13.1 Reproductive system Anatomy

What it is and what it does?

- The _____ system is everything that is involved in allowing humans to create a _____ human life.
- Humans reproduce _____, using _____ fertilization. It involves _____ (sperm and eggs) which then fuse and form a _____ cell. (Mom provides half the DNA, dad provides half the DNA).
- The ability to reproduce occurs at _____, when hormones produced by the hypothalamus (_____) stimulate the anterior pituitary to produce LH (_____ hormone) and FSH (_____ stimulating hormone). LH and FSH stimulate the _____ to produce either _____ (by the ovaries) or _____ (by the testes), which results in development of sperm and eggs, also secondary _____ characteristics.

Secondary Characteristics:

- Male secondary characteristics: (not comprehensive)
  - _____ hair.
  - Facial hair
  - _____ of voice
  - Broadening of shoulders and chest
  - Body _____ and sweat increases
  - Growth of the penis
- Female secondary characteristics: (not comprehensive)
  - Enlargement of _____
  - Growth of _____ hair, primarily pubic and underarm hair.
  - _____ of hips.
  - Increased _____ deposits around buttocks, thighs, and hips.

The Male reproductive system:

- Composed of: testes, _____, vas deferens, seminal vesicles, prostate gland, _____ glands, urethra, and _____.
- ____ Testes:
  - _____ abdominal cavity in scrotum
  - _____ production needs a lower body temp
  - sperm is produced inside tubes called _____ *tubules*
  - produce male sex hormones _____, and _____
  - maturing sperm are moved to the epididymis
- 2 Epididymis:
  - area where sperm _____ (coiled tubes) then moved to the ductus (vas) deferens
- 2 Vas Deferens:
  - sperm _____ here
  - leads to _____
  - long tube from epididymis to the urethra
- 2 Seminal vesicles:
  - 2 small glands
  - _____ vas deferens at the base of the bladder
  - makes about _____% of the seminal fluid
  - creates a slightly basic (pH 7.5) fluid, high in fructose, amino acids, *prostaglandins* (hormones that causes contractions of the vagina to help move sperm), and buffers
- 1 Prostate:
  - found _____ urethra
  - contributes _____ (basic) solution to the semen.
- 2 Bulbourethral glands (also called cowper's gland):
  - adds to _____ fluid
  - 2 small glands
  - secretes _____ fluid to neutralize urine in urethra (pre-ejaculate).
  - seminal fluid + sperm = _____.

- Urethra:
  - _____ purpose tube (semen and urine), but never at same time

- Semen is expelled out of urethra by rhythmic muscular contractions (ejaculation)

- Penis:
  - becomes _____ and firm to allow semen to be deposited in the vagina near the _____.
- The sperm is specially designed for its role.
  - A _____ nucleus
  - _____ (contains enzymes that digest the barriers surrounding the egg)
  - _____ for energy production
  - A tail for _____

The female reproductive system:

- Composed of: _____, fimbria, oviducts (uterine tubes), the uterus, cervix, _____, clitoris, labia Secondary sexual characteristics are not directly involved in the reproductive system so are not looked at here.
- 2 Ovaries:
  - Produce the _____ from follicles.
  - Produce _____ from follicles.
  - Produce _____ from the corpus luteum.
- 2 Fimbria:
  - Has _____ to sweep the egg into the oviduct
- 2 Oviducts (tubes):
  - Contain cilia to push the egg from the _____ to the uterus.
  - The _____ is fertilized while in the oviducts
- Uterus:
  - Has a thick _____ wall, shaped like an upside down pear.
  - Lined with a layer called the _____.
  - The fertilized egg attaches to the wall and develops into a _____ here.
- Cervix:
  - Produces _____ which depending on the hormones present can either help _____ along or stop them entirely.
  - During pregnancy _____ off to hold the baby in.

- Vagina:
    - Also called the _____ canal.
    - Expands in _____ and _____ during sex.
    - When stimulated during sex it _____ alkaline mucus to help the sperm survive and to reduce friction with the penis.
    - The concentration of _____ endings are shallow.
- Clitoris:
    - Sexually _____ organ located above the vaginal opening.
    - Contains _____ tissue and it becomes enlarged when stimulated.
    - _____ can lead help with the female _____.
- Vulva:
    - This is the name given to the _____ female genitalia.

13.2 The Menstrual Cycle

- Is a _____ sequence of _____ and _____ events controlled by hormones.
- The _____ in the brain releases the hormone _____ (gonadotropin-releasing hormone) and this stimulates the anterior pituitary to release _____ and _____.
- These are _____ hormones that act on the ovaries:
    - _____ - Follicle Stimulating Hormone - stimulates the follicle to mature and causes it to produce _____.
    - _____ - Leutinizing Hormone - maintains the corpus luteum and causes it to produce _____.
- The average cycle lasts _____ days. During the cycle the ovary releases an _____ and the _____ is prepared for embryo implantation. By convention we consider the _____ of the cycle to be the shedding of the _____.
- The cycle consists of two phases:
    - The _____ phase. (days 1-14)
        - **Day 1-7**:
            - High levels of _____ and low levels of _____
            - FSH _____ a follicle to grow in the ovary

- The _____ lining of the uterus is _____ and exits through the vaginal opening. (menstruation)
- Developing _____ produces low levels of _____ and _____.
- Low levels of _____ keep the _____ levels low.

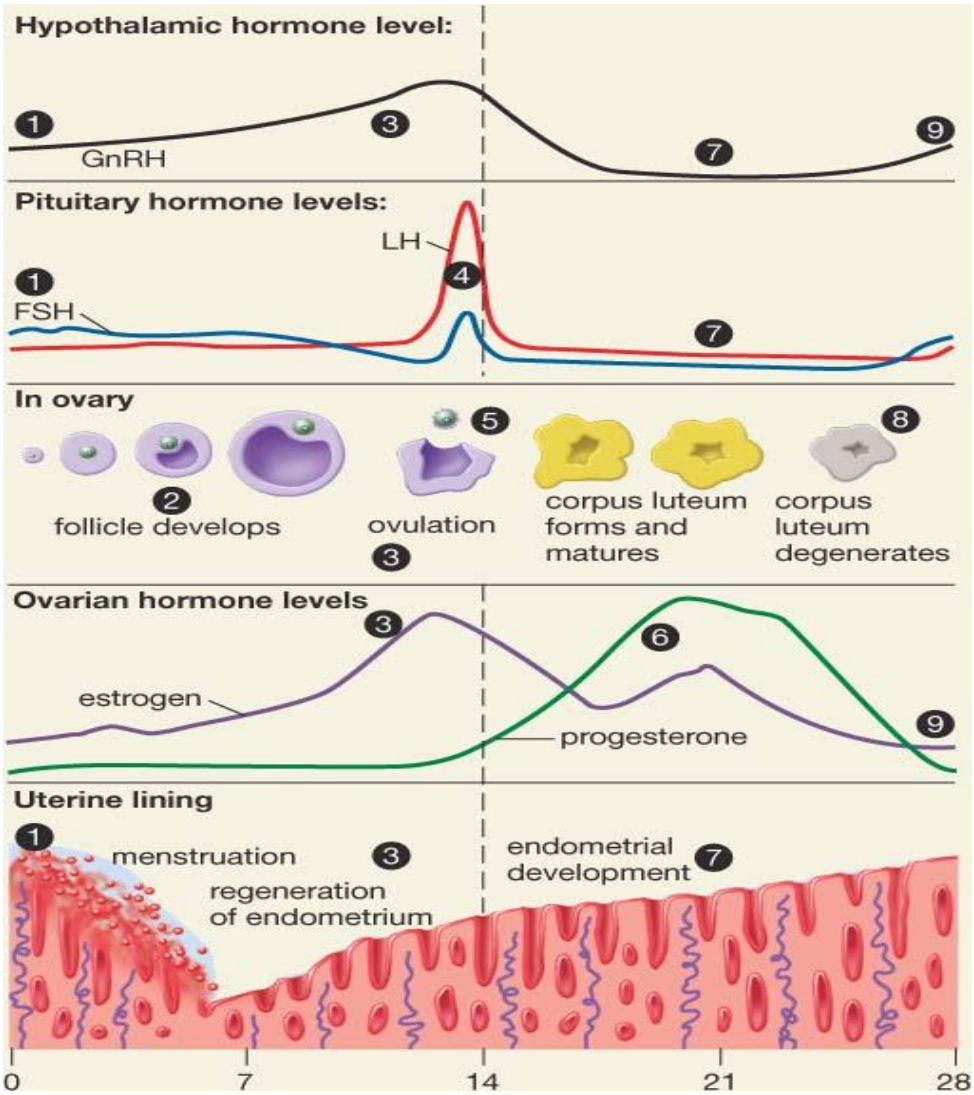
- **Day 7-14**:
  - Menstruation is _____ and the uterine lining begins to rebuild.
  - As the _____ grows in the ovary it produces more _____.
  - Higher estrogen levels _____ LH levels and _____ FSH levels. The LH level and FSH level eventually _____ causing the egg in the follicle to be released from the ovary (_____).

- The _____ phase (Day 14-28)
  - _____ happens around day 14.
  - The _____ is transported down the _____.
  - The ruptured _____ develops into the corpus luteum.
  - LH, FSH and estrogen levels _____.
  - The corpus luteum starts producing _____ in _____ amounts, and _____ amounts of _____.
  - The progesterone level _____ the FSH and LH levels inhibiting further follicle development.
  - Rise in _____ levels converts the thickening uterine lining to an actively _____ tissue with a well-developed _____ supply.

- **Pregnant**:

- If a _____ egg implants the corpus luteum remains active for a while keeping progesterone and estrogen levels high.

- **Not Pregnant:**
- If fertilization does _____ occur, then the corpus luteum degenerates and the _____ and _____ levels fall causing menstruation to _____.



13.3 Fertility and Fertilization

- During copulation, the erect penis ejaculates semen (average 3 or 4 mls of semen containing up to _____ sperm) into the vagina.

- The sperm swim through the vagina, uterus, and uterine tubes where _____ usually takes place.
- Both sperm and eggs only live for a few days, so fertilization can succeed only if copulation occurs within _____ before or after ovulation.
- During fertilization, a few hundred sperm swarm the egg. Enzymes released by the all the sperms' _____ digest the outer corona radiata and zona pellucida layers of the unfertilized egg. This allows a single sperm cell to penetrate the egg and fertilize it. The two _____cells fuse into a single diploid cell giving it all of the genes of a new human.
- Permanent contraception can be achieved by _____, either by vasectomy or tubal ligation.
- Most temporary _____ methods prevent ovulation or prevent sperm and egg from meeting.
- _____ removes the embryo from the uterus, but is not considered a contraceptive device because it terminates, rather than prevents, pregnancy.

13.4 How Do Humans Develop?

- A fertilized egg (_____) develops into a _____ and implants in the _____. During implantation, the outer blastocyst layer forms the chorion, while the inner cell mass forms the _____, yolk sac, and embryonic disc.
- During the _____week of development, chorionic villi extend into the endometrium of the uterus.
- During the _____week of development, the endoderm forms a tube that will eventually form the digestive tract. The umbilical cord also forms between the embryo and the placenta of the mother.
- During the _____week of development, the embryo displays prominent chordate features (notochord, tail, gill grooves), rudimentary eyes, and a developing brain.
- By the _____week of development, most of the major organs have developed. The gonads form and develop, producing testosterone or estrogen that will affect future embryonic development. The developing embryo is now called a fetus.
- Over the next seven months, the fetus continues to grow and develop, with its organs becoming more functional.

- _____months of fetal development culminates in labor and delivery, which occurs through the interplay of estrogen, progesterone, steroid hormones produced by the fetus, oxytocin, and uterine stretching.
- During pregnancy, the mammary glands within the mother's breasts grow under the influence of estrogen and progesterone. After birth, infant suckling stimulates the release of _____ and oxytocin, which triggers milk secretion and release from the mammary glands.