstrual Cycle



- The monthly cycle of changes in which the lining of the uterus (endometrium) thickens to allow for the implantation of a fertilized ovum.

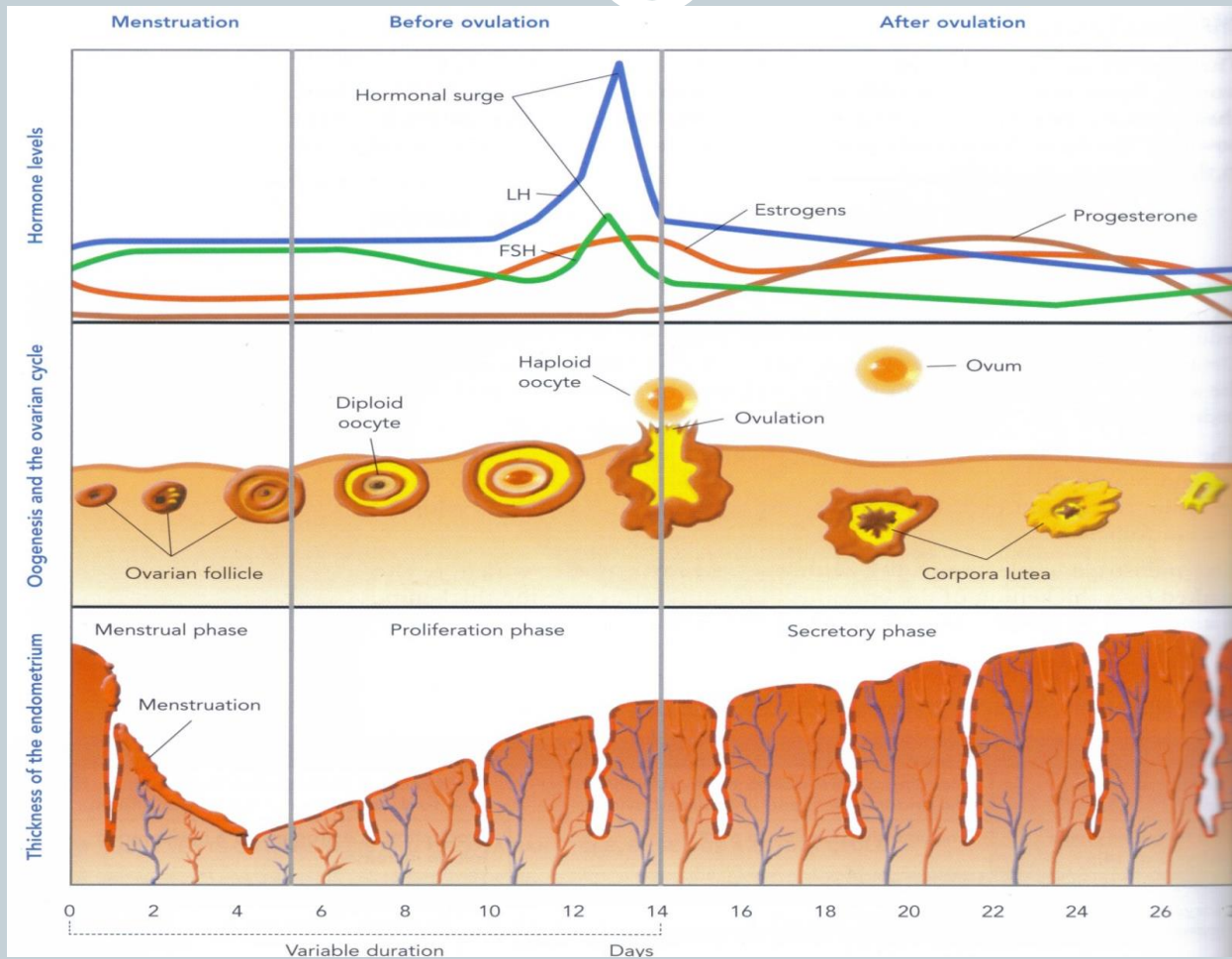


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- Day 1-5 (Menstrual phase)
- Drop in progesterone levels cause the unfertilized ovum and endometrium to be expelled from the uterus and bleeding occurs.
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- Day 6 – 14 (Proliferation phase)
- Estrogen (secreted from maturing ovarian follicle) promotes thickening of endometrium



- Day 15 – 28
- Progesterone (secreted from corpus luteum) promotes increased thickening of the endometrium, until the endometrium reaches maximum thickness.
- If fertilization occurs, endometrium remains intact, the zygote (fertilized egg) implants in the endometrium.
- If fertilization does not occur, the menstrual commences.

Putting it all Together





- Duration of a menstrual cycle varies from woman to woman although the 14 day time period from ovulation to the beginning of menstruation rarely varies.

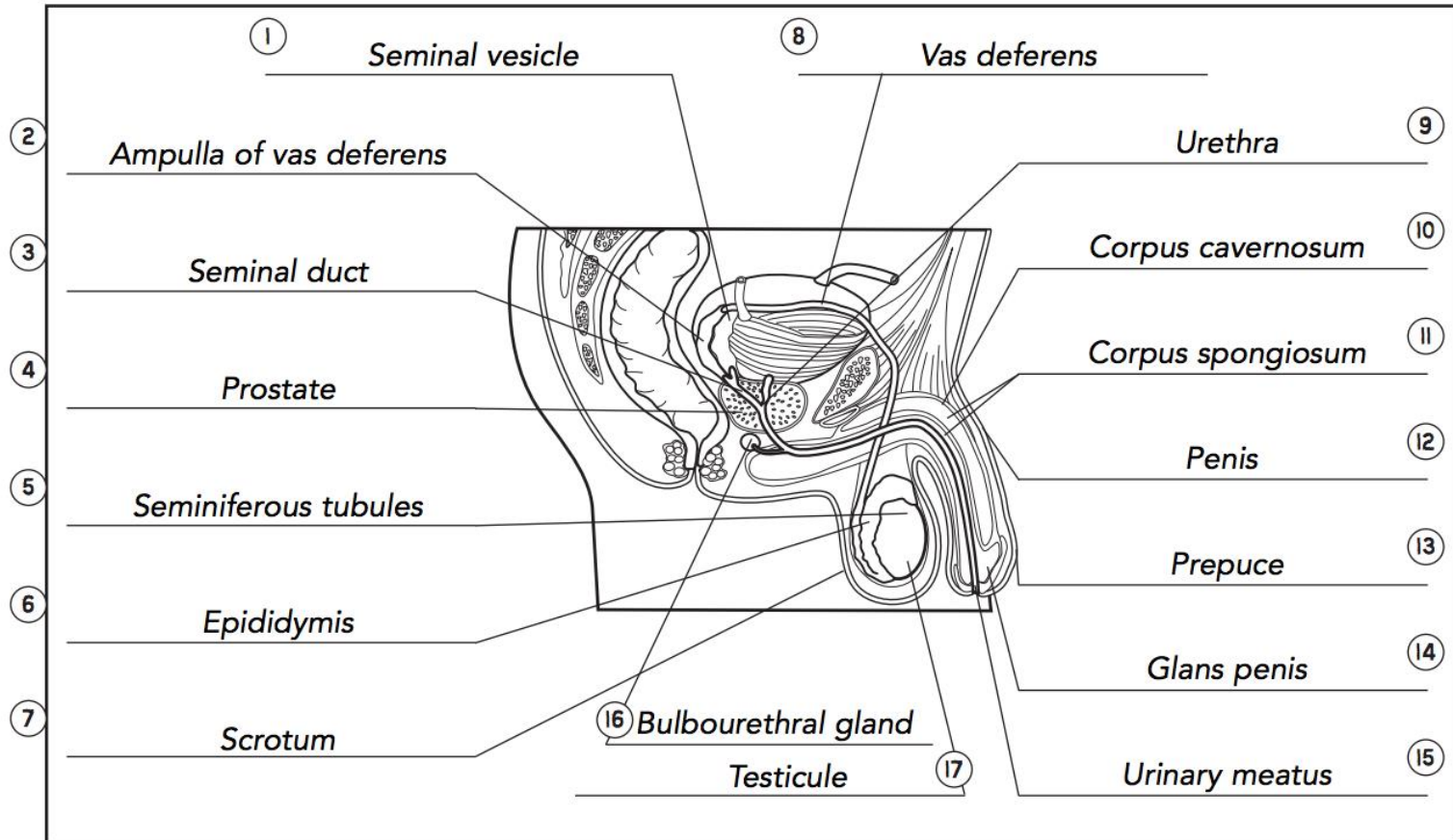
Fertile Period



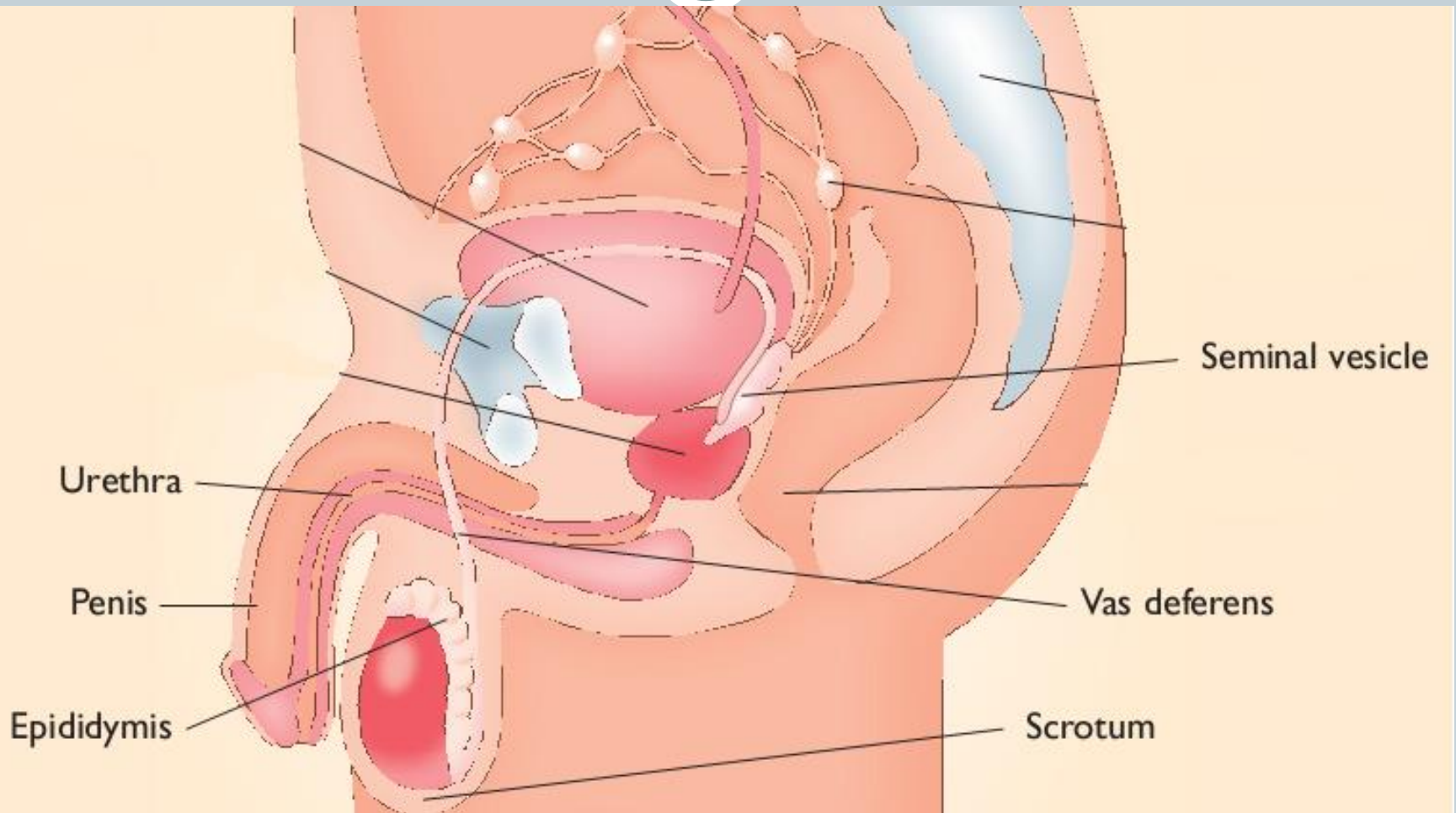
- Life span of ovum: 12 to 24 hours.
- Life span of sperm 24 hours to 72 hours.
- This means that a women is fertile (most likely to get pregnant) for about four days: three days before ovulation to one day after.

Male Reproductive System

ANATOMY OF THE MALE REPRODUCTIVE SYSTEM



Anatomy of the Male Reproductive System



Male Reproductive System

Involves the production of sperm and the processes to release it into a receptive female, containing three key phases

1) Spermatogenesis

- a. The process of sperm production through meiosis
- b. Occurs in the testicles
- c. Is prompted by FSH and LH secreted by the pituitary gland
- d. Once created, they are stored in the epididymis until ejaculation

Male Reproductive System



2) Erection

- a. Is an increase in volume and rigidity of the penis, prompting ejaculation

3) Ejaculation

- a. Sperm stored in the epididymis is pushed forward through the vas deferens
- b. Sperm mix with seminal fluid (from the seminal vesicle) forming semen
- c. Semen travels through the urethra, and exits through the penis.

The Great Sperm Race!



Video



- <https://www.youtube.com/playlist?list=PLCDECC6C14006053D>



Menopause & Andropause

Menopause



- Only in **females**
- When a woman has not menstruated for over a year (not because of pregnancy or nursing) she may be starting menopause.

Menopause



- Physical change caused by menstrual & ovarian cycles coming to an end.
- Progesterone production eventually stops, which may cause discomfort (hot flashes, mood swings and bone loss).

Andropause



- Only in **males**
- Definition: a decrease in hormone levels and sperm production due to aging.
- Contrary to menopause, andropause does not necessarily affect fertility.
- Fertility: ability to reproduce.

Building a Concept Map



Suggestions for key terms to use in map

- Puberty
- Hormones
- FSH
- LH
- Estrogen
- Progesterone
- Testosterone
- Oogenesis
- Ovarian cycle
- Menstrual cycle
- Spermatogenesis
- Male reproductive organs
- Female reproductive organs

STIs



- Two types:
- Viral (cause by a virus)
- Bacterial (cause by bacteria)

Bacterial infections



- Syphilis: Starts off as painless sores if untreated can lead to cardiac problems, damage to nervous system, and eventually death.
- Gonorrhea: Symptoms appears a few days after infection. Burning sensation during urination, thick yellow discharge from penis, painful and/or swollen testicles.
- Chlamydia: Symptoms appear a few weeks after infection. Similar to gonorrhea.

Viral STIs



- Hepatitis B, C: Early symptoms include loss of appetite, nausea, vomiting, jaundice. Can cause permanent liver damage.
- HIV: Renders immune system ineffective.
- Genital herpes: Early symptoms begin as tingling sensation on or around genital area. Eventually become painful blisters and ulcers.
- Oral herpes: Cold sores.

Contraceptives/ Birth Control



- Protect against pregnancy, not all STIs
- Examples:
 - The pill (female contraceptive does not protect against STIs)
 - Vasectomy (male surgical procedure resulting in ending production of sperm cells but does not protect against STIs)
 - Spermicides (kills sperm cell but does not protect against STIs)
- Best contraceptives/Protection against STIs
 - Condom
 - Diaphragm/Female condom