



جامعة الأزهر - غزة
AL-AZHAR UNIVERSITY-GAZA



Female reproductive system





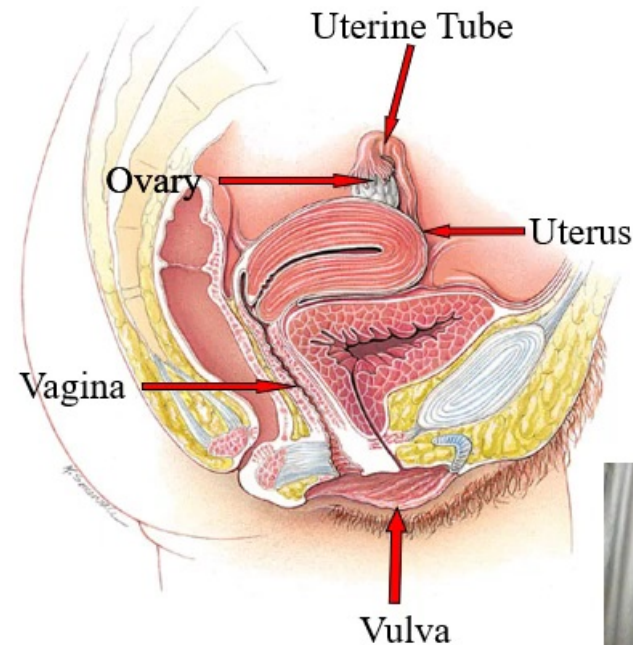
Female reproductive functions

- Divided into two major phases:
 - ✓ Preparation of the female body for conception and pregnancy.
 - ✓ The period of pregnancy itself.



Female Reproductive System

- Ovaries produce eggs (oöcytes) & hormones
- Uterine tubes transport the eggs
- Uterus where fetal development occurs
- Vagina or birth canal
- External genitalia constitute the vulva
- Mammary glands produce milk

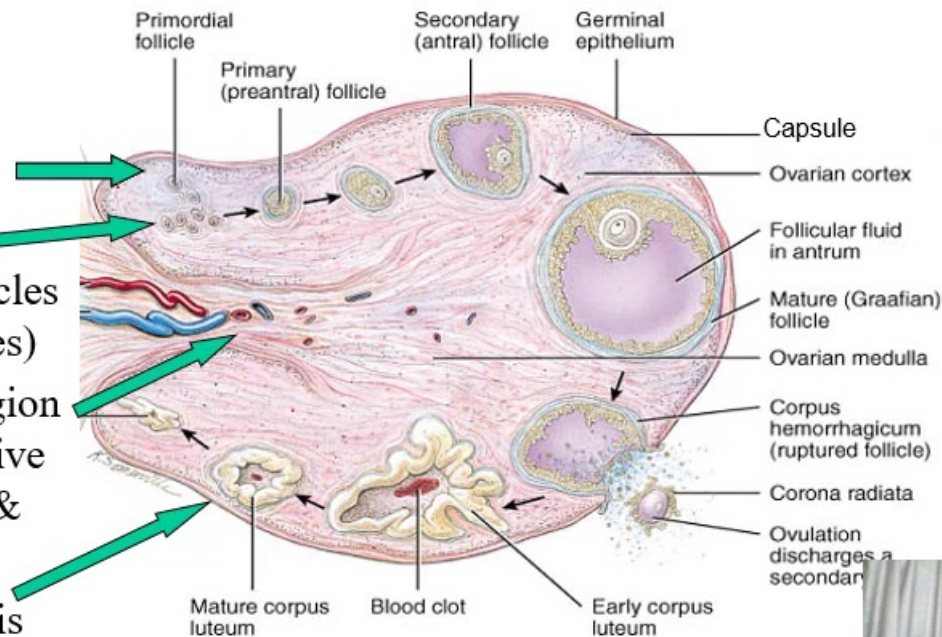


The Ovary

- Pair of organs, size of unshelled almonds in upper pelvic region

- Histology

- Capsule of dense CT
- Cortex just deep to capsule contains follicles with egg cells (oocytes)
- Medulla is middle region composed of connective tissue, blood vessels & lymphatics
- Germinal epithelium is peritoneal membrane covering the ovary





Oogenesis

- A developing egg (oocyte) differentiates into a mature egg (ovum) through a series of steps called oogenesis





Functions of ovaries

- Endocrinal Estrogen & progesterone
- Oogenesis It occurs in intrauterine life
- Fetal life
 1. Primordial germ cells in hindgut migrate to gonadal ridge
 2. → Primordial ova (oogonia)
Migrate to ovarian cortex & proliferate
6-7th W 10000
8th W 600000
- Collect ovarian stems from granulosa cells → 3- Primordial follicles
11-12th weeks
- 20 W 6-7 million
- At birth 2-2.5 million
- → 4- First meiotic division at 5th month of gestation
crossing over of genetic material





Functions of ovaries

- Childhood
- No pituitary gonadotropins – ovaries inactive
++ size of follicles & granulosa cells → stratum granulosum
- Puberty & adult life
- Primary oocyte → second stage of 1st meiotic division → secondary oocyte
in primordial follicle before ovulation FSH Haploid N + 1st polar body
Diploid N
- Second meiotic division:
Secondary oocyte → 2-3 hours → Mature ovum
After fertilization LH + 2nd polar body
extragenetic material
- During reproductive period, only 450 follicles expel their ova
- 1st meiotic division is arrested in metaphase by ptn pp 39 mos in ova Fe causes its destruction





Oogenesis

Egg forming cells (oocytes) go through two divisions

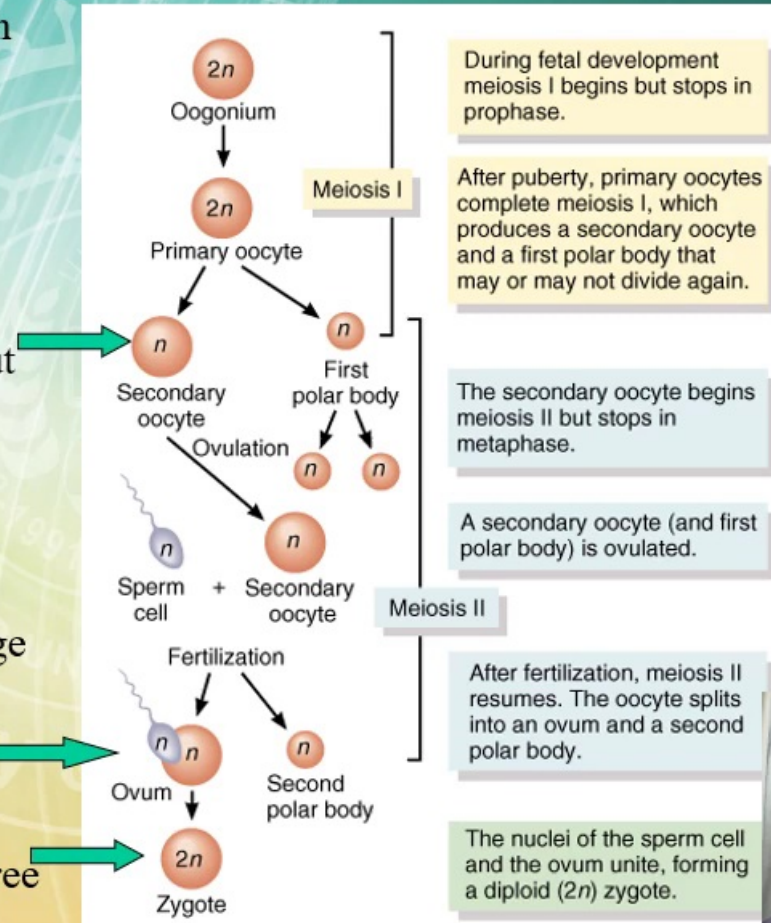
1° = primary

2° = secondary

- Starts with a $2n=46$ 1° oocyte that divides, resulting in two $n=23$ cells, but one is a large 2° oocyte and one is a small 1st polar body that may itself divide

- Second division only occurs if 2° oocyte is fertilized. Results in one large $n=23$ ovum (egg) and one small $n=23$ 2nd polar body

- Thus oögenesis results in one large fertilized egg (zygote) and possibly three small polar bodies





The female hormonal system

- The female hormonal system, like that of the male hormonal system, consists of three hierarchies of hormones, as follows:
- A hypothalamic releasing hormone, called gonadotropin- releasing hormone (GnRH)
- The anterior pituitary sex hormones, follicle- stimulating hormone (FSH) and luteinizing hormone (LH), both of which are secreted in response to release of GnRH from the hypothalamus
- The ovarian hormones, estrogen and progesterone, which are secreted by the ovaries in response to the two female sex hormones from the anterior pituitary gland





Female Reproductive Cycle

- Controlled by monthly hormonal cycle from the hypothalamus, anterior pituitary and ovary
- Monthly cycle of changes in ovary and uterus
- Ovarian cycle
 - Changes in ovary during and after maturation of the follicle and oocyte
- Uterine cycle (menstrual cycle)
 - Preparation of the uterus to receive fertilized ovum
 - If implantation does not occur, the functional layer of endometrium is shed during menstruation





Female Reproductive Cycle

- The normal reproductive years of the female are characterized by monthly rhythmic changes in the rates of secretion of the female hormones and corresponding physical changes in the ovaries and other sexual organs.
- This rhythmic pattern is called the female monthly sexual cycle (or, less accurately, the menstrual cycle).
- The duration of the cycle averages 28 days. It may be as short as 20 days or as long as 45 days in some women, although abnormal cycle length is frequently associated with decreased fertility.
- The female sexual cycle has two significant results.
 - ✓ First, only a single ovum is normally released from the ovaries each month, so normally only a single fetus will begin to grow at a time.
 - ✓ Second, the uterine endometrium is prepared in advance for implantation of a fertilized ovum at the required time of the month.





Gonadotropic hormones

- FSH and LH stimulate their ovarian target cells by combining with highly specific FSH and LH receptors in the ovarian target cell membranes.
- In turn, the activated receptors increase the cells' secretion rates and usually the growth and proliferation of the cells as well.
- Almost all these stimulatory effects result from activation of the cyclic adenosine monophosphate second messenger system in the cell cytoplasm, which causes formation of protein kinase and multiple phosphorylations of key enzymes that stimulate sex hormone synthesis.

