

REPRODUCTIVE SYSTEM – Textbook and Lecture Slides

The female and male reproductive systems have obvious differences, and yet they share several general characteristics. For example, some mature reproductive system structures are derived from common developmental structures (primordia) and serve a common function in adults. Such structures are called **homologues**. Both reproductive systems have primary sex organs called **gonads** —ovaries in females and testes in males. The gonads produce sex cells called **gametes**, which unite at fertilization to form a new individual.

FEMALE REPRODUCTIVE SYSTEM

Dormant until puberty, at puberty the hypothalamus increases the secretion of gonadotropin hormone (GH) which stimulates secretion of follicle stimulating hormones (FSH) and luteinizing hormone (LH). Gonads produce sex hormones – gametes and sex maturation starts. Estrogen and progesterone prepares uterus for implantation and mammary glands for lactation. Produces gametes (oocytes), protects and supports the developing embryo, facilitates birth and nourishes the newborn infant.

Recto-uterine pouch (pouch of Douglas) between the uterus and the rectum and continuous with the pararectal fossae. **Vesico-uterine pouch** between the uterus and bladder and continuous with the paravesical fossa.

Female gametes are called oocytes, whereas male gametes are called sperm. In addition, the gonads produce large amounts of **sex hormones** (estrogen and progesterone in the female and androgens in the male), which affect maturation, development, and changes in the activity of the reproductive system organs. Both sexes have accessory reproductive organs, including ducts to carry gametes away from the gonads toward the site of fertilization (in females) or simply to the outside of the body (in males). Fertilization occurs when female and male gametes fuse. The sexual union between a female and a male is known as **copulation, coitus, or sexual intercourse**. If fertilization occurs, then the support, protection, and nourishment of the developing human occurs within the female reproductive tract.

Both the female and male reproductive systems are primarily nonfunctional and dormant until a time in adolescence known as puberty. At **puberty**, external sex characteristics become more prominent, such as breast enlargement in females, penis and scrotum enlargement in males, and pubic hair growth in both sexes, and the reproductive organs become fully functional. Also, the gametes begin to mature, and the gonads start to secrete their sex hormones. Puberty is initiated when the hypothalamus significantly increases **GnRH (gonadotropin-releasing hormone)** secretion. GnRH acts on specific cells in the anterior pituitary and stimulates them to release **FSH (follicle-stimulating hormone)** and **LH (luteinizing hormone)**. (Prior to puberty, FSH and LH are virtually nonexistent in girls and boys.) As levels of FSH and LH increase, the gonads produce significant levels of sex hormones and start the processes of gamete maturation and sexual maturation.

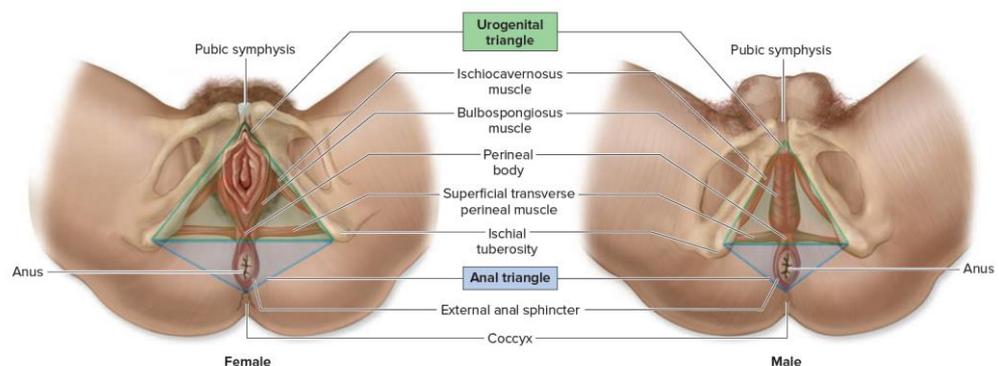
Both reproductive systems produce gametes. However, the female reproductive tract typically releases a single gamete (secondary

oocyte) monthly, whereas

the male reproductive tract produces large numbers (100 million) of gametes (sperm) daily. These male gametes are

stored within the male reproductive tract for a short time, and if they are not expelled from the

body within that period, they are resorbed.



PERINEUM

Diamond shape extending from the pubis anteriorly to the coccyx posteriorly. **Urogenital triangle:** Females = clitoris and the urethral and vaginal orifices. Males = the base of the penis and scrotum. Houses the muscles that surround the external genitalia (the ischiocavernosus, bulbospongiosus, and superficial transverse perineal muscles). **Anal triangle:** the location of anus in both sexes, surrounding the anus is the external anal sphincter.

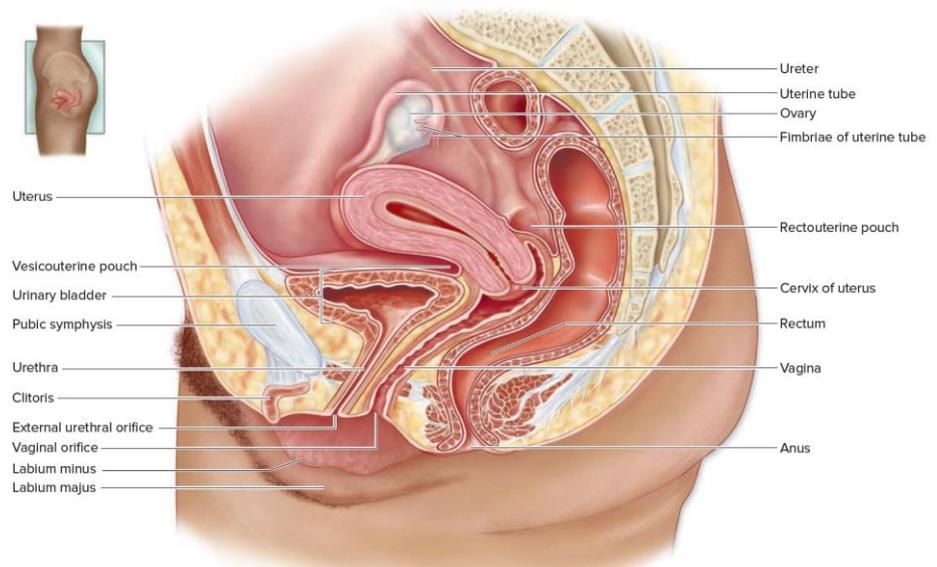
The **perineum** is a diamond-shaped area between the thighs in both females and males that is bounded anteriorly by the pubic symphysis, laterally by the ischial tuberosities, and posteriorly by the coccyx. Two distinct triangle bases are formed by an imaginary horizontal line extending between the ischial tuberosities of the ossa coxae. Both triangles house specific structures in the floor of the trunk:

- The anterior triangle, called the **urogenital triangle**, contains the clitoris and the urethral and vaginal orifices in females and the base of the penis and the scrotum in males. Within the urogenital triangle are the muscles that surround the external genitalia, called the ischiocavernosus, bulbospongiosus, and superficial transverse perineal muscles.

- The posterior triangle, called the **anal triangle**, is the location of the anus in both sexes. Surrounding the anus is the external anal sphincter. The external anal sphincter, bulbospongiosus, and superficial transverse perineal muscles are partly anchored by a dense connective tissue structure called the perineal body.

OVARIES

Paired oval organs, site of oocyte development, do not anchor to the fallopian tubes directly, **intraperitoneal**, tubal and uterine extremities, anchored to body wall via **broad ligaments**, anchored to outer layer of uterus via the **ovarian ligaments**. **Suspensory ligament** attaches to the lateral edge of each ovary and projects superolaterally to the pelvic wall. **Mesovarium:** the part of the broad ligament covering the ovary at the hilum. Smooth muscle fibres within the mesovarium and suspensory ligament contract during ovulation and bring the ovaries close to the uterine tube openings.



Early primary follicle: ovum covered by single layer of follicular cells – **late primary follicle:** ovum covered by multiple layers of follicular cells – **secondary (antral) follicle:** follicular layer contains fluid – **tertiary (mature) follicle (Graafian follicle)** – **over ovulation.**

Uterine tube, ovarian ligament, suspensory ligament and uterosacral ligament.

The outermost layer is called the **ovarian epithelium** (germinal epithelium), the connective tissues below the ovarian epithelium is called **tunica albuginea**, the ovarian **cortex** consists of ovarian follicles whereas the **medulla** consists of blood vessels, lymph vessels and nerves. Release of the ovum is called **ovulation.**