Embryology

Faculty of Medicine – JU2017

◉ Sheet ○ Slides

Number

4

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(Female reproductive cycle)

- Babies' eggs are formed during fetal life. Around the 5th week of pregnancy, the eggs will arrive to the ovum and mitosis will begin.
- Before mitosis begins though, the primary oocyte will begin at prophase meiosis I.
- The primary oocytes are covered by cells.

  → *The cells start as one layer of flat cells*

  **NOTE: oocyte plus its covering are called follicles.*

  → *These follicles start as flat cells then they are differentiated into cubodial cells (or grown follicles)*

  →*The covering will then become multi-layered (stratified),these cells are called* ***granulosa cells.***

  →*These cells with the primary oocyte secrete a glycoprotein substance around and "tailor it" to a clear (see through) layer called* ***zoona pallucida.***
- The **zoona pallucida** is what prevents implantation.

  →***When the ovum (fertilized) increases*** *and passes through the uterine cavity, it must lose the zoona pallucida to continue otherwise it will not.*

  →***It's job is to protect, until t reaches the cavity and attached to daisiks,***
- Cells around the primary oocyte secrete, which accumulates to form large spaces we call the antrum.

  →***This large cavity will lead to the arising of the secondary follicle.***
- The ovum still did not leave the ovary; it is still completing prophase **meiosis I.**
- These cavities will enlarge and the oocyte will be "pushed" to the side, covered by some granulose cells with the zoona pallucida and corona radiate surrounding it.
- After the secondary follicles arise, the fluid will enlarge and the follicle will become something called **graphical follicle**. It will cause a bulging on the surface of the ovary which will become avasular (stigma). **On day 14** it will explode and everything in it, including secondary oocyte will be released.

  ****NOTE: it will finish meiosis I and the go on to meiosis II.***

- In the end all that's left are some granulosa cells which will form the corpus luteum.

  →What is the importance of these left-over cells?!

  ****ANSWER:*** *When a female's period is done, the granulosa cells will be in charge of forming a new layer for the endometrium by secreting estrogen (proliferation phase)*
- The body of the female on day 14,will think that it is fertile, so the corpus luteum goes and secretes progesterone and this will affect the endometrium, blood vessels enlarge and glands secrete mucus. With no fertilization, progesterone closes, blood vessels contract, blood leaves the walls it will cut the nicrotic epithelium which will cause a bleeding phase.
- During the 1st period females go through a very bad back pain called menaric.
- Cell secondary follicle layer, around it is part of the connective tissue layer of the ovary, **it will differentiate into 2 layers:**
  1. **Theca extrena (fibrous connective tissue)**
  2. **Theca interna (secretary part)**
- **The female period is controlled by four organs:**
  1. **Hypothalamus**
  2. **Pituitary glands**
  3. **Ovary**
  4. **Uterus**

→The commander us the Hypothalamus, it controls the Ovarian cycle by releasing gonadotropin (sex organs-stimulating hormone) .

→The pituitary gland releases:

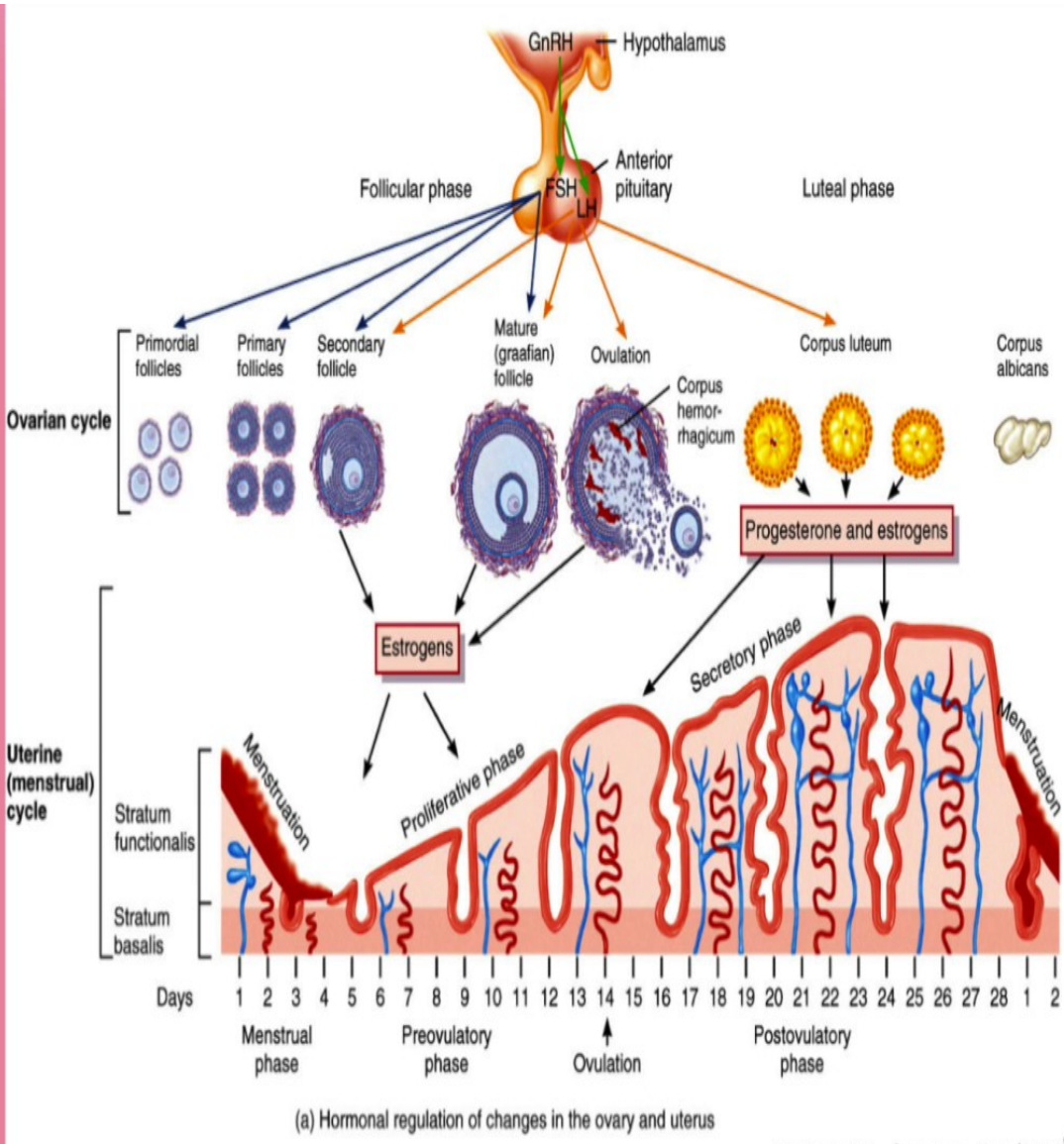
1. FSH: follicle stimulating hormone controls the proliferative phase stimulates growth, maturation of follicle and proliferation of follicular cells (release of estrogen)

2. LH: lutenizing hormone for ovulation and this controls the secretory and menstrual phases.

- **Layers of endometrium:-**
  1. ***Functional***
  2. ***Basel layer which is made of compact and spongy.***
     → Compact, regenerative
     → Spongy has blood vessels and gland, goes through menstruation

In the end:-

- Corpus luteum left over of, granulosa cells, and theca internal cells are vascularized by surrounding cells with the help of LH, they will give us the yellow color, which is fat, corpus luteum will be part of the endocrine, a gland. Secreting progesterone, it increases the size and growth of the endometrium , prepares the cells for implantation, where will the sperm and ovum at day 5^{th} or 6^{th}, will reach the Fallopian tube and there a zygote is formed by Mitosis rapid division, (increase in amount but not in size). 2,4,8,16, and 32 by the 5^{th} day. It is in the end of the tube, to go to the uterine cavity. Wondering…… needs to do implantation. …no progesterone no formalization. This is a continuous cycle.
- **Oral contraceptives: "موانع الحمل"**used to prevent pregnancy , it usually contains progesterone , it inhibits secretion of "gonadotropin " it works by stopping women`s egg development and the egg will not accept sperm, so fertilization is prevented
- **Clinical case:** *How to stop pregnancy? If there is an increase in estrogen or progesterone there will be a feedback …no need for LH, birth control pills.*



(a) Hormonal regulation of changes in the ovary and uterus

Tortora, G. J., & Tortora, G. J. (2014).

Figure 28.24a Tortora - PAP 12/e