

The Reproductive System: Female

I. ORGANS OF THE FEMALE REPRODUCTIVE SYSTEM

A. Organs

1. **Ovaries** = the primary female sex organ which produces ova (eggs) and female sex hormones.
 - a. Solid ovoid structures located (one on each side) on the posterior wall of the pelvic cavity.
 - b. Internal structure: each ovary is subdivided into a
 - **Medulla** = CT, blood and lymph vessels and nerves, provides nourishment and support.
 - **Cortex** = ovarian follicles covered by germinal epithelium
 - c. **Oogenesis:**
 - Mitosis of primordial germ cells within female embryos produces diploid **oogonia** (23 pairs of chromosomes), which duplicate their DNA and give rise to:
 - **Primary oocytes** (23 pairs of duplicated chromosomes). Note that human females are born with all their potential ova as primary oocytes.
 - At puberty, once each month, FSH stimulates one primary oocyte to undergo meiosis I, which gives rise to one:
 - **Secondary oocyte** (23 duplicated chromosomes) and a polar body due to unequal cytokinesis. The secondary oocyte is then ovulated from the ovary (LH).
 - If the secondary oocyte is penetrated by a sperm cell then meiosis II is initiated.
 - When and if meiosis II is complete, a second polar body is separated from the large ovum (23 chromosomes). The haploid nuclei of the sperm and the mature ovum fuse.
 - d. **Maturation of Follicle:**
 - During childbearing years, each month FSH stimulates one primordial follicle to mature: The following events occur over a 14-day period (approximately).
 - The primary oocyte enlarges and undergoes meiosis I
 - The follicular cells multiply and give rise to stratified epithelium composed of **granulosa cells**
 - A layer called the **zona pellucida** appears and separates the oocyte from the granulosa cells. The follicle is now called a **primary follicle**
 - A fluid filled cavity, called the **antrum** appears. A crown of granulosa cells surrounds the oocyte (**corona radiata**). The follicle is now called a **secondary follicle**
 - e. **Ovulation:**
 - Oogenesis (meiosis I) is complete as the follicle matures (approximately 14 days)

- Upon maturation, luteinizing hormone (LH) causes the follicle to burst, releasing a secondary oocyte
 - After ovulation, the oocyte is drawn into the fallopian tube via the fimbriae
2. **Fallopian Tubes** (Uterine tubes, Oviduct)
 - a. Tubes which pass medially from ovaries to uterus
 - b. Distal ends are expanded over ovary and form extensions called **fimbriae**
 - c. Inner lining is covered with cilia to aid oocyte movement
 - d. Fertilization typically occurs in fallopian tube
 3. **Uterus**
 - a. A muscular organ that receives embryo and sustains its life during development
 - b. Is located within the pelvis
 - c. The uterine wall has three layers:
 - **Endometrium** = inner lining, site of blastocyst implantation. (Endometriosis = endometrial tissue in locations other than uterus. tissue bleeds, but does not shed, resulting in scars or adhesions, painful and possibly infertile condition)
 - **Myometrium** = bundles of smooth muscle, bulk of uterus
 - **Perimetrium** = visceral covering
 - d. Lower one-third of uterus narrows to form **cervix**
 - Internal sphincter
 - Cervical canal
 - External sphincter
 - Posterior/anterior fornix
 - **Pap smears** are taken from cervical tissue

II. DEVELOPMENT DURING PREGNANCY

B. Formation of the Morula

1. **Cleavage** = the early series of mitotic divisions of the zygote
 - a. These divisions occur so rapidly, that the cells are unable to grow between divisions
 - b. The mass of successively smaller and smaller cells is still contained within the zona pellucida
 - c. These small cells are called **blastomeres**
2. First division = 36 hours = 2 cells
3. Second division = 48 hours = 4 cells
4. **Morula** = solid ball of 32 cells (resembles a raspberry) in about 96 hours

C. Formation of the Blastocyst

1. **Blastocyst** = a hollow ball of cells surrounding a central cavity, about 5 days