

Part I. Parts of the reproductive system

1. List the parts of the male system and their function:

- testes contain the seminiferous tubules (this is where sperm form)
- leydig cells produce male hormones
- sperm mature and are stored in the epididymis
- sperm travel through the vas deferens
- seminal vesicles produce fluid that contains fructose and basic properties
- prostate gland produces fluid that contains anticoagulants
- bulbourethral gland also adds to seminal fluid and helps to neutralize the fluid

2. Describe the process of spermatogenesis? Where does it occur?

- Occurs in the seminiferous tubules and the sperm are nourished by sertoli cells

spermatogonia (2n) → matures into the primary spermatocyte (2n) → meiosis I to generate the secondary spermatocyte (n), there are two of these → meiosis II to generate the spermatids (n), there are 4 of these

3. Why do the cells surrounding the newly formed spermatids contain tight junctions?

To prevent an immune response! If the immune system sees the haploid cells it will recognize it as not normal and flag for destruction. The tight junctions prevent the immune system from being able to see the spermatids. The junctions act like a wall to keep out the immune system fighters

4. Describe the parts of the female system and their function

- ovaries contain follicles
- the follicles contain the oocyte and granulosa cells nourish the egg
- the oviduct "connects" the uterus to the ovaries (there is no real connection the egg is actually swept from the ovary into the oviduct)
- the uterus is where the oocyte implants (the lining of the uterus is called the endometrium)

5. Describe the process of oogenesis

in the embryo all of the oogonium (2n) mature into the primary oocyte (2n)

** AT BIRTH ALL PRIMARY OOCYTES ARE FROZEN IN PROPHASE I

- at puberty, one primary oocyte finishes meiosis I and stops in METAPHASE II
- the egg is ovulated and if the sperm fertilizes the egg then meiosis II will finish

oogonium (2n) → primary oocyte (2n) → secondary oocyte (N) → after the egg is fertilized meiosis II completes

Part II. Hormonal Control of the reproductive system

6. How are hormones controlled in the male and female reproductive systems?

Males:

The hypothalamus produces gonadotrophic releasing hormone which stimulates the anterior pituitary to release FSH (follicle stimulating hormone). FSH affects the sertoli cells and causes them to do two things (i)

turn on spermatogenesis and (ii) produce inhibin. Inhibin works by negative feedback and tells the anterior pituitary to stop making FSH

Gonadotropin releasing hormone also tells the anterior pituitary to release LH (leutinizing hormone) which tells the leydig cells to release testosterone which also helps to turn on spermatogenesis (in conjunction with the sertoli cells)

7. There are two parts to the female reproductive cycle: the ovarian and the menstrual
Describe how the reproductive cycle starts:

Just like in males, the hypothalamus releases GnRH which stimulates the anterior pituitary to release FSH and LH hormones. FSH stimulates the follicle to start growing (in combination with LH) and the follicle begins to produce estrogen.

Ovarian Cycle:

A. The follicle secretes estrogen in low levels at first. This low level inhibits the anterior pituitary from releasing LH and FSH

- Look at graph below, this is why the two hormones stay at a constant low rate during the first half of the phase (first half of graph)

B. At a certain point estrogen levels become to rise dramatically. This rise in estrogen causes the hypothalamus to start releasing GnRH levels again which in turn causes the anterior pituitary to release FSH and LH. Note that LH has a higher peak because follicle cells are more receptive to this hormone

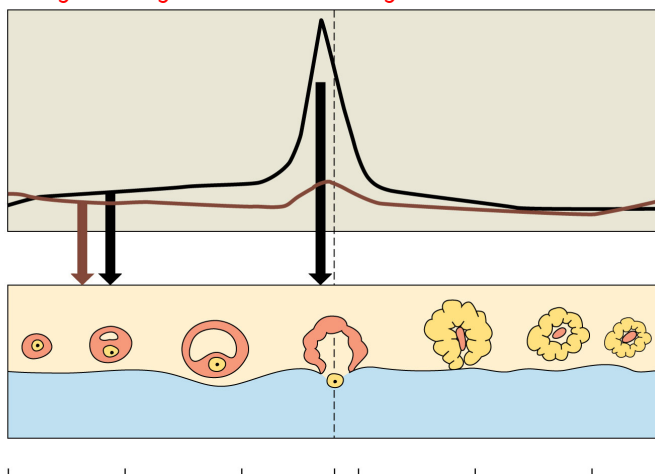
C. The spike in LH causes the follicle to reach maturity and it is released (called ovulation)

D. LH causes the left over follicle cells to form the corpus luteum. This structure begins to secrete estrogen and progesterone.

E. As the estrogen and progesterone levels rise they tell the hypothalamus to stop releasing GnRH which in turn halts the release of FSH and LH

F. Low levels of GnRH cause the corpus luteum to start disintegrating which causes a sharp drop in estrogen and progesterone levels

G. Now that estrogen and progesterone have stopped being produced, the hypothalamus can start secreting GnRH again to kick start the growth of a new follicle



Describe the Uterine Cycle:

- A. Estrogen secreted from the follicle cells causes the endometrium of the uterus to thicken
- B. Once the egg has been ovulated, estrogen and progesterone secreted by the corpus luteum stimulate the uterus to continue thickening and growing. The lining of the uterus gains endometrial glands that secrete nutrients for incoming egg and blood vessels grow
- C. When the corpus luteum disintegrates the estrogen and progesterone levels drop and the uterine lining disintegrates

** an implanted egg will produce hCG which maintains levels of estrogen and progesterone

