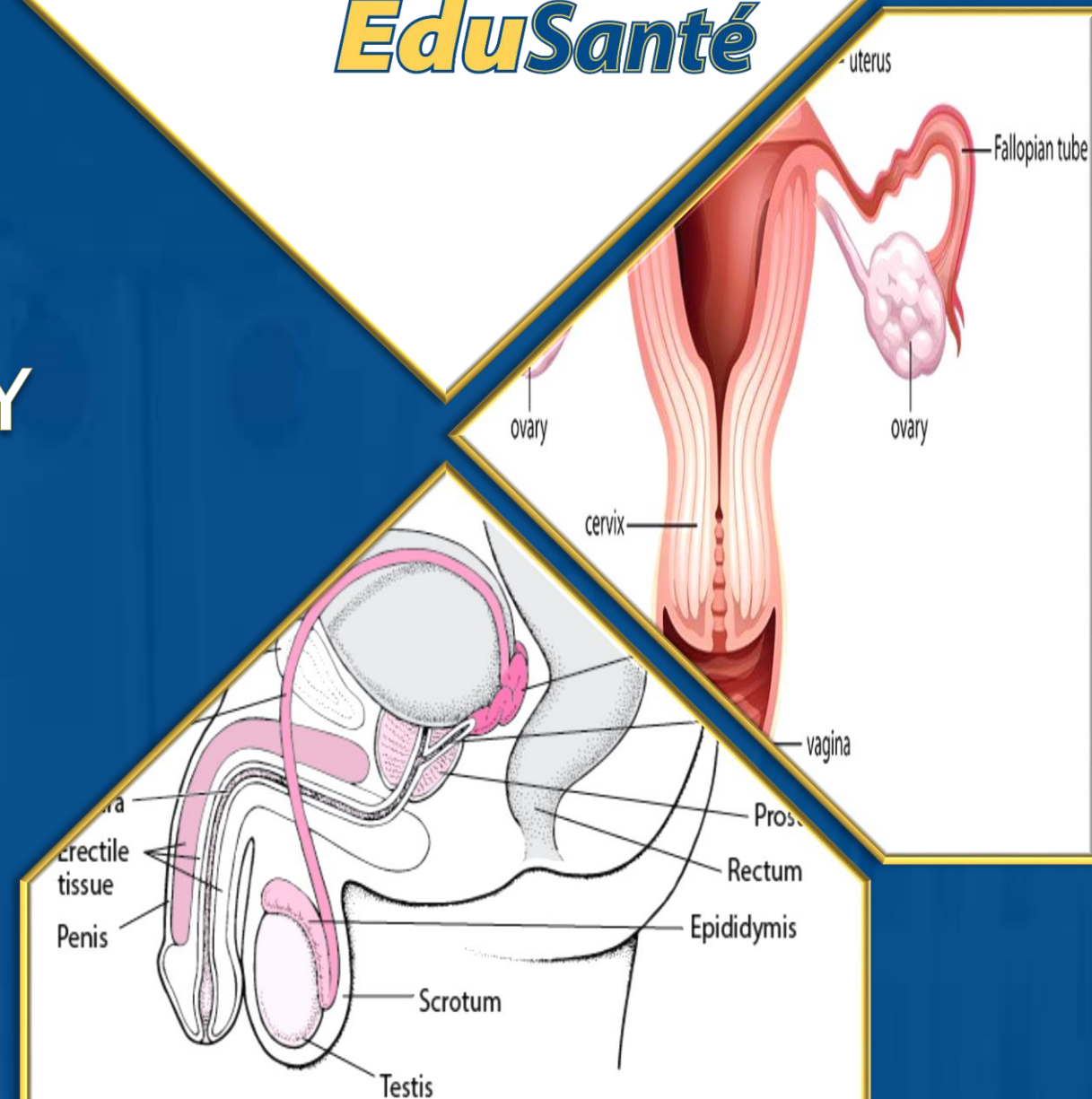


REPRODUCTIVE ANATOMY

Primary Care Paramedicine

Module: 18

Section: 01

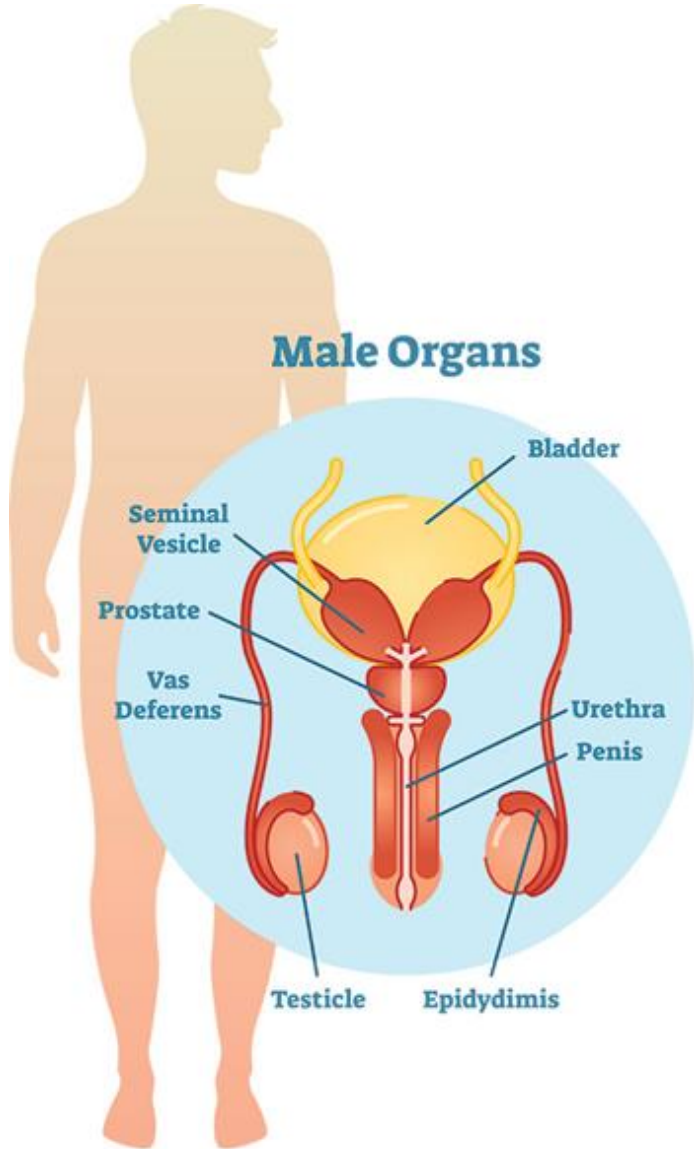


- Sexual Reproduction is the process in which organisms produce offspring by means of uniting gametes (sperm and egg)
 - Male reproductive organs secrete androgen hormones, produce gametes (sperm) and facilitate fertilization
 - Female reproductive organs secrete female hormones, produce gametes (ova), facilitate fertilization and sustain growth of the embryo and fetus

- Produce eggs and sperm cells
- Transport and sustain them
- Nurture the developing offspring
- Hormone production

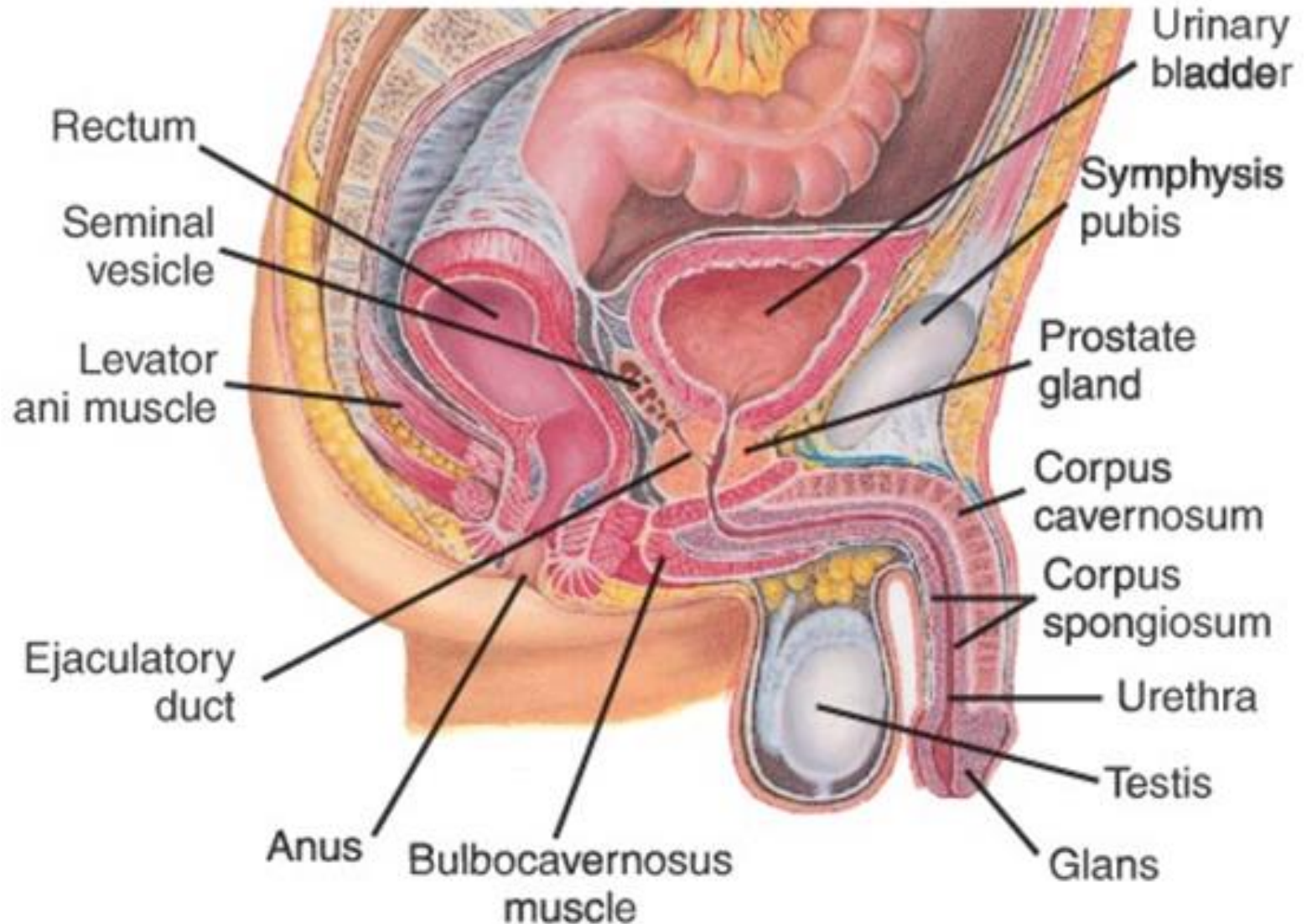
Reproductive Anatomy

MALE

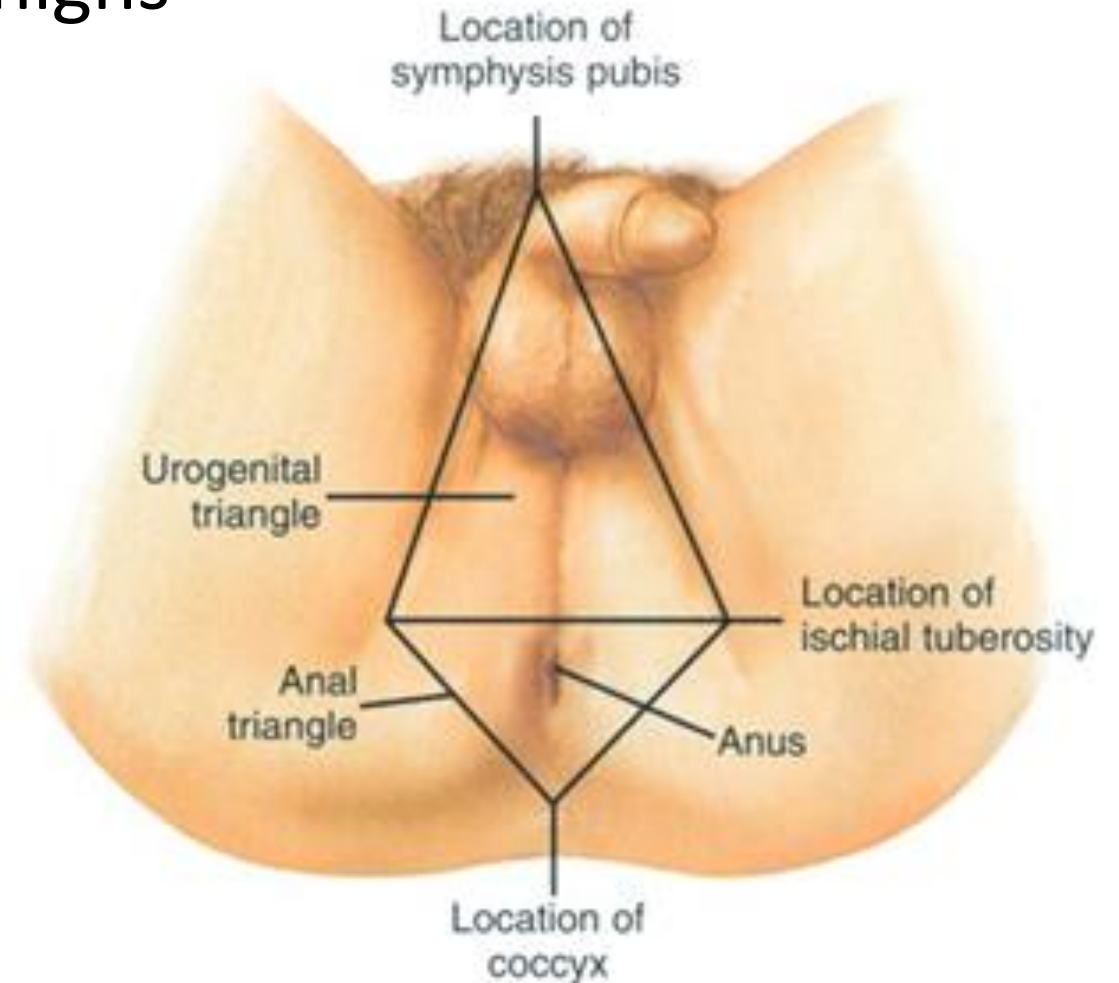


- The genitals are all the structures of reproduction
 - The gonads (the testes in males and ovaries in females) are the site for gamete production and hormone secretion
 - Various ducts store and transport gametes
 - Accessory sex glands produce secretions to protect and support the gametes
 - Supporting structures deliver and/or assist in joining gametes (penis in male, vagina and uterus in female)

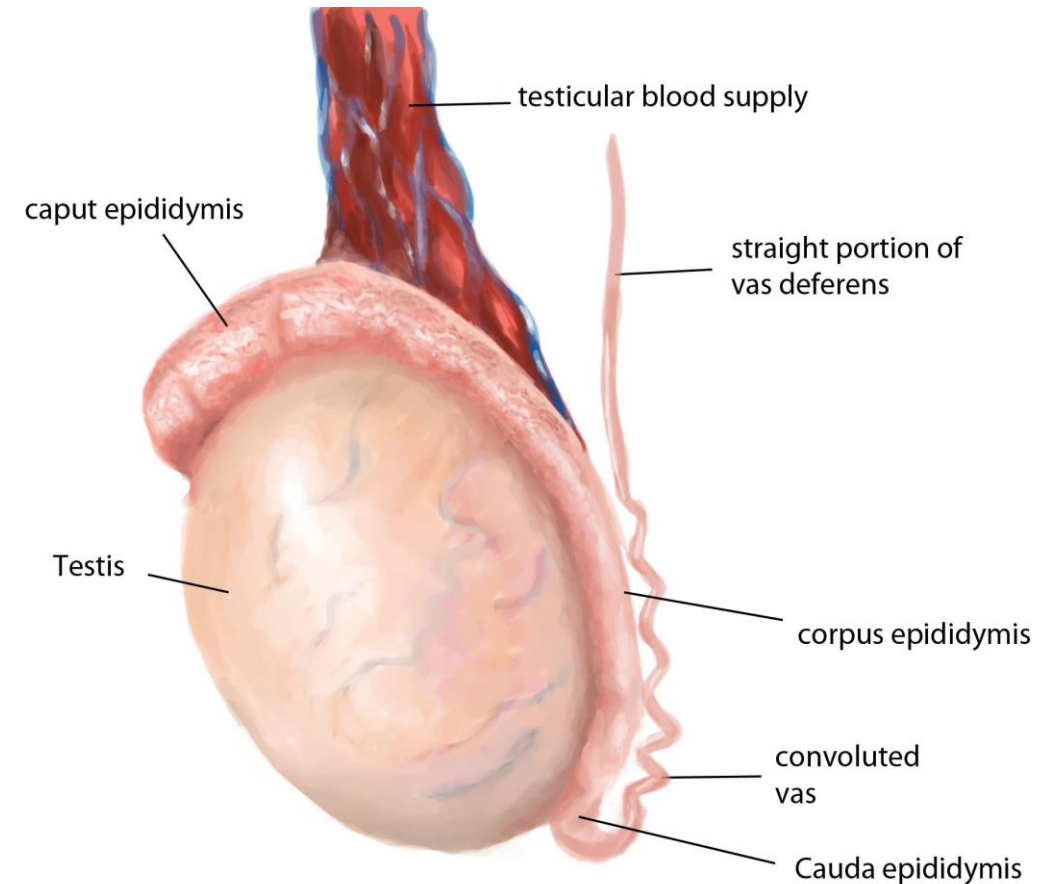
- Essential
 - Testes (gonads)
- Accessory
 - Epididymis
 - Vas Deferens
 - Ducts
 - Urethra

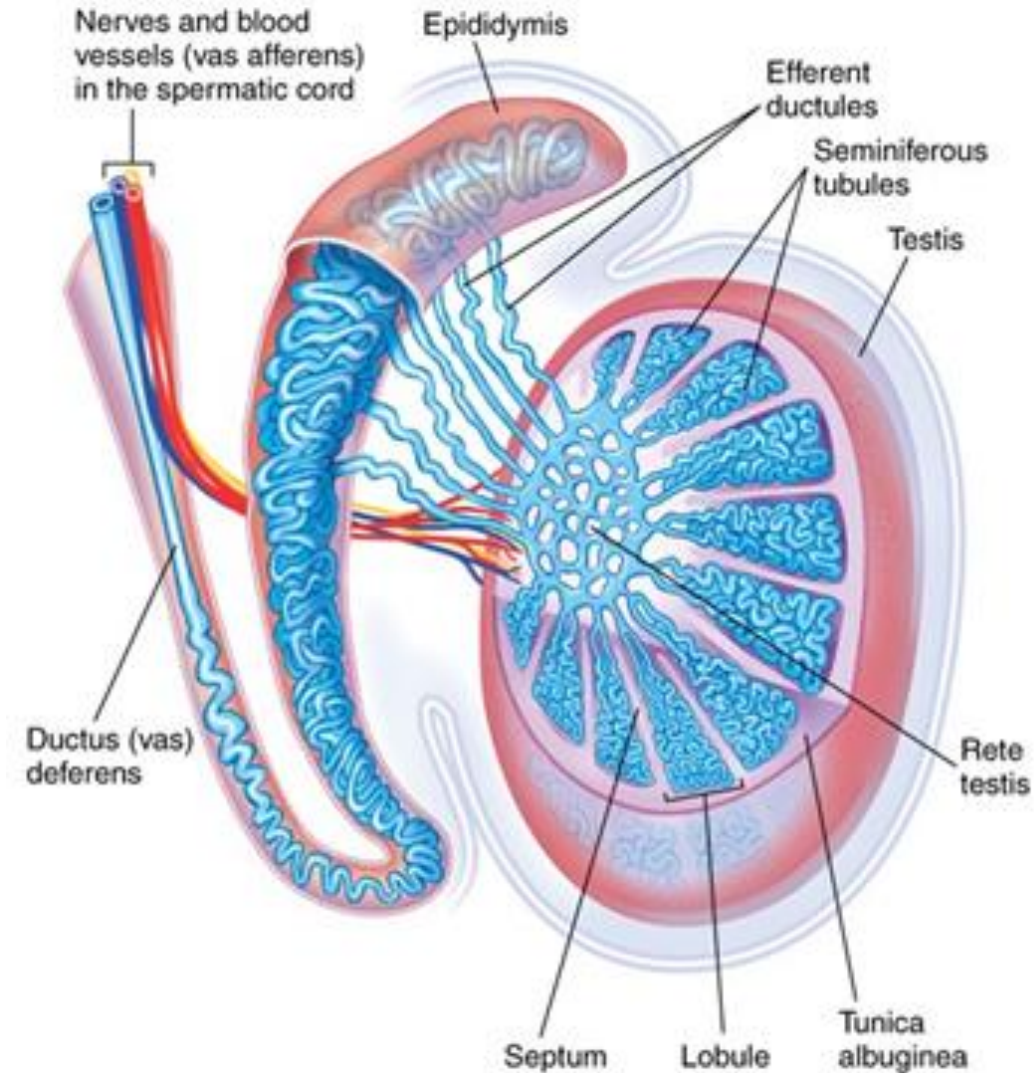


- Diamond shaped area between thighs
- Divided into two distinct regions
 - Urogenital triangle
 - Anal triangle

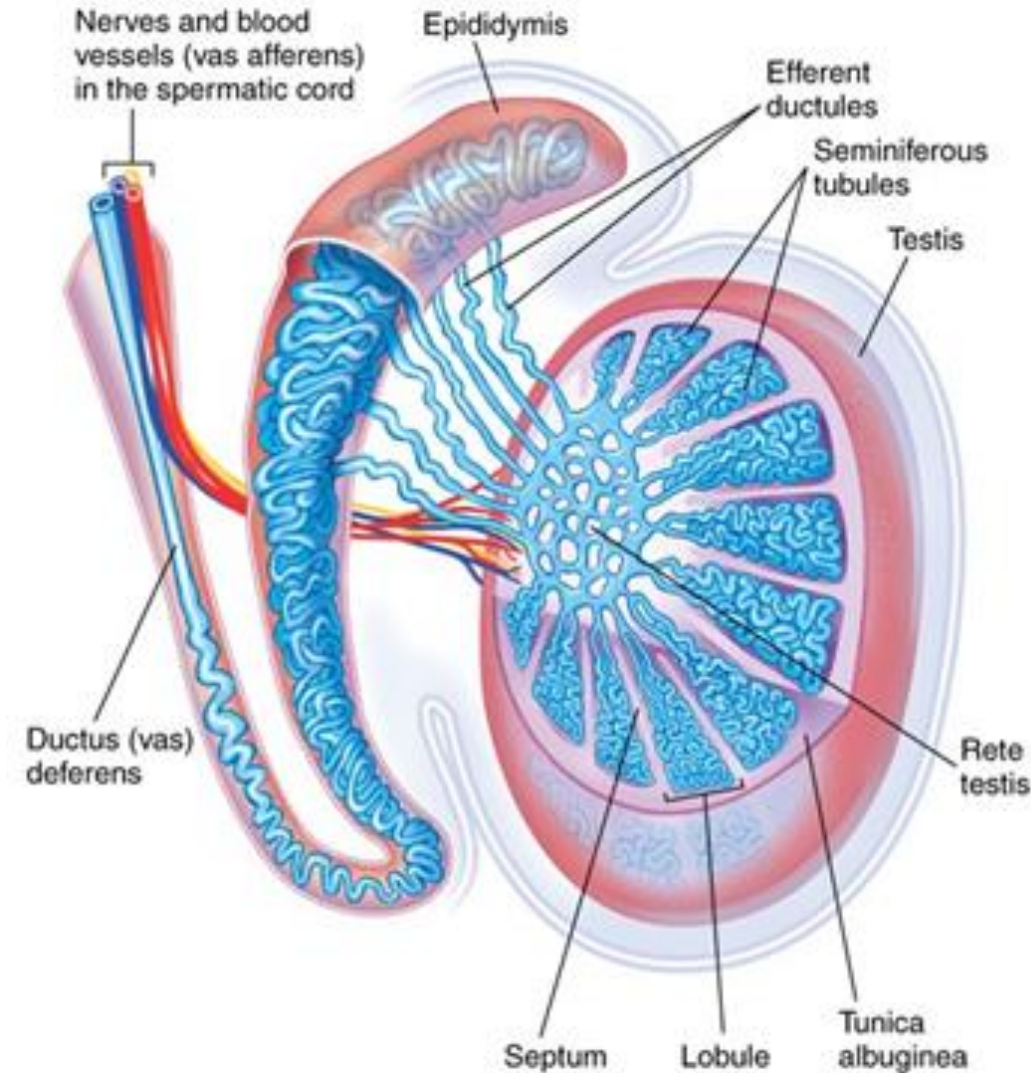


- Male gonads
 - Begin development high in abdominal cavity (near kidneys) and drop into scrotum 2 months before birth or shortly after
 - Scrotum maintains temp 3°C below body temp
 - Testes will be pulled closer to the body if cold or aroused
 - Location of sperm production (spermatogenesis)





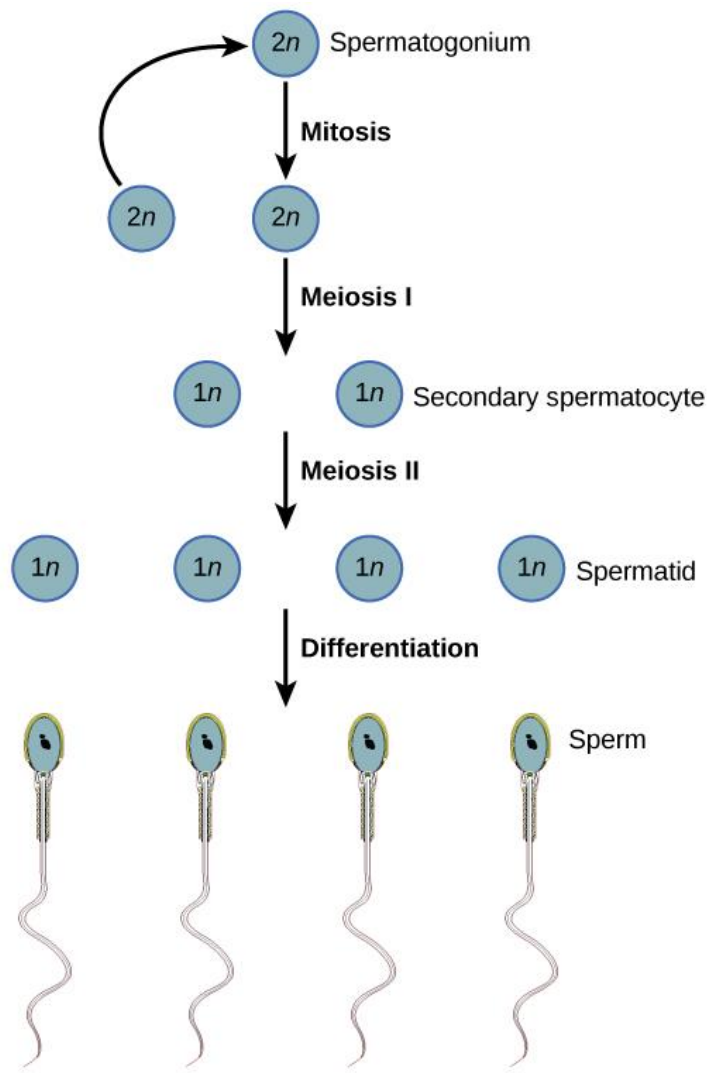
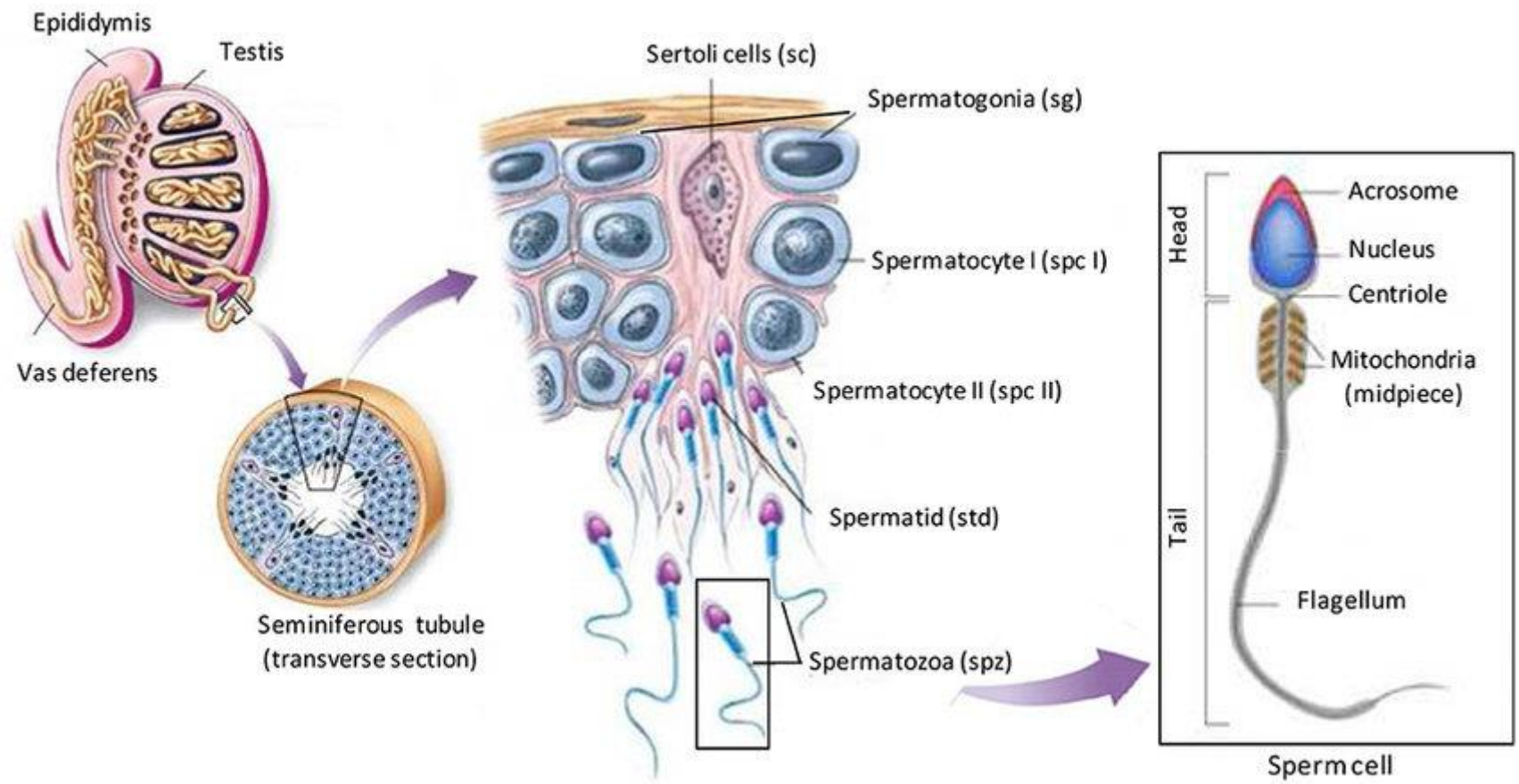
- Suspended in scrotal sac by scrotal tissue and spermatic cords
- Blood vessels (vas afferens) enter through spermatic cord
- Tunica albuginea encases testicle and enters the gland producing lobules
- Lobes contain seminiferous tubules and specialized interstitial cells (cells of Leydig)
 - Hormone producing

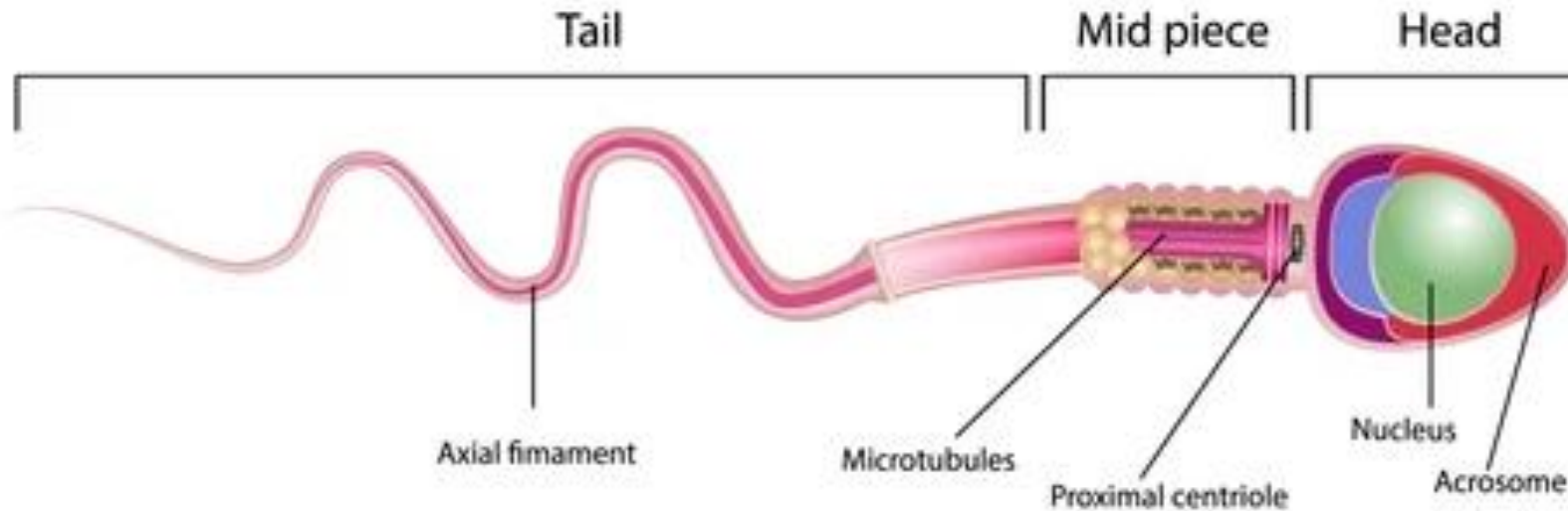


- Tubules form plexus (rete testis)
- Efferent ductules drain rete testis into epididymis
- Sertoli cells
 - Columnar shaped cells that extend from basement membrane to lumen surface of seminiferous tubule
 - Tight junction between cells forms blood-testis barrier

- Spermatogenesis
 - Seminiferous tubules produce the sperm
- Hormone secretion
 - Testosterone from interstitial cells
 - Promotes “maleness”
 - Stimulates protein anabolism (growth of muscles/bones)
 - Stimulates kidneys to retain Na and Water while excreting K
 - High levels of testosterone inhibit anterior pituitary gland from secreting FSH and LH
 - High levels of gonadotropins stimulate testosterone secretion
 - Think of impotency in anabolic steroid users

Spermatogenesis





Tail

(Locomotor region)

- Flagellum for motion

Mid-piece

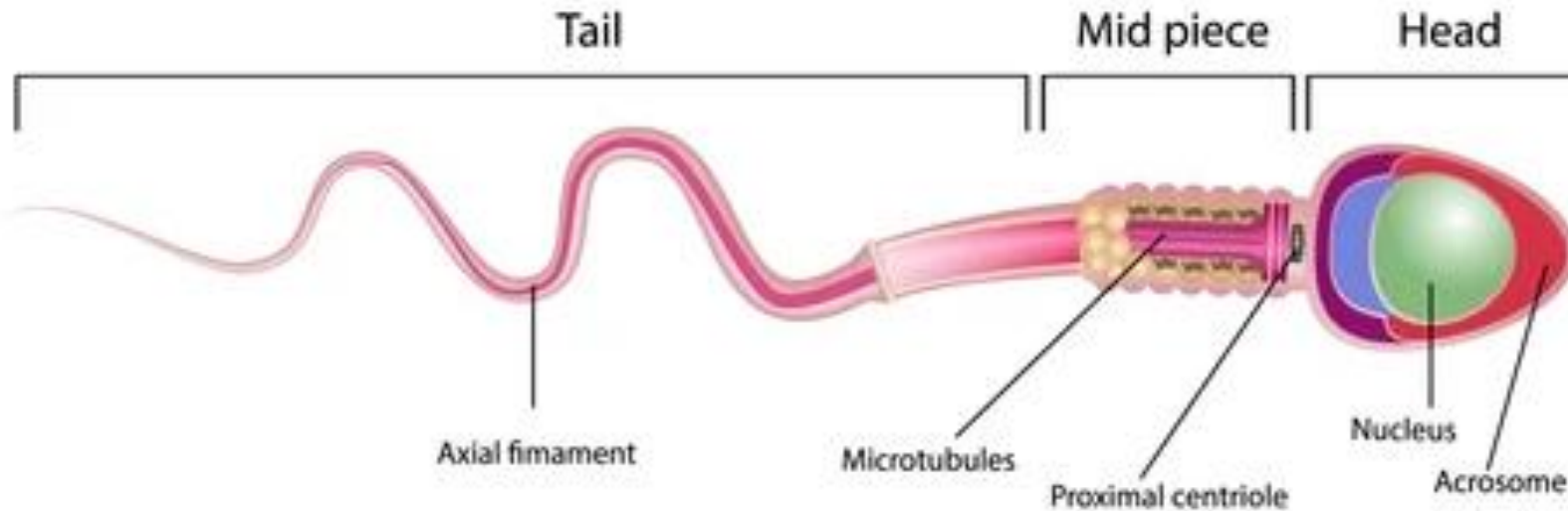
(Metabolic region)

- Contains mitochondria to produce ATP

Head

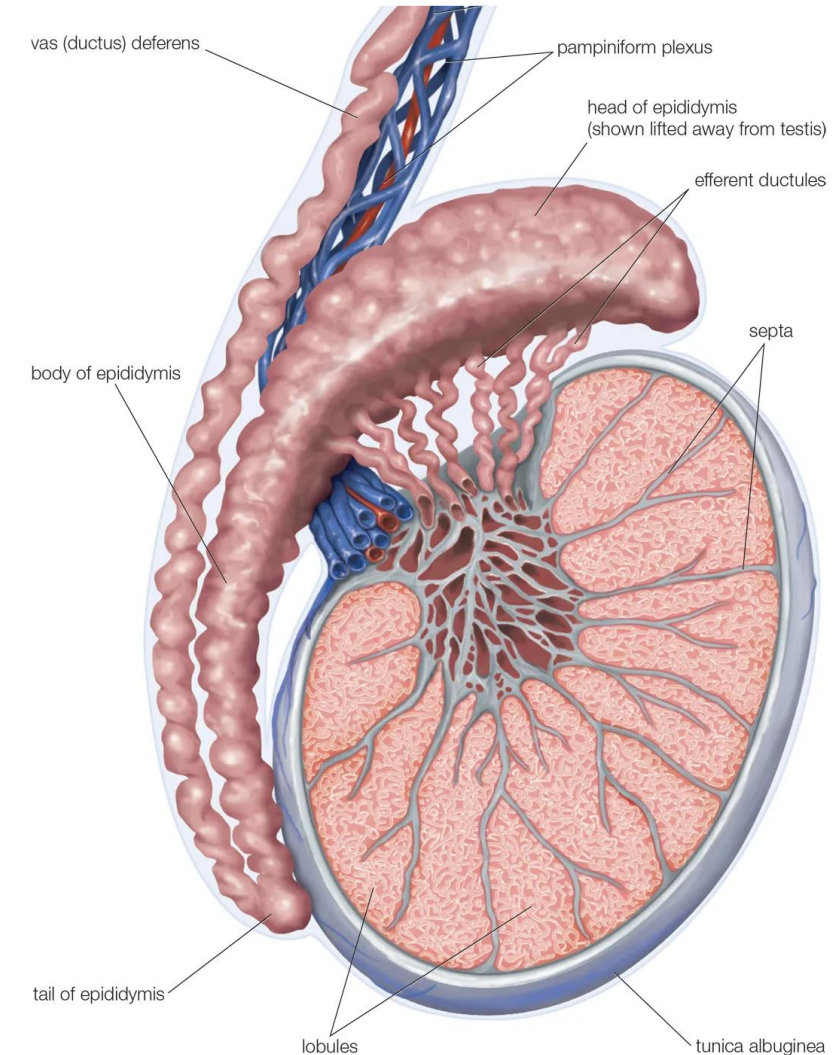
(Nuclear region)

- Contains 23 chromosomes
- Covered by acrosome (contain splitting enzymes to help penetrate to the egg and into it - capacitation)
 - Break down cervical mucus
 - Break down outer covering of egg



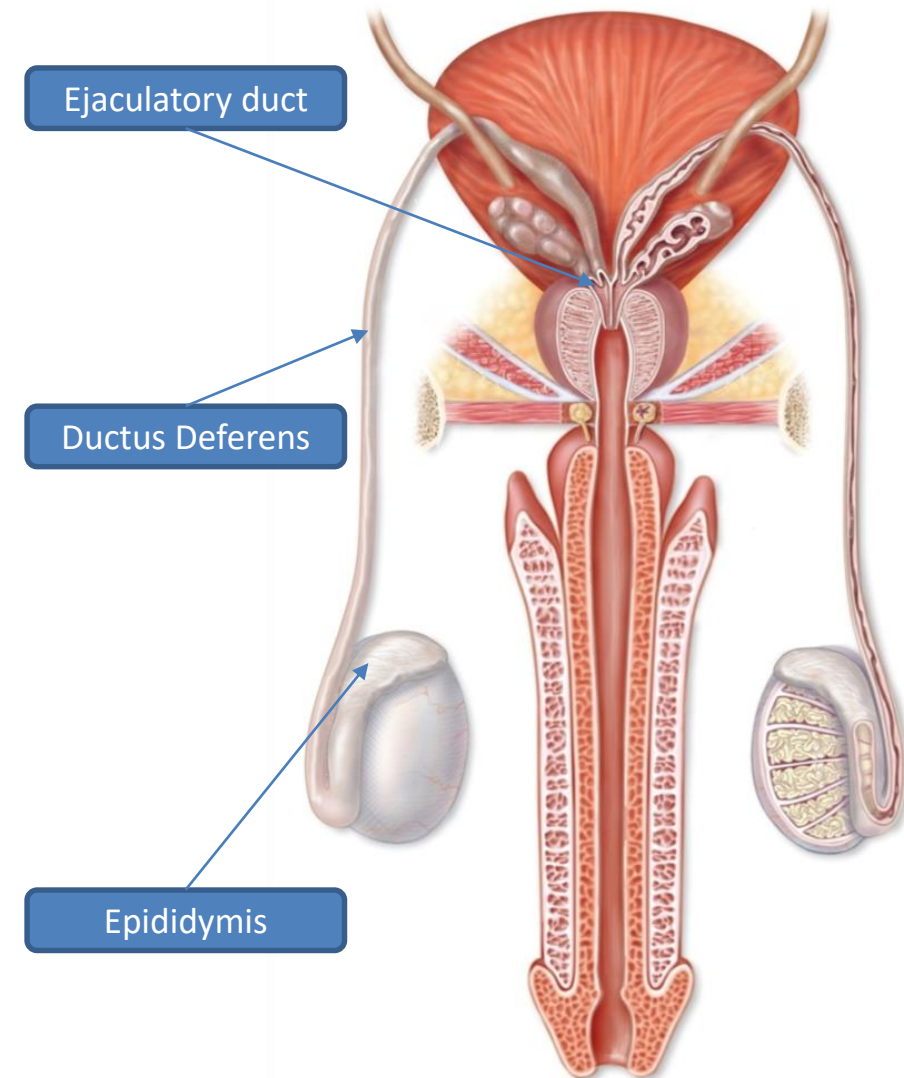
- Released from testes into epididymis for maturation
- Sperm production begins at puberty and continues through out life
- Production takes approximately 74 days
- Can live 48 hours in the female reproduction tract

- Single coiled tubule covered with a fibrous casing
- Can measure 20 feet in length
- Lies on top of and behind testis
 - Head
 - Attached to testis by efferent ductules
 - Body
 - Tail
 - Continuous with body and attaches to vas deferens

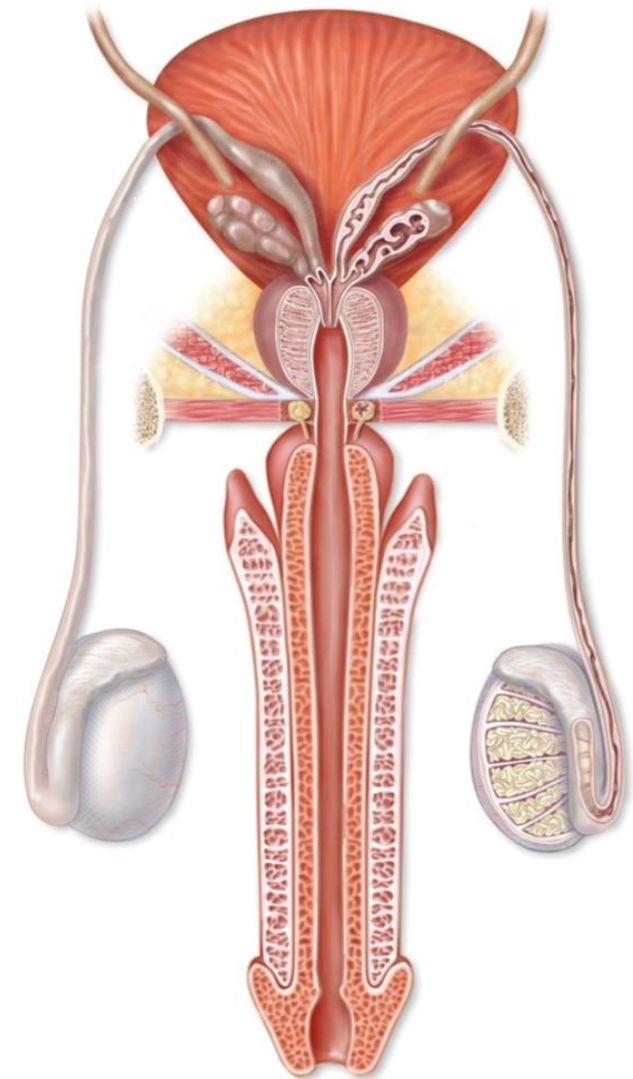


- Sperm passage
- Allows sperm cells to mature (spermatozoas will spend up to 3 weeks in this area)
- Introduces small amount seminal fluid (5%)

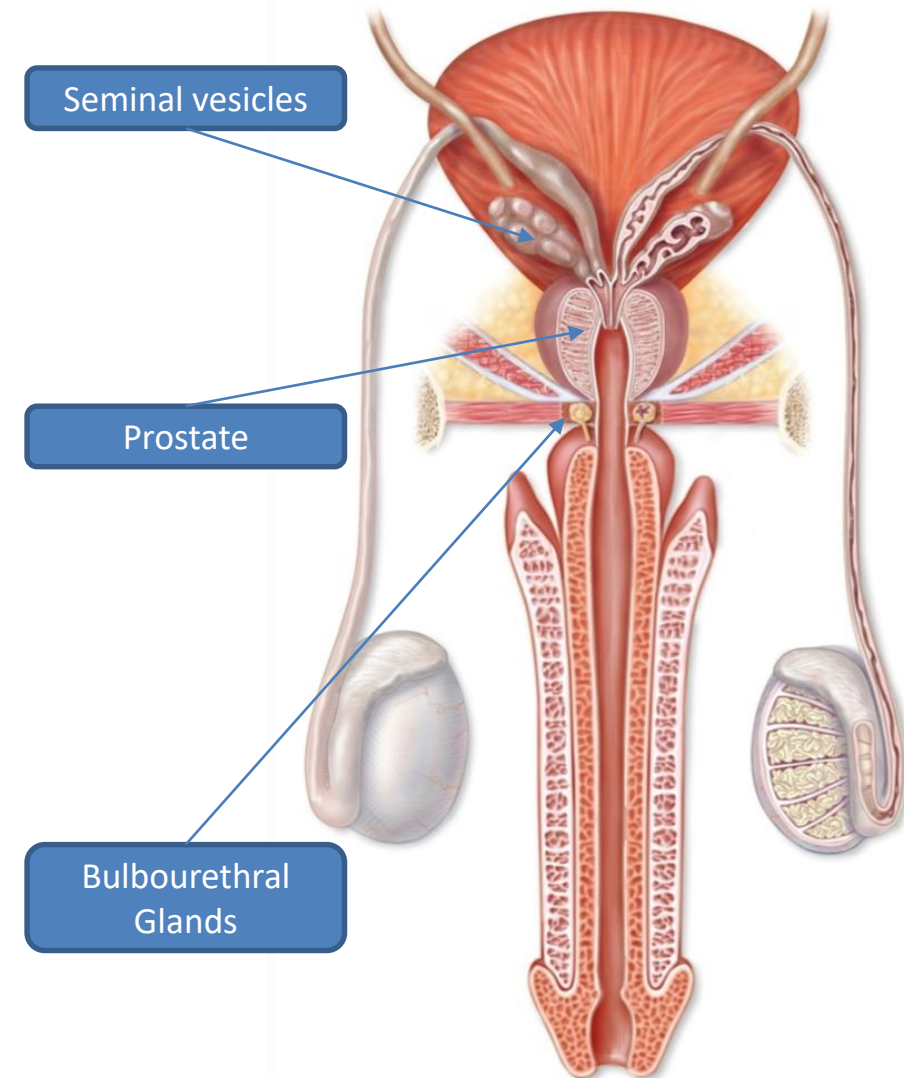
- Ejaculatory duct
 - Vas deferens join at the ampulla to form
 - Pass through the prostate and empties into urethra
- Ductus Deferens (vas deferens)
 - Continuous with the epididymis
 - Enlarge to form ampulla prior to prostate
 - Sperm are stored in the proximal portion of vas deferens and are propelled by peristaltic movement
- Epididymis



- Extends from bladder to external orifice
- Sphincter control keep urine out of urethra while sperm is being transported



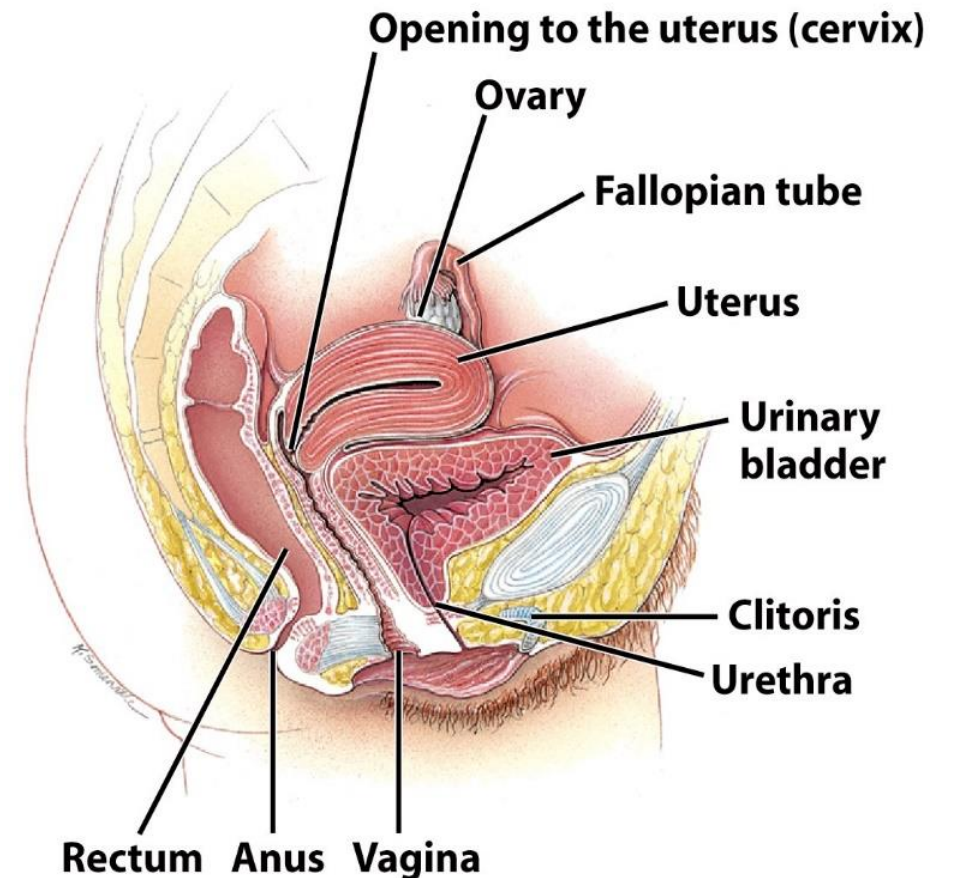
- Seminal vesicles
 - Provides a viscous fluid (containing fructose) to the ejaculate – 60%
 - Fructose provides energy for spermatozoa
- Prostate
 - Provide secretions to the ejaculate (milky alkalitic fluid) – 30%
- Bulbourethral Glands
 - During arousal secrete alkaline solution to neutralize urine – 5%
 - Also helps neutralize the vagina
 - Provides some lubrication



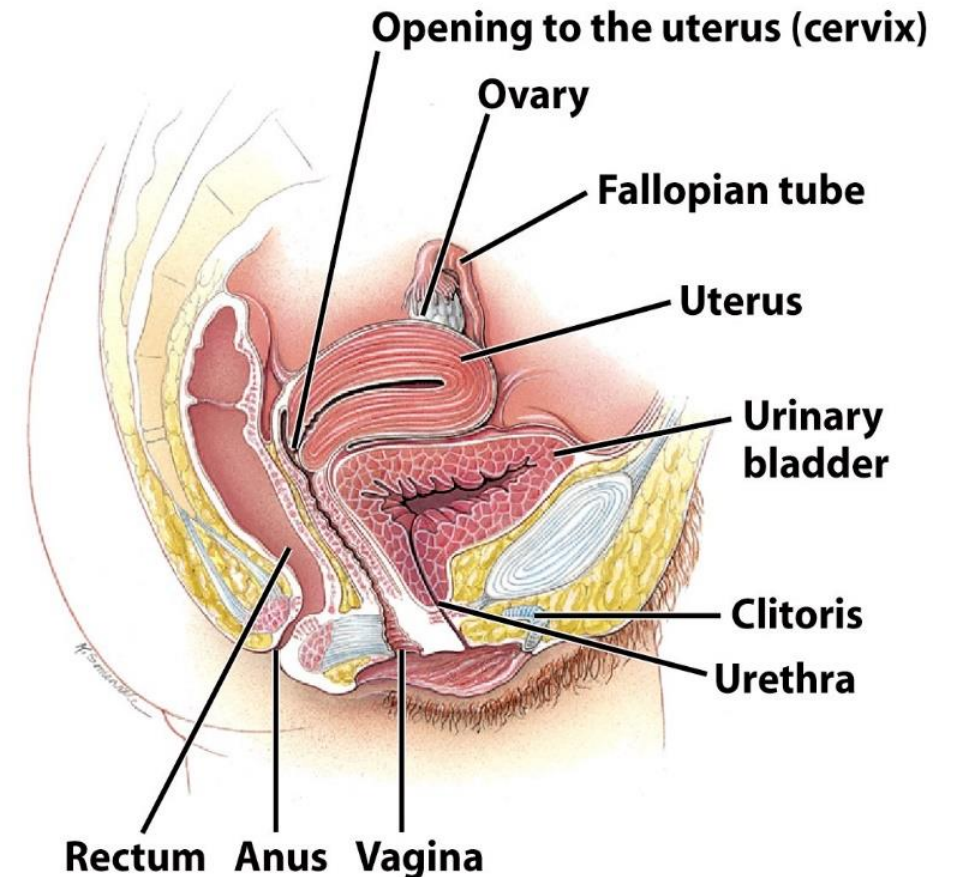
Reproductive Anatomy

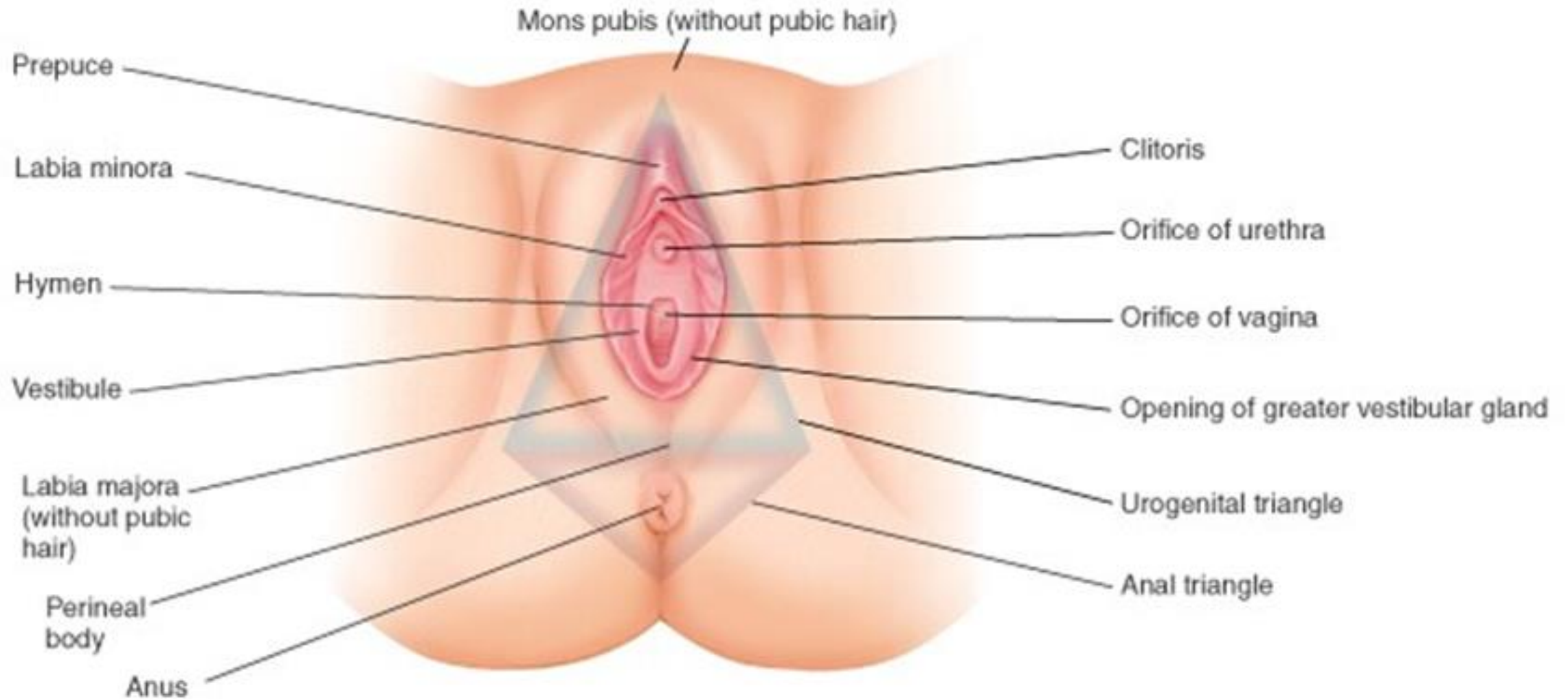
FEMALE

- The organs of the female reproductive system include the ovaries (female gonads)
 - The uterine tubes (fallopian tubes)
 - The uterus
 - The vagina
 - The external organs
 - collectively called the vulva

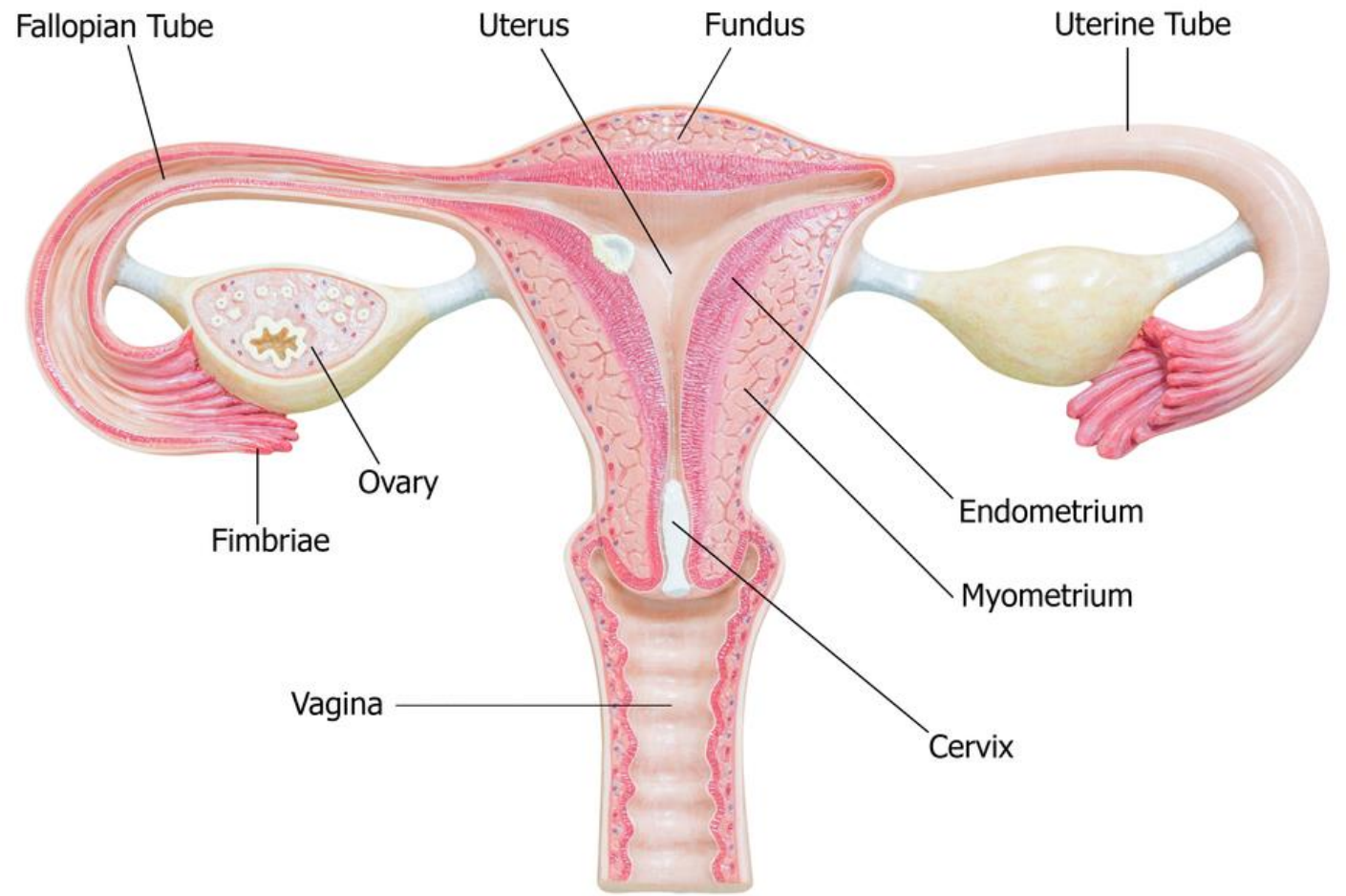


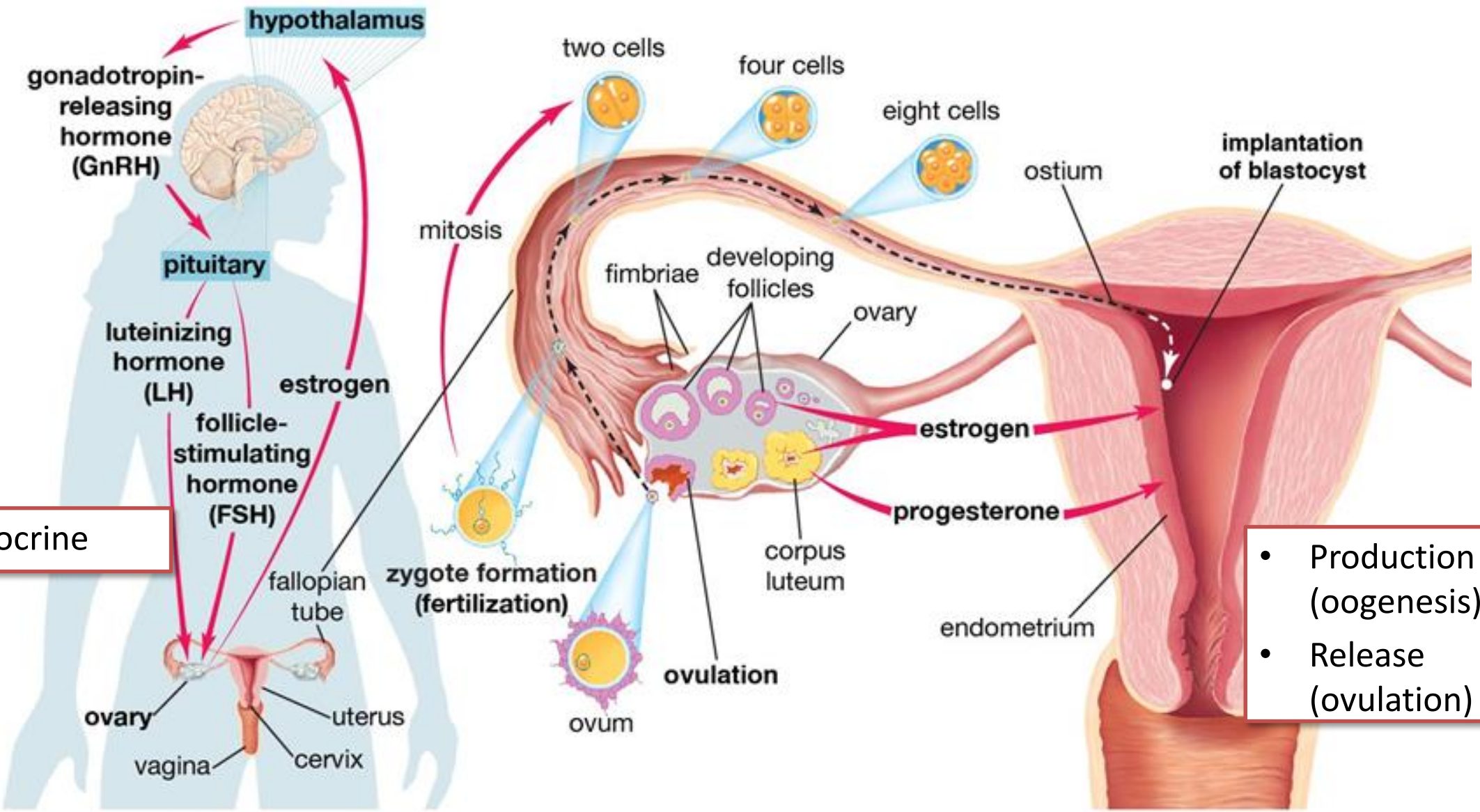
- Essential
 - Ovaries (gonads)
- Accessory
 - Ducts
 - Fallopian tubes
 - Uterus
 - Vagina
 - Vulva
 - Glands
 - Mammary





- Similar to the male testes
- Nodular glands
- Located on either side of uterus
- Attached to the uterus by the ovarian ligament

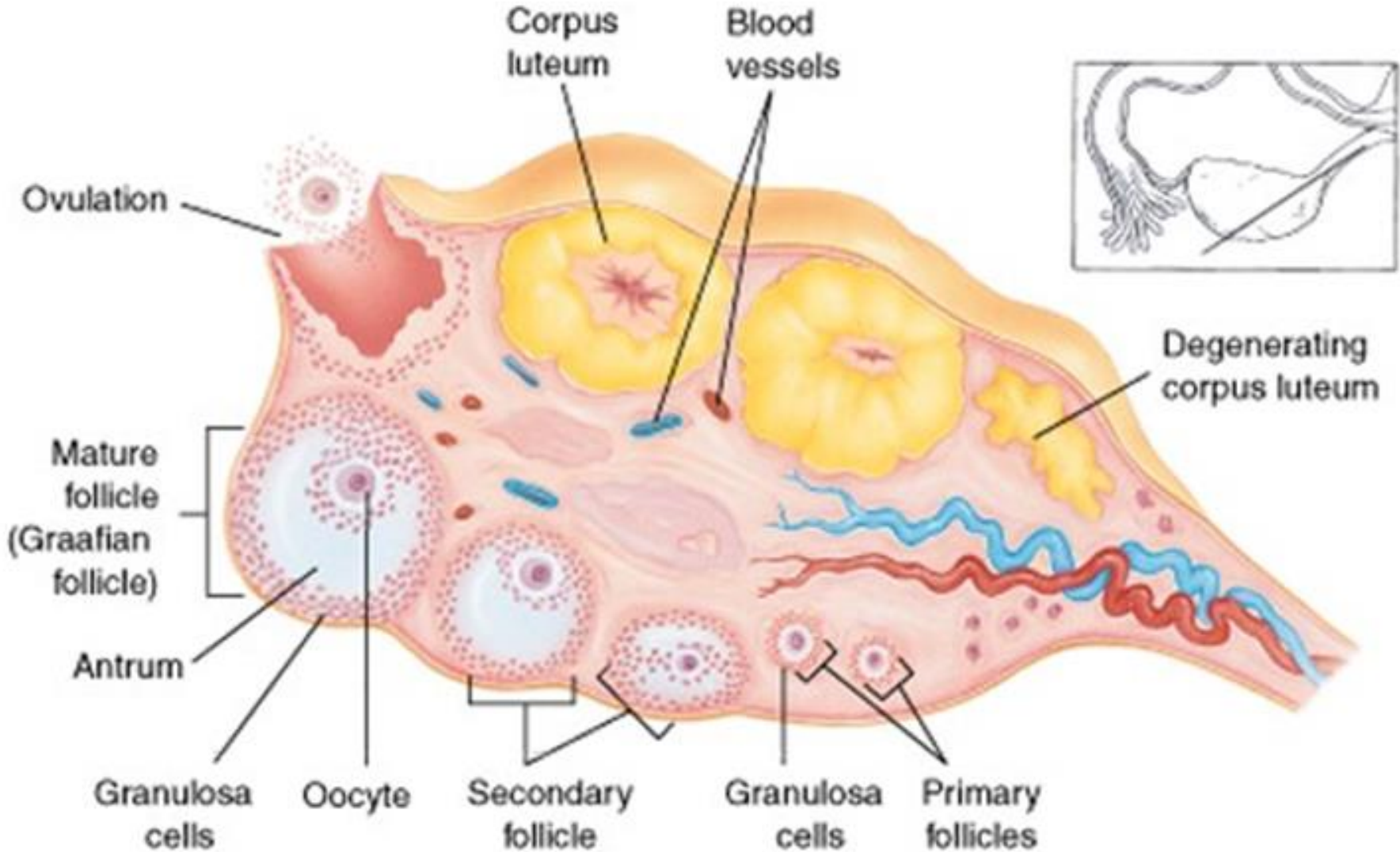




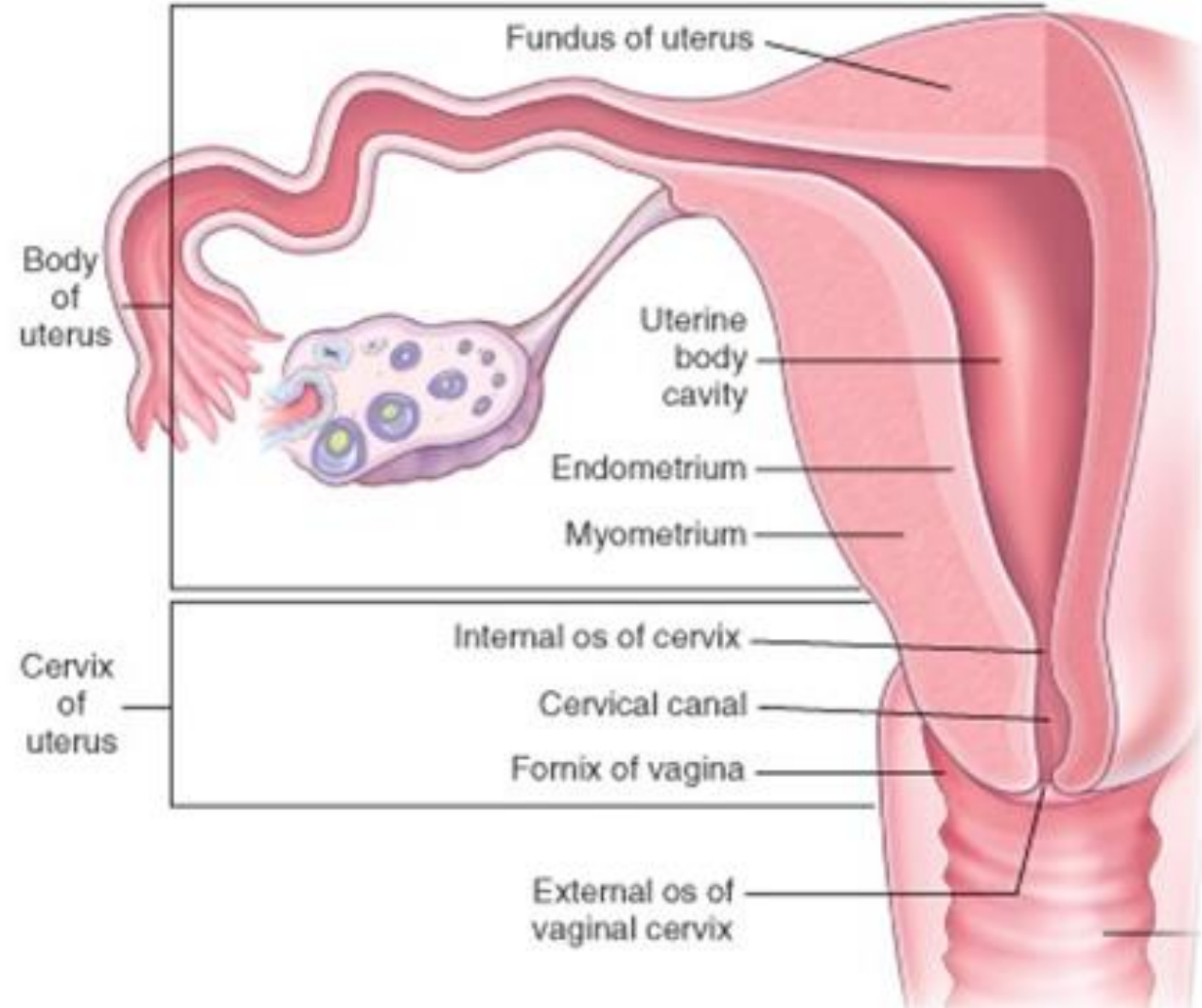
Endocrine

- Production (oogenesis)
- Release (ovulation)

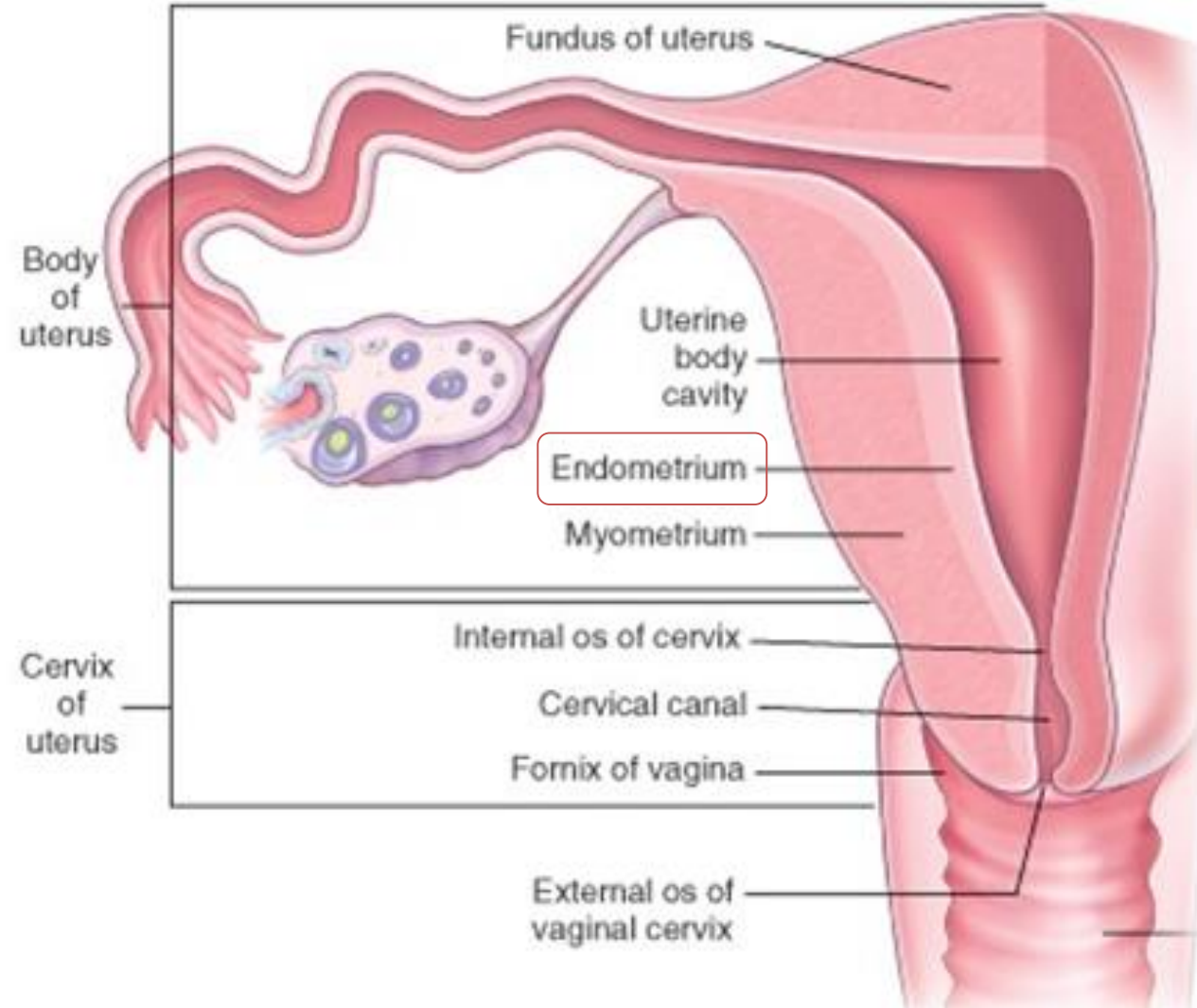
- Germinal epithelium (outer layer)
- Inner layer (epithelial cells and connective tissue)
- Ovarian follicles
 - Found in the connective tissue matrix
- Oocytes are produced before birth
 - Both ovaries contain approx 700,000 but declines to approx 400,000 by puberty
- Remain dormant until puberty where FSH influences some to begin meiosis and forms a blister on the ovary
- When blister breaks and releases oocyte
- Oocyte is released into the peritoneal cavity



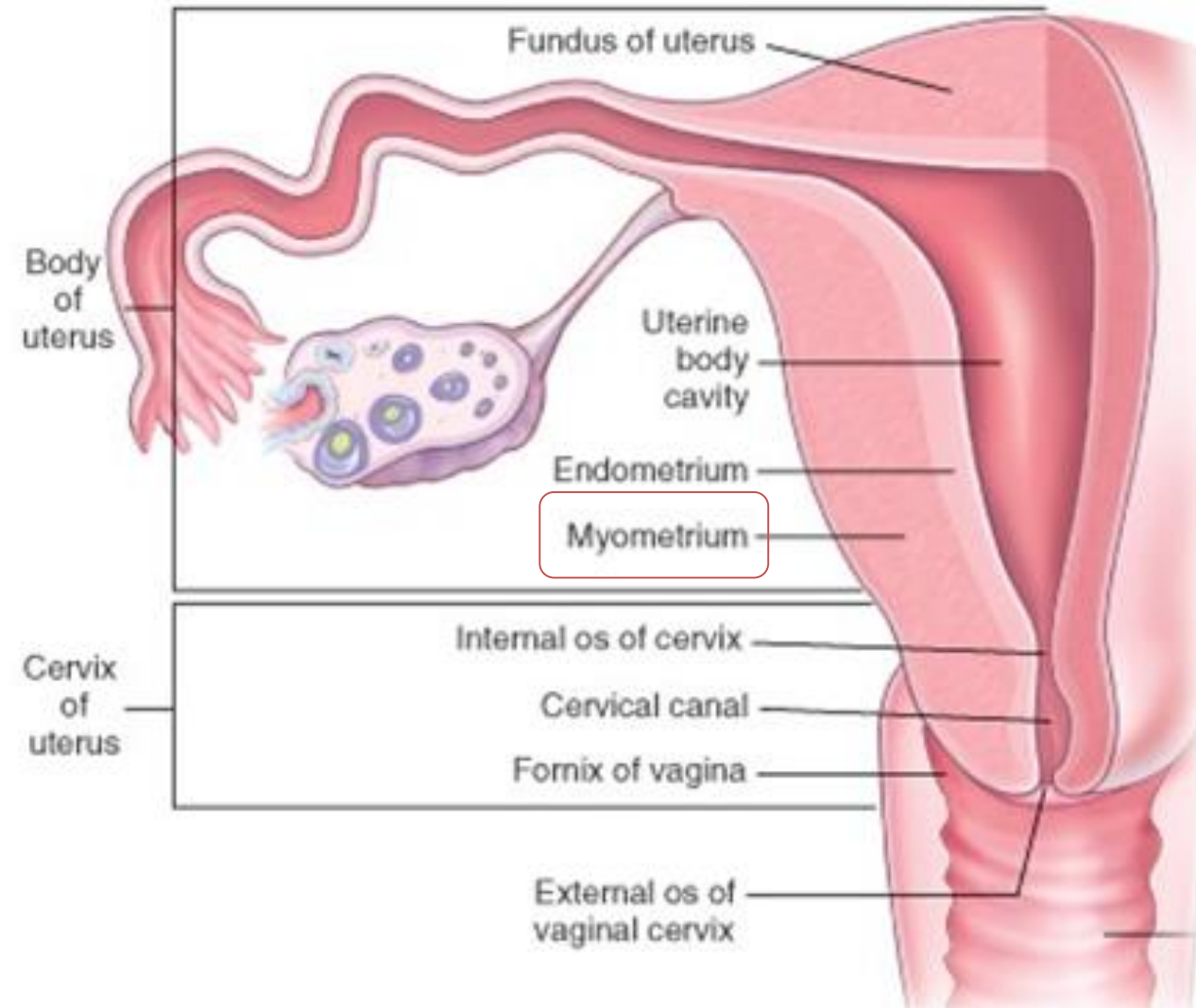
- Size and shape of a pear
- Fundus
- Body
- Cervix
 - Internal Os
 - External Os (hymen)



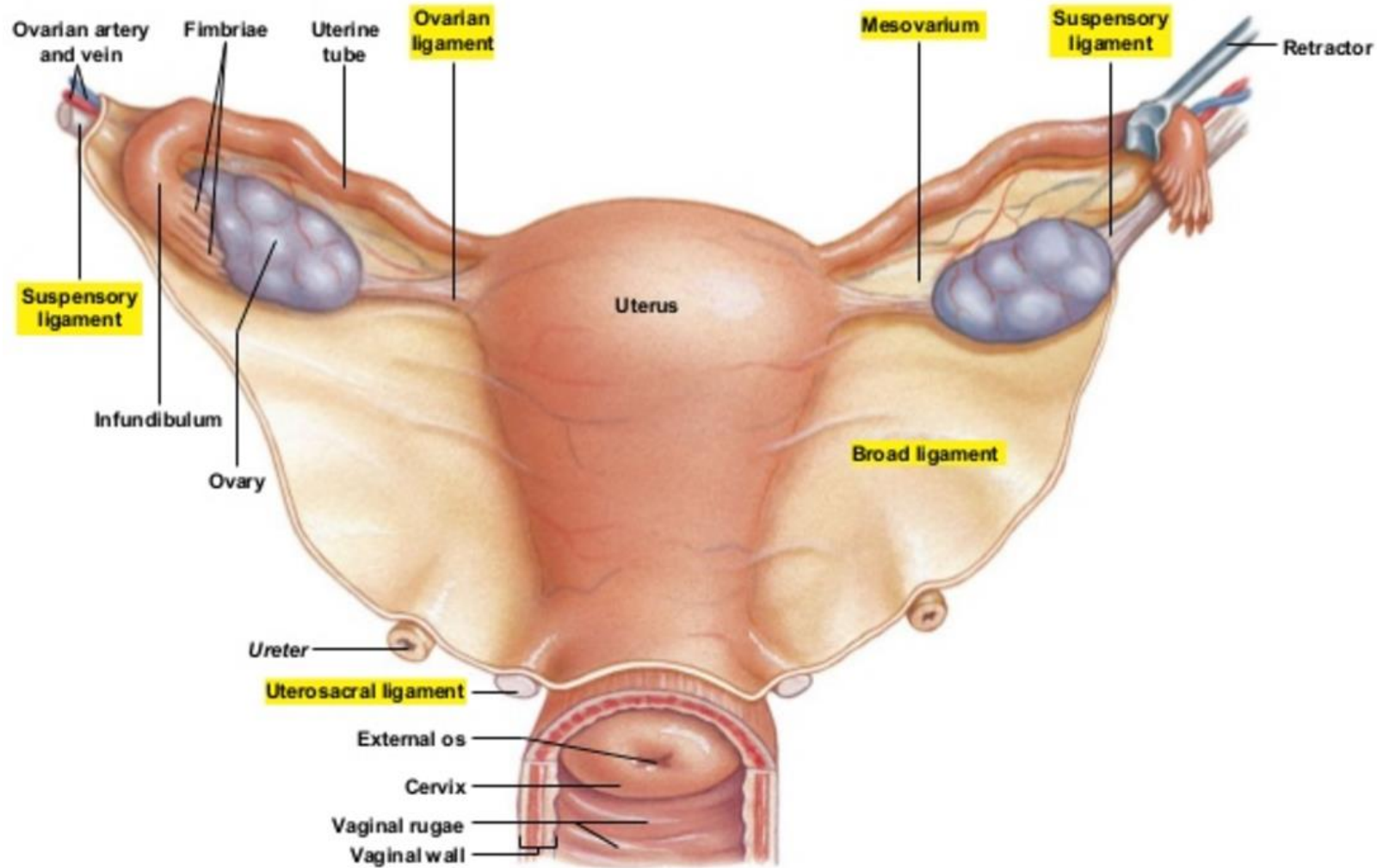
- Endometrium
 - Mucous membrane
 - Has many exocrine glands that produce mucous
 - Rich in capillaries



- Myometrium
 - 3 layers of smooth muscle
 - Thickest in the fundus
 - Helps propel baby during delivery
 - Thinnest in the cervix
 - Allows for dilation

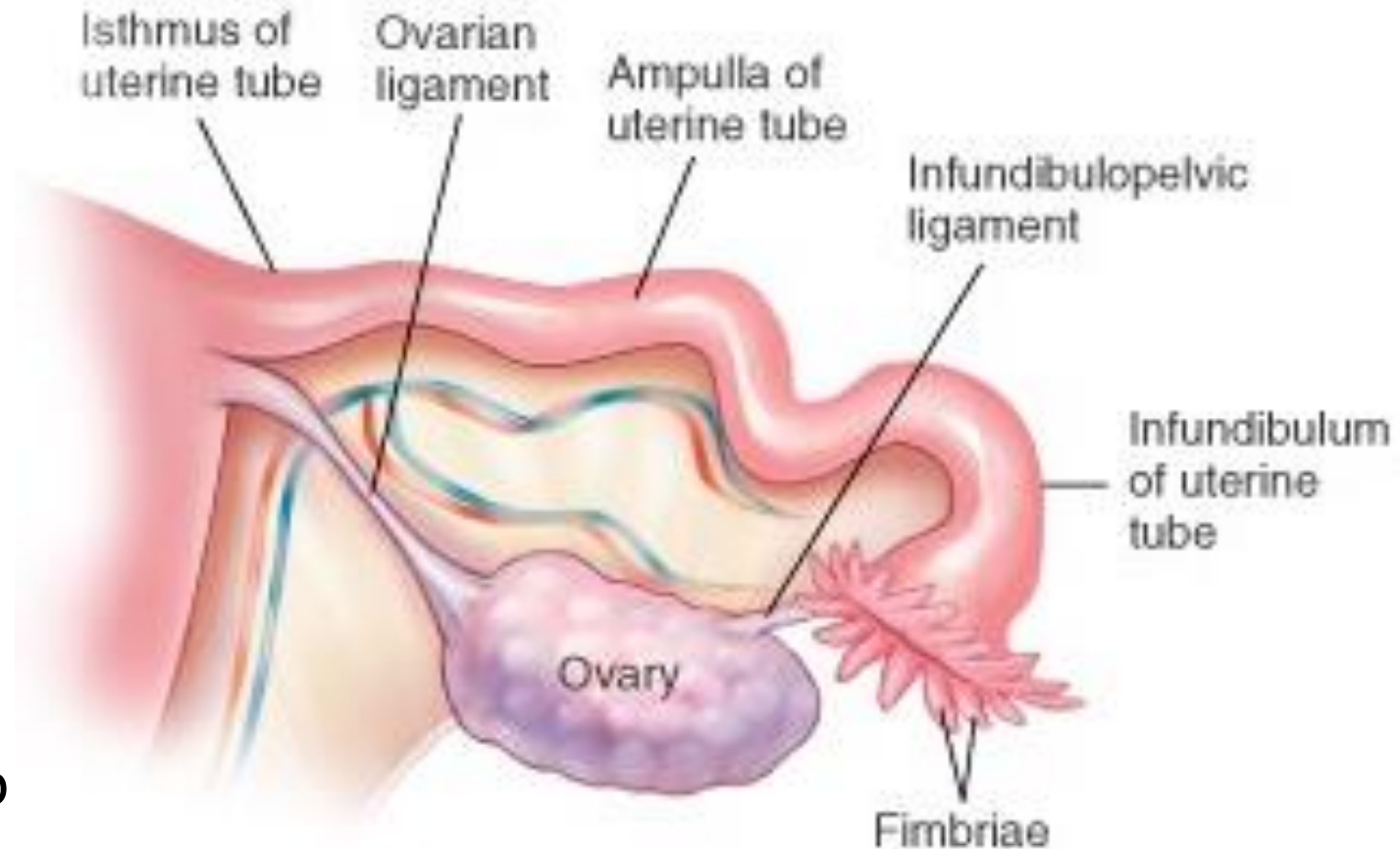


- Parietal peritoneum
 - Incomplete covering
 - Covers only part of the body (all except the lower ¼ of anterior surface)
 - Does not cover the cervix

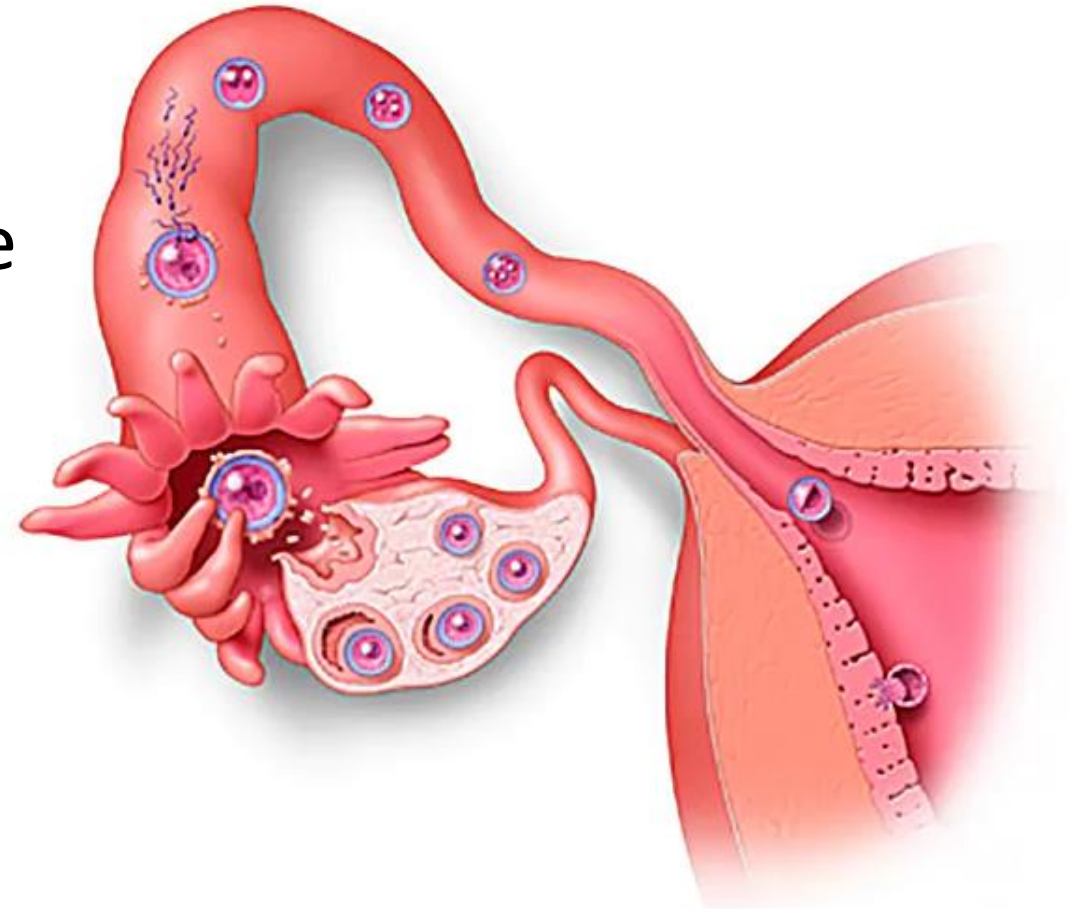


- Part of the reproductive tract
- Facilitate growth of ova
 - Fertilized ova implant in the lining of the endometrium
 - Produce nutrient secretions to sustain ova until placenta is developed

- AKA fallopian tubes or oviducts
 - Composed of same layers as uterus
- 3 Regions
 - Isthmus
 - Ampulla
 - Infundibulum
- Fimbriae
 - Are not directly connected to the ovaries

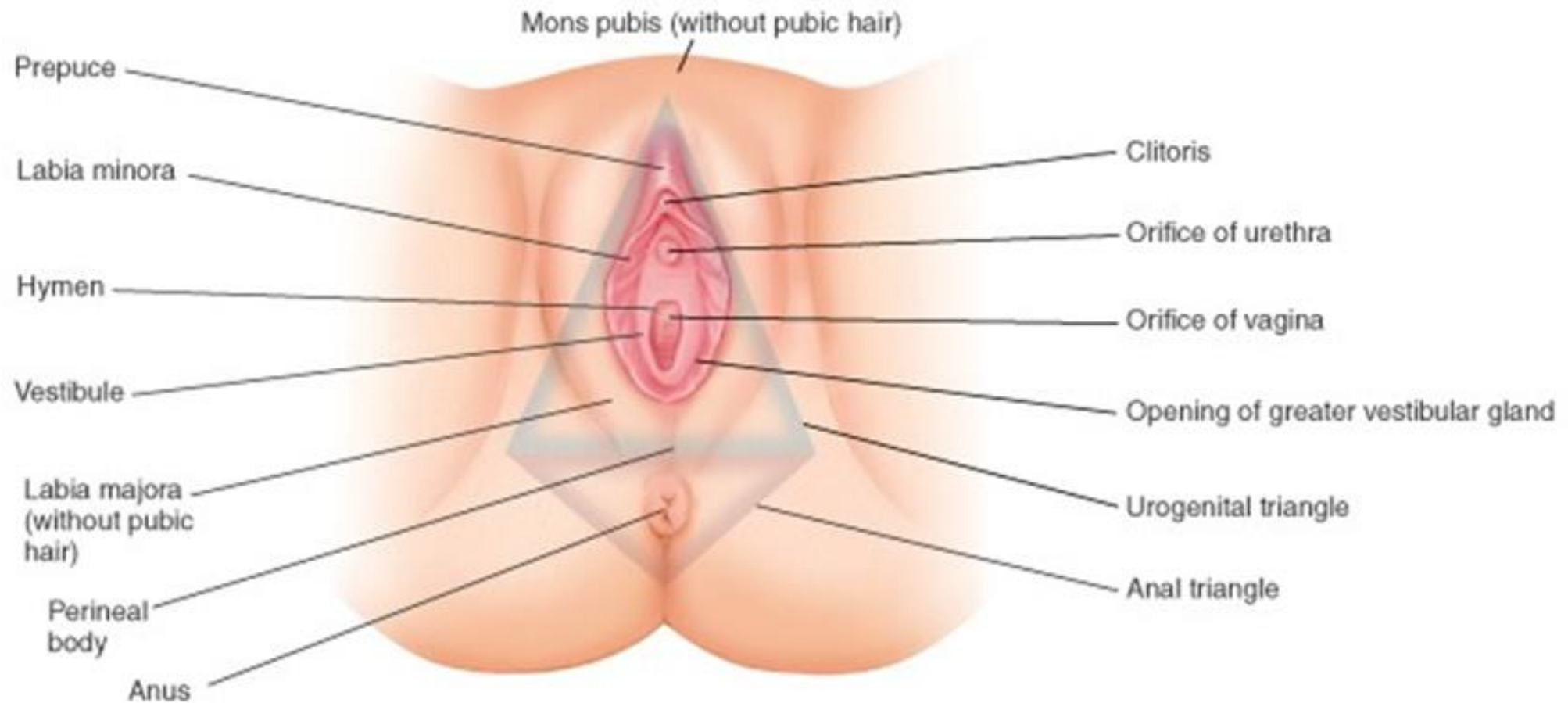


- Once the oocyte enters the oviducts, they are propelled by cilia and by peristaltic motion
- This takes 7 days to travel the tube
- Fertilization usually takes place here

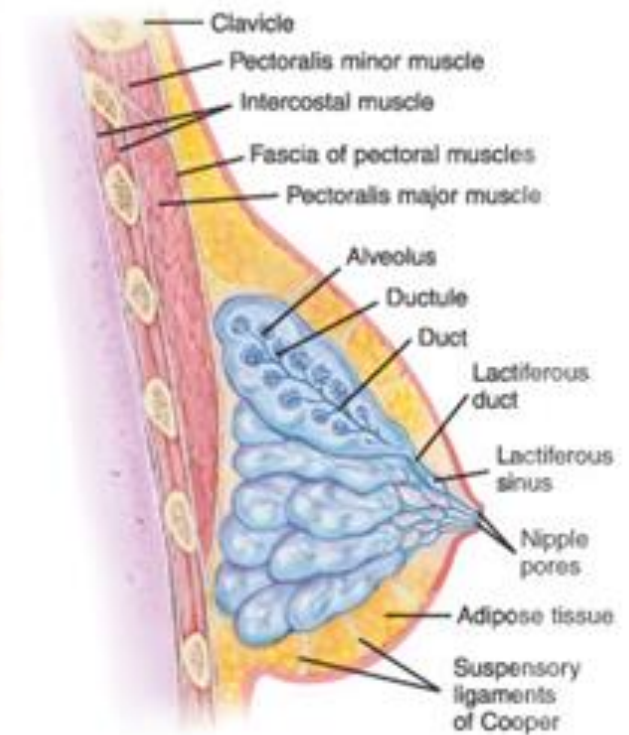
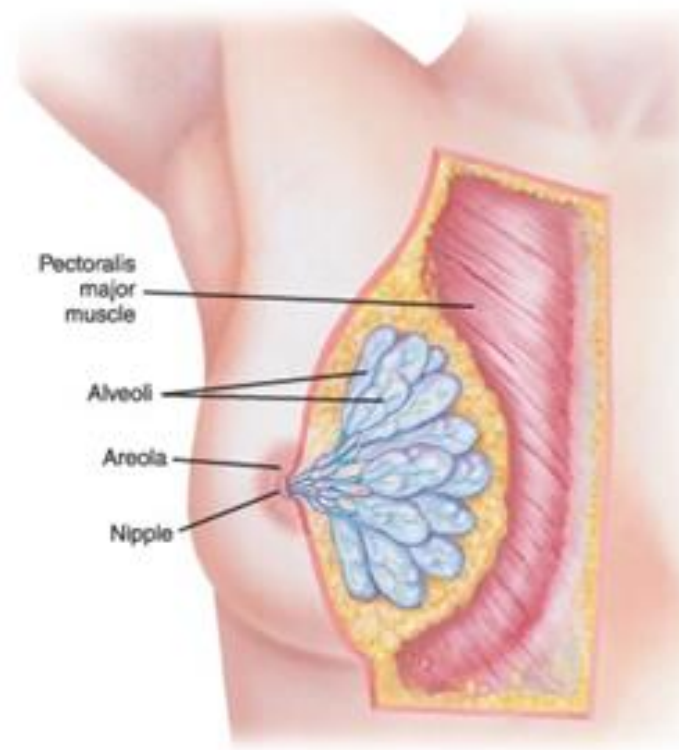


- Collapsible tube
- Mostly smooth muscle with mucous membranes arranged in rugae
 - Exocrine glands secreting lubrication

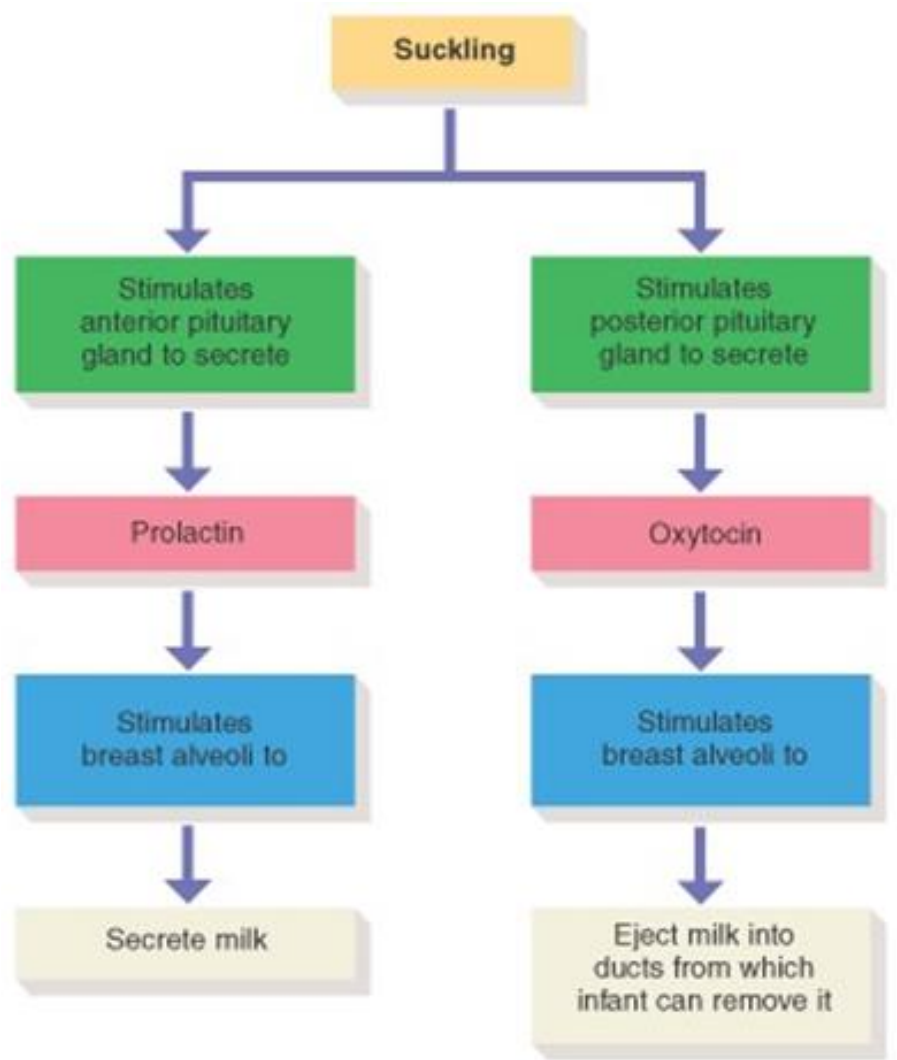
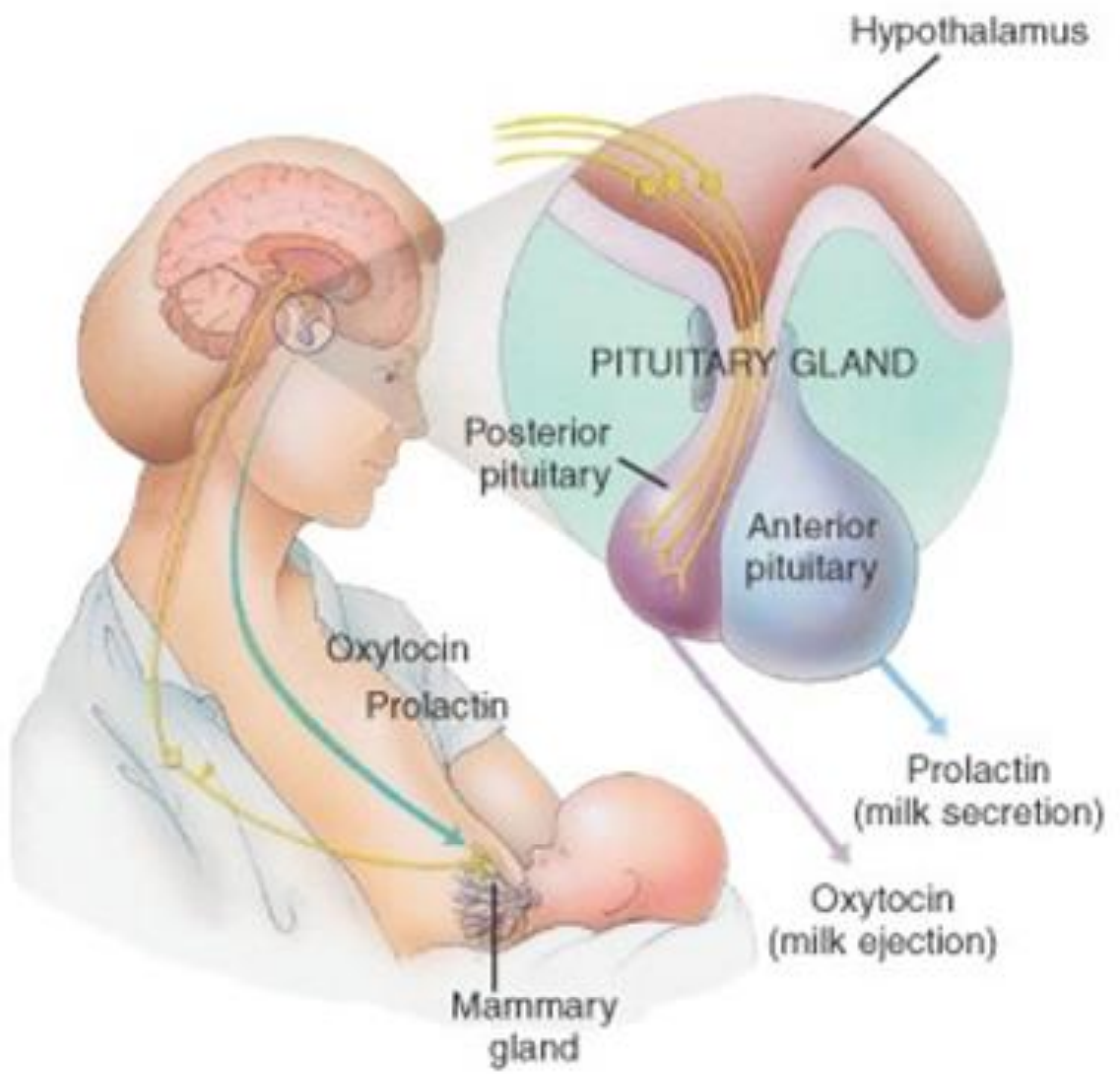
- External structures



- Organs of milk production
- A single lactiferous duct divides to form smaller ducts
 - Forms secretion sacs (alveoli) that secrete milk during nursing

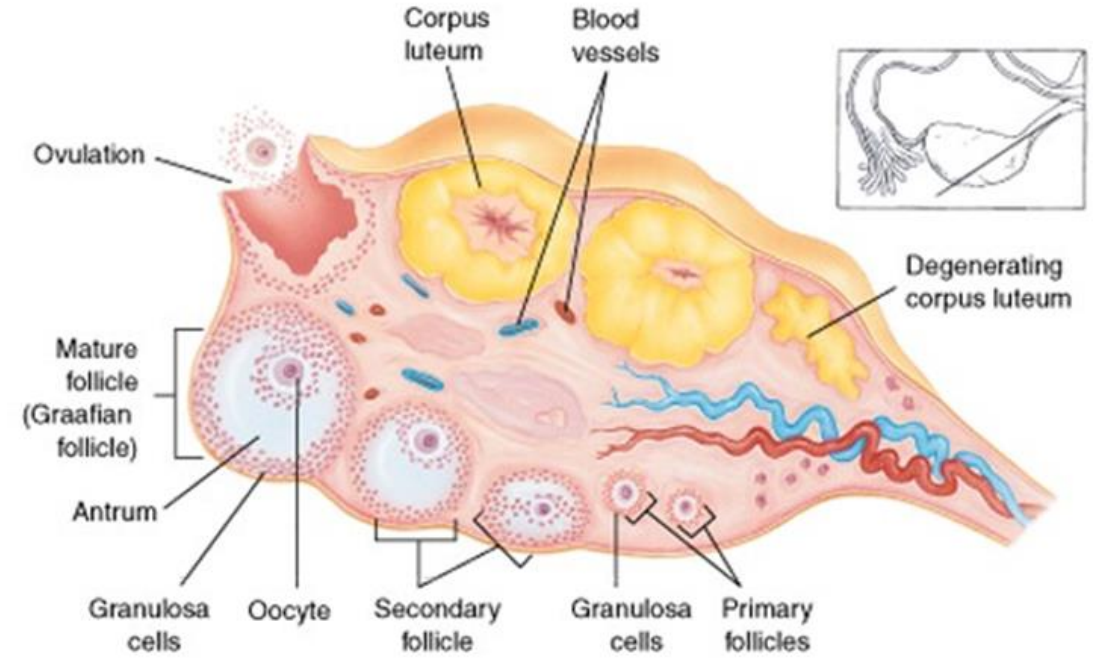


- Estrogen and progesterone provide structural development
 - Estrogen develop ducts
 - Progesterone acts on cells ‘primed’ by estrogen to promote completion of ducts and development of alveoli
 - High levels of estrogen inhibit prolactin secretion
- Shedding of placenta after delivery sharply decreases estrogen levels
 - Stimulates anterior pituitary to secrete prolactin
 - Suckling aids in stimulation as well as the post pituitary to release oxytocin

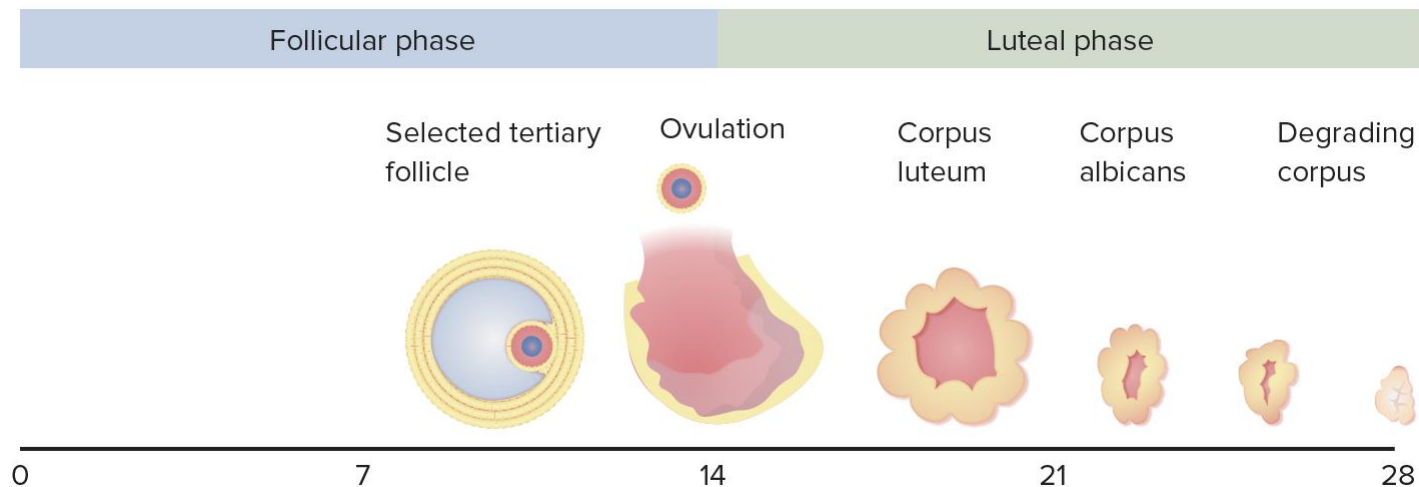


- Recurrent cycles from onset of menses to menopause
 - Ovarian cycle
 - Endometrial (menstrual) cycle
 - Myometrial cycle
 - Gonadotropic cycle

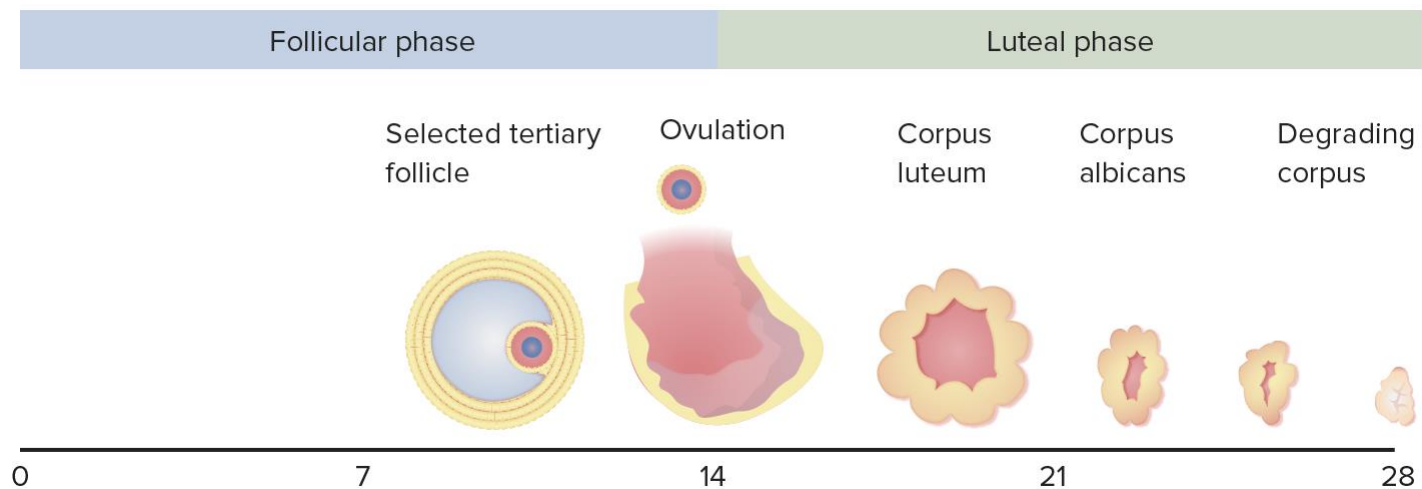
- Reflects changes in the ovaries
 - Ovarian tissue begin meiosis decreasing # of chromosomes in daughter cells to ½ producing primary follicles with an oocyte suspended in development



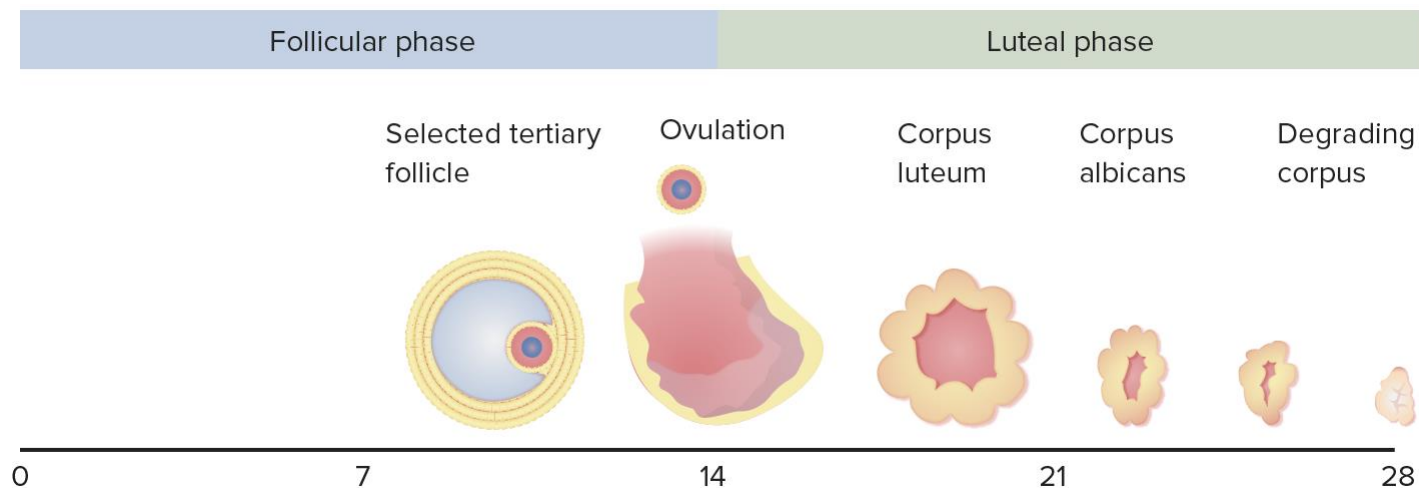
- Once per month (around first day of menstruation)
 - Primary follicle resumes development
 - Follicular cells surrounding it secrete estrogens and small amount of progesterone
 - Maturing follicle moves to outer surface
 - Meiosis again halts prior to ovulation



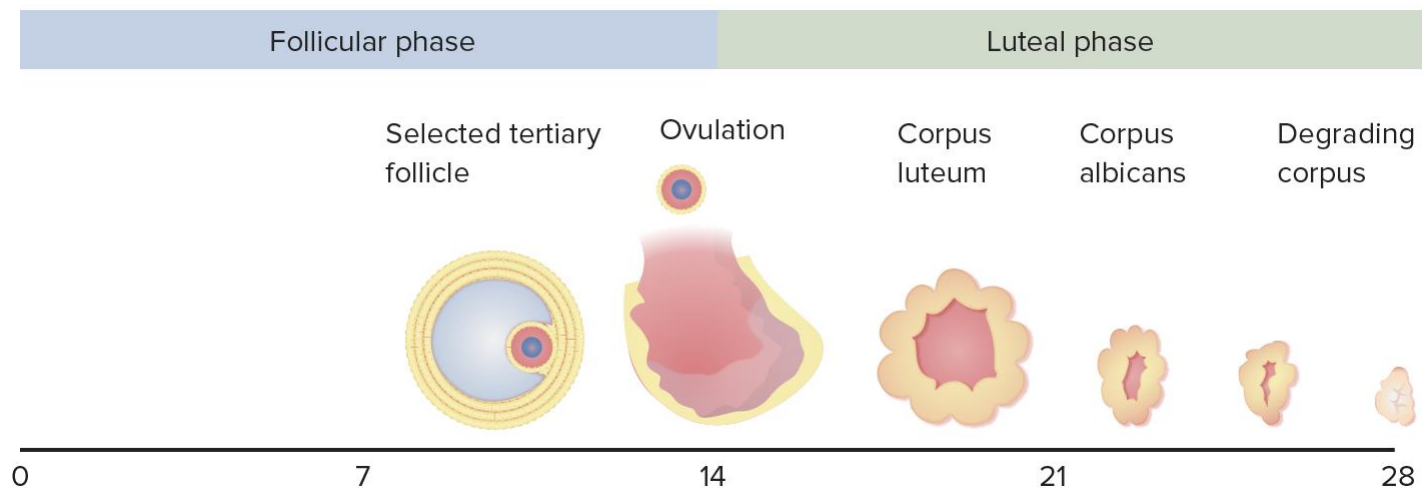
- Ovulation occurs 14 days prior to next menstrual cycle



- After ovulation cells of ruptured follicle enlarge and are transform into corpus luteum
 - This continues to grow for 7 – 8 days
 - Will secrete progesterone in increasing amounts (diminishes if fertilization does not occur)

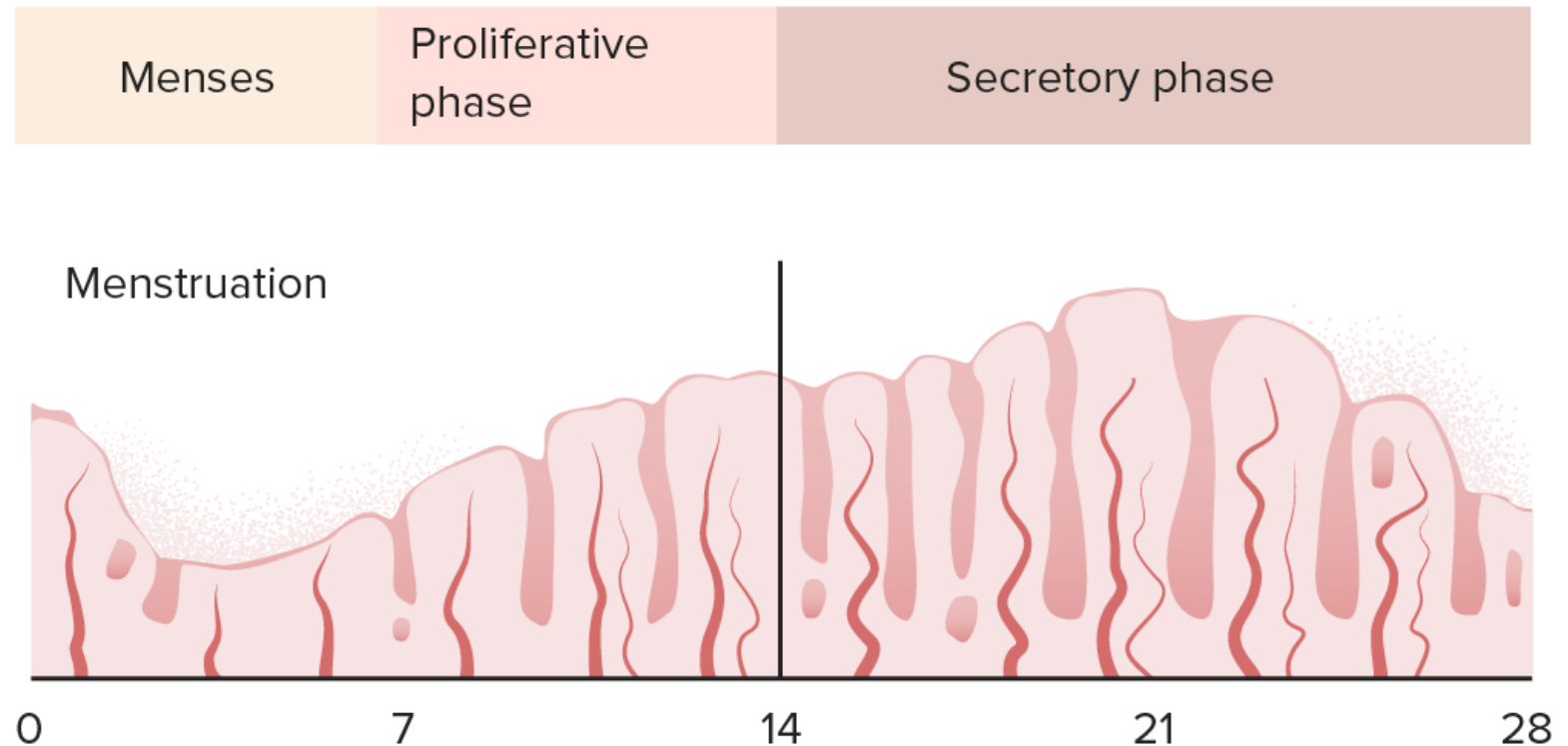


- Nonfunctional corpus luteum are reduced to scar tissue (corpus albicans)
 - Moves into central portion of ovary
 - Eventually disappears



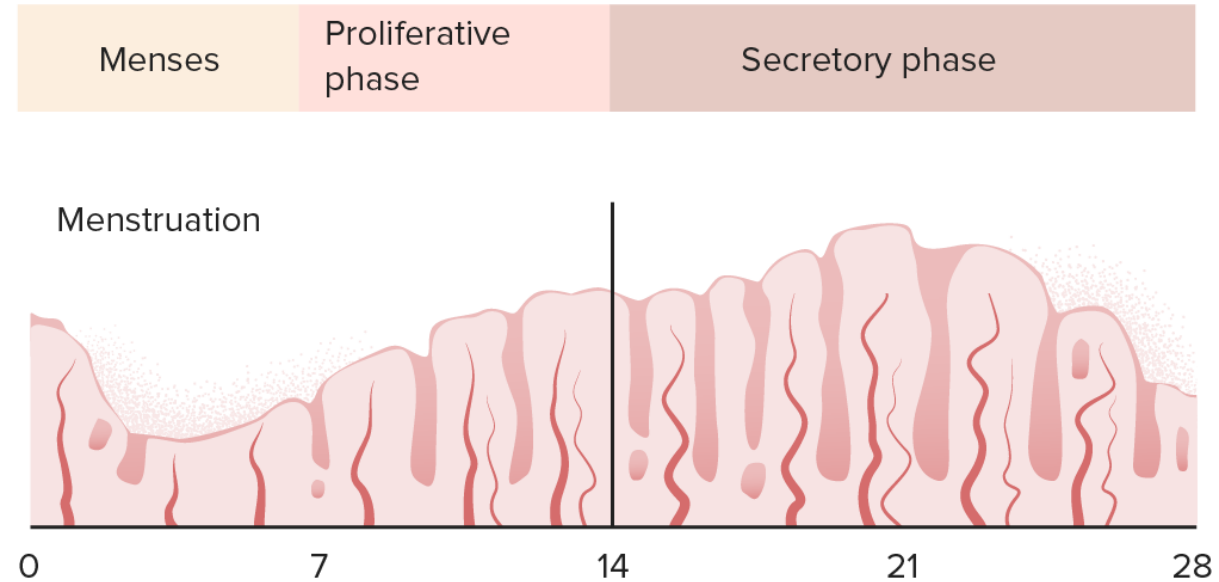
Uterine (Menstrual) Cycle

- Reflects changes in the endometrium
- Phases
 - Menses
 - Proliferative
 - Secretory
 - Premenstrual



Uterine (Menstrual) Cycle

- Menses
 - Occurs on days 1 – 5 of new cycle



- Proliferative (Postmenstrual)

- Occurs between of menses and ovulation

- Cycle days 6 to 13 or 14

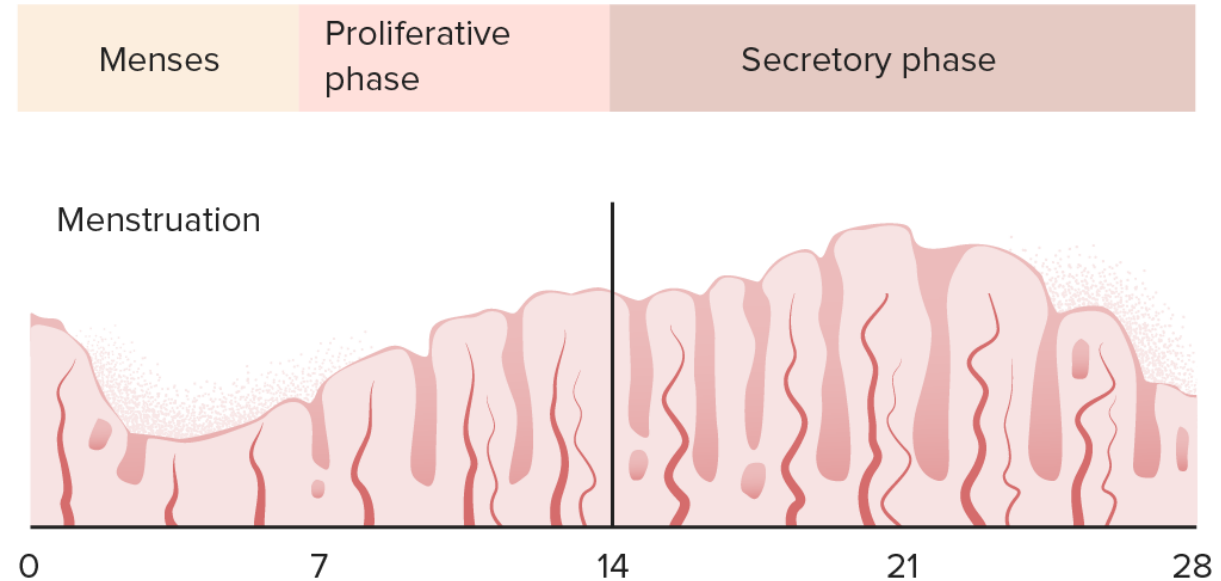
- Estrogen stimulates repair of endometrium

- Also known as preovulatory stage or follicular phase

- FSH release (and some LH) stimulates growth of ovarian follicles

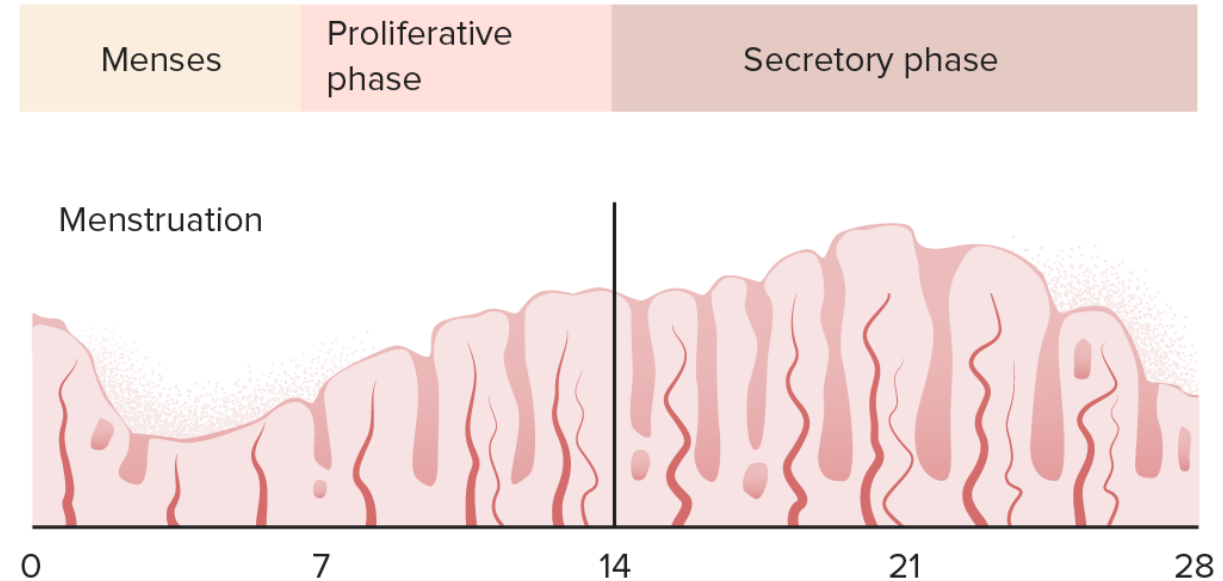
- Estrogen levels increase (released from follicle)

- Causes appearance, consistency and amount of cervical mucous

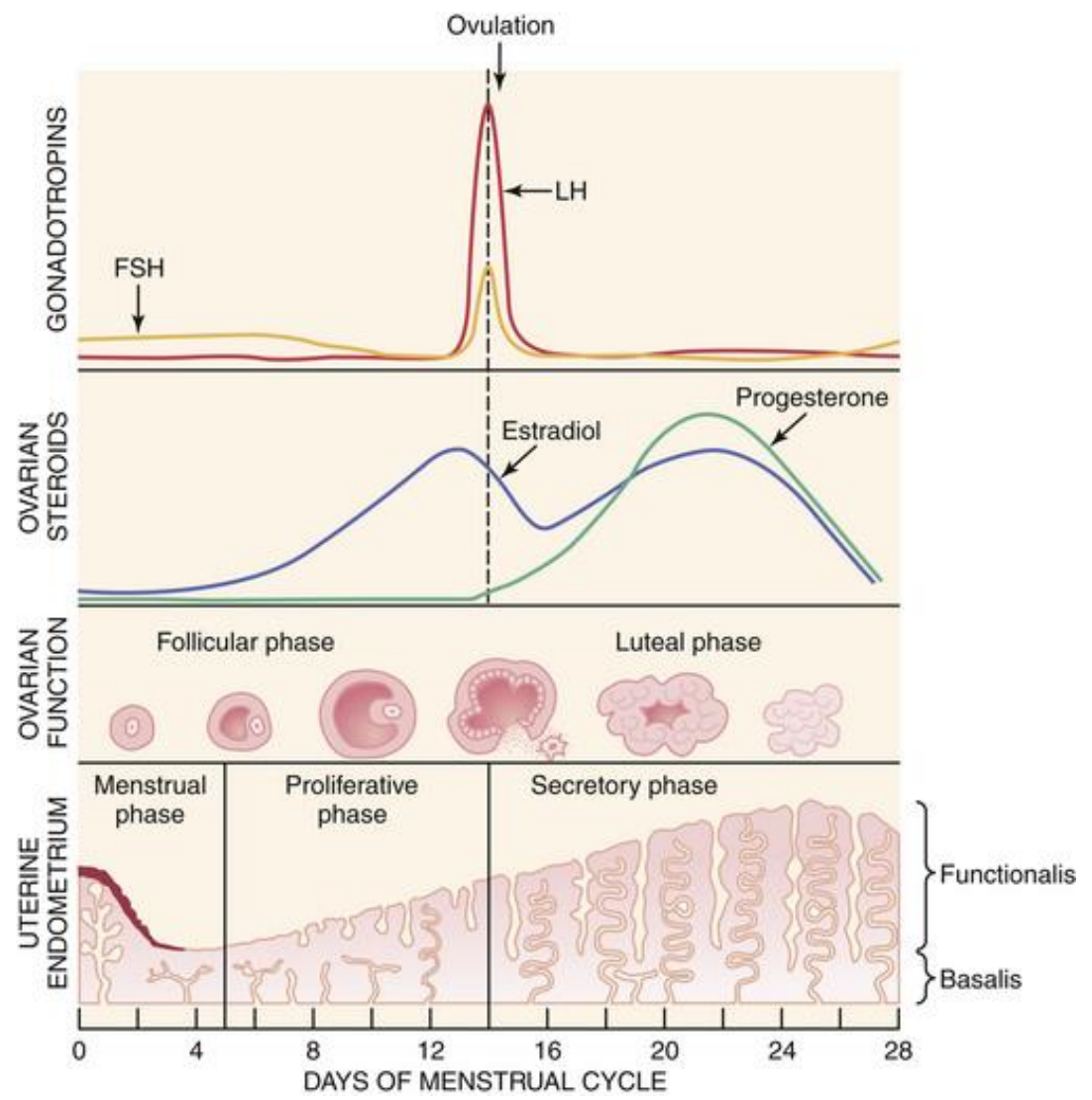
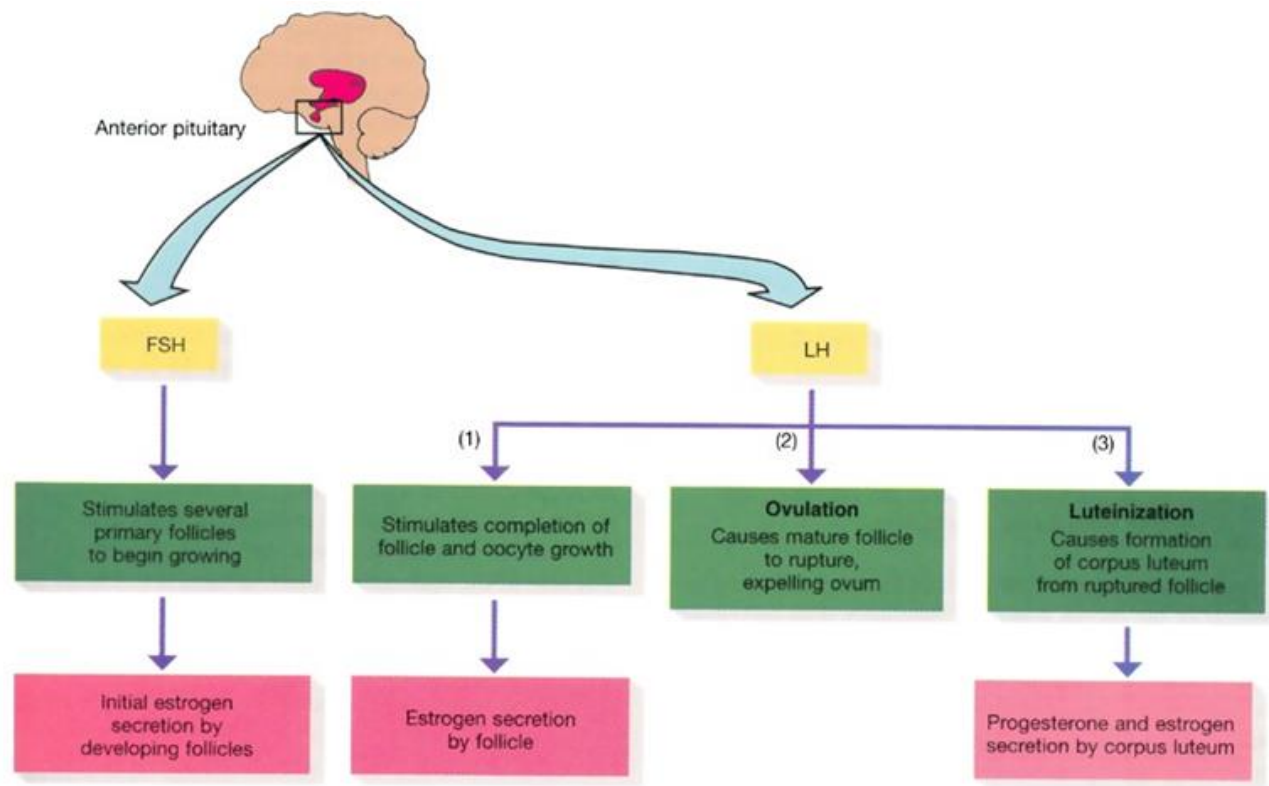


Uterine (Menstrual) Cycle

- **Secretory**
 - Ovulation
 - Cycle day 14
 - Premenstrual (postovulatory)
 - Cycle days 15 – 28
 - Between ovulation and menses
 - Also known as the luteal phase
 - Corpus luteum secretes progesterone during this time
 - Glands and blood vessels develop
 - Glands release glycogen for embryo nourishment



- Myometrial Cycle
 - Myometrium contracts mildly with increasing frequency during 2 weeks prior to ovulation
 - Decrease or disappear between ovulation and next menses
 - To lessen probability of expulsion of fertilized ovum
- Gonadotropic Cycle
 - Anterior pituitary secretes FSH and LH



- The cessation of female reproductive cycles
- First changes are noted in the ovaries
 - Cease responsiveness to FSH and LH at around 45 - 50
- Menstruation cycle soon ceases
- Some will experience, but most will have only a few S/S if any:

