

Female Reproductive System

- prepares body to conceive, take care & develop a baby
- one ovum produced from gonads every month to be expelled into the abdomen & transported along the fallopian tube. After fertilization, the zygote is implanted in the uterus, & the fetus is delivered through the cervix & exterior vaginal organ

okay ... let me start the story ... hang in there

Oogenesis

in early embryonic life, primordial cells from yolk sac migrate to ovaries & start proliferating until it reaches ovaries cortex.

There it is called Primordial ovum/oogonia. After collecting

1 layer of granulosa cells around it, it is called the

primordial follicle ... The baby is born w/ 1-2 million primordial follicles ($2n$) arrested in prophase of meiosis I....

* in childhood, the granulosa layer provides nourishment for ovum, & secretes maturation-inhibiting factor so it stays as primordial follicle

Follicular phase

- After puberty (11-13 yrs) GnRH from hypothalamus stimulates secretion of FSH & LH from ant. pituitary. This will allow for ovum size to ↑, & additional layers of granulosa cells are made; outside the granulosa cell layer, we have Thecal cells, & this is now called the primary follicle. In this phase, LH is acting on thecal cells to convert cholesterol →

androgens ... androgens diffuse into granulosa cells & turn into estrogen under FSH stimulation ... FSH & LH are allowing for granulosa cell proliferation, so additional layers are added & we create a 2nd follicle ... FSH & LH are still doing the same job in creating more estrogen, but now FSH is acting on granulosa to secrete follicular fluid (high in estrogen) into a pocket called the antrum ... so the ovum continues to enlarge & fluid continues to fill the antrum, until we create the Graffian follicle (preovulatory follicle)

* so in follicular phase, growth of primary follicle → antral stage is primarily done by FSH for mitosis of granulosa cells, estrogen production, & follicular fluid

* on average, follicular phase is from day 1 - 14

- As estrogen levels rise in mid follicular phase, it acts as

(-) feedback & stops secretion of GnRH (so no LH or FSH) ...

toward the end of follicular phase, estrogen levels rise again,

but act as (+) feedback on GnRH, at the same time,

Graffian is secreting inhibin ... this way we have ↑ secretion

of LH, b/c inhibin will inhibit FSH secretion, so we have

LH surge, leading to ↑ progesterone from the follicle &

↑ blood flow to the follicle

Ovulation

from day 14/15, proteolytic enzyme from theca is produced

(due to LH activity) & thins the wall surrounding the ovum.

This allows for rupture of the stigma, & the ovum is released from graffian follicle, & is surrounded by granulosa cells (corona radiata) & zona pellucida

- the ejected oocyte can be caught by the fimbriae of the fallopian tube for sperm to come & fertilize it

* body temp \uparrow by $.5^{\circ}\text{F}$ in ovulatory phase

- remaining granulosa & theca cells that were left behind, gets filled w/ blood (corpus luteum)

↳ Stimulated by LH

Luteal phase (day 15-28)

Corpus luteum (made of granulosa & theca) gets changed into lutein cells (yellow / lipid filled) due to LH stimulation.

Corpus luteum secretes progesterone (high progesterone in this phase)

- LH & FSH allow corpus luteum to secrete progesterone, estrogen & inhibin, which will have (-) feedback on hypothalamus GnRH secretion

- if pregnancy occurs, placenta secretes HCG onto corpus luteum to \uparrow progesterone & estrogen

- if no pregnancy, corpus luteum will involute, & new cycle will begin

please read through the sheet online, I did not include all information, I just wanted the ovulatory cycle to be better understood