**THE REPRODUCTIVE SYSTEM**

**\_ANATOMY OF MALE REPRODUCTIVE SYSTEM….**

 **-it consists of:**

 **1) Primary reproductive organs of the male are testes or male gonads**

 **2) The accessory reproductive structures are ducts or glands that aid in the delivery of sperm to body exterior or to the female reproductive tract**

**\_TESTES:**

 **-the paired testes, reside in scrotum outside the abdominopelvic cavity**

 **-it surround by fibrous capsule (tunica al ), from it arise septa divide the testes into large number of lobules**

**-each lobule contains 1-4 seminiferous tubules (the actual sperm –forming factories)**

**-between seminiferous tubules, there is interstitial cell which produce androgen (the most important of which is testosterone)**

**\_DUCT SYSTEM:**

 **-the accessory organs forming the male duct system, which transports sperm from the body, are epididymis, ductus** **deferens and urethra**

 **\_EPIDIDYMIS:**

 **-the epididymis is the first part of male duct system and provides a temporary storage site for that immature sperm that enter it from testes**

 **-the mature gaining the ability to swim (motile sperm mature in the epididymis)**

**\_DUCTUS DEFERENS (vas deferens)**

 **-its main function is to propel live sperm from their storage site (epididymis) into the urethra**

**URETHRA: \_**

 **-it extends from the base of the urinary bladder to the tip of the penis**

 **-it has 3 regions:**

 **1) Prostatic urethra**

 **2) Membranous urethra**

 **3) Penile (spongy) urethra**

 **-it carries both urine and sperm to the body exterior**

**\_ACCESSORY GLANDS AND SEMEN …..**

 **-the accessory glands include (seminal vesicles, prostate and bulbourethral gland)**

 **-these glands produce the bulk of semen (sperm +secretions)**

 **\_SEMINAL VESICLES:
 -located at the base of the bladder, produce 60%of seminal fluid**

**-their secretion is rich in sugar (fructose) vitamin C prostaglandine and other substances, which nourish and activate the sperm**

**\_PROSTATE:**

 **-is a single gland, its secretion is a milky fluid that plays a role in activating sperm**

**\_BULBOURETHRAL GLANDS:**

 **-they produce thick, clear mucus that drain into penile urethra**

**-the secretion cleanses the urethra of traces of acidic urine and it serves as a lubricant during sexual intercourse**

 **\_SEMEN…..**

 **-it is a milky white sticky mixture of sperm and accessory gland secretion**

 **-the liquid portion act as a transport medium for nutrients and chemicals that protect the sperm and aid their movements**

 **-the fructose in seminal vesicle secretion provides energy fuel**

**-the alkalinity of semen (7.2-7.6) helps to neutralize the acidic environment of the female vagina**

 **-also semen contains antibiotic chemicals that destroy certain bacteria , the hormone relaxin ,certain enzymes that enhance sperm motility and substances that inhabit an immune response in female reproductive tract**

 **-also semen dilutes sperm, without such dilution sperm motility is severely impaired**

**ANATOMY OF FEMALE REPRODUCTIVE SYSTEM**

**-it consists of:**

 **1) Ovaries.. Primary female reproductive organs**

 **2) Duct system…uterine tube, uterus, vagina**

**3) Female external genitalia …labia major and minor, clitoris, urethral and vaginal opening**

 **\_OVARIES:**

**-they are located against the lateral walls of the pelvis**

**-they are exocrine (produce ova)**

**-and endocrine (secrete estrogen and progestron hormones)**

**-ovaries contain ovarian follicles, each follicle consist of an immature egg called an oocyte, surrounded by one or more layers of follicle cells**

**-as a developing egg within a follicle begin to mature**

 **- the follicle enlarges and develops a fluid –filled central region called antrum ,at this stage the follicle called graafian follicle and the developing egg is ready to be ejected from the ovary ,this called ovulation**

**-after ovulation, the ruptured follicle is transformed into a corpus luteum, which eventually degenerates (after 14 days)**

**-ovulation occurs every 28 days, but it can occur more or less frequently in same women**

 **\_DUCT SYSTEM……**

 **-UTERINE (fallopian) TUBES:**

 **-it form the initial part of duct system**

 **-they receive the ovulated oocyte and provide a site where fertilization can occur**

 **-the extend from ovary to the uterus, ends are fimbriae and wave to direct ovulated oocytes into uterine tube, which conduct the oocyte**

**\_UTERUS:**

 **-it is located in the pelvis between the urinary bladder and rectum**

**-it is a hollow organ that functions to receive, retain and nourish a fertilized egg**

**-it is a pear shaped muscular organ, its wall consists of 3 layers:**

 **1) The inner layer (mucosa) is the endometrium**

**2) The middle layer (smooth muscles) is the myometrium**

**3) The outer layer is the perimetrium**

**-the endometrium sloughs off each month in menses unless an embryo has become embedded in it**

**-the myometrium contracts rhythmically during the birth to force the baby out of the mothers body**

**\_VAGINA:**

 **-the vagina is a passageway between the uterus and the body exterior that allows a baby or the menstrual flow to leave the body (birth canal)**

**-it also receives the pines and semen during sexual intercourse**

**\_FEMALE EXTERUAL GENITALIA:**

 **-include labia major and minor (skin folds)**

**-clitoris, urethral and vaginal opening**

**\_FEMALE REPRODUCTIVE FUNCTIONS AND CYCLE…..**

 **\_OOGENESIS AND OVARINE CYCLE…**

 **-oogenesis: is the production of female ….**

 **-in the developing female fetus, oogonia (female stem cell) multiply to increase their number and their daughter cells (primary oocytes) push into ovary …….,where they surrounded by single layer of cells to form (primary follicle)**

**-by birth, the female contain about 2 million of them in ovaries, waiting the chance to undergo meiosis to produce functional eggs**

**-the primary oocyte remains in this state all through childhood (10-14 years)**

**-at puberty, the anterior pituitary gland begins to release FSH, which stimulate a small number of primary follicles to grow and mature each month and ovulation begins to occur each month**

**-these cyclic changes that occur monthly in the ovary constitute the (ovarian cycle)**

**-at puberty , perhaps 250,000 oocytes remain and beginning at this time , a small number of oocytes are activated each month and there is typically only one ovulation per month, therefore fewer than 500 ova are released during women's life time**

**-as a follicle prodded by FSH grows larger, it accumulate fluid in the antrum and the primary oocyte it contains begins meiosis**

**-the first meiotic divisions produce 2 cells dis-similar in size, the larger cell is secondary oocyte and the other is small is a polar body**

**-the time a follicle has ripened to mature stage take about 14 days ,and ovulation occurs at just about that time in response**

**To release of LH**

**-the ovulated secondary oocyte is still surrounded by its follicle cell capsule, called the coronaradiata**

**-also LH causes the ruptured follicle to change into corpus luteum (produce progestron and estrogen hormones)**

**-if the ovulated secondary oocyte is penetrated by sperm in one of the uterine tube, the oocyte undergoes**

**-the second meiotic division and produce mature ovum and another polar body**

**-once the ovum is produced, its chromosomes are combining with sperm to form fertilized egg, which is the first cell of off spring**

**-if the secondary oocyte is not fertilized egg, it deteriorates without completing meiosis to form mature egg**

**\_UTRERIAN (MENSTRUAL CYCLE)……**

**-involves changes in the endometrium in response to blood levels of ovarian hormones**

**-there are 3 phases (menstrual phase, proliferative phase and secretary phase)**

**-both female cycles (ovarian and uterine cycles) are about 28 days long, ovulation occur midway in the cycle or about day 14**

 **\_MENSTRUAL PHASE (day 1-5)…**

 **-endometrium sloughs off and bleeding occur**

 **-It takes 3-5 days**

 **-ovarian hormones are at their lowest levels**

**\_PROLIFERATIVE PHASE (day 6-14)…**

 **-Stimulated by rising estrogen levels produced by the growing follicles of the ovaries**

 **-the endometrium becomes thick and well vascularized (ovulation occur in the ovary at the end of this stage) in response to the sudden surge of LH in the blood**

**\_SECRETORY PHASE (day 15-28)…**

 **-rising levels of progesterone production by the corpus luteum act on endometrium and increase its blood supply**

 **-progestrone causes the endometrial glands to increase in size and begin secreting nutrients into uterine cavity**

 **-the nutrients will sustain a developing embryo until it has implanted**

 **-if fertilization occurs, the embryo produces a hormone similar to LH that causes corpus luteum to continue producing its hormones**

**If fertilization does not occur the corpus luteum begins to degenerate toward the end of this period**

**\_HORMONE PRODUCTION BY THE OVARIES …..**

 **-at puberty, the ovaries become active and start to produce ova and begin to produce ovarian hormones**

**-the follicle cells of growing and mature follicle produce estrogen, which cause the appearance of secondary sex characters**

**-also, estrogen has metabolic effects ex:**

 **\*it helps maintain low total blood cholesterol level and high HDL level**

**\*it facilitates calcium uptake, which sustains bone density**

**-the second ovarian hormone, progestrone is produced by corpus luteum**

**-it works with estrogen to establish the menstrual cycle**

**-it maintain the pregnancy by inhibiting contraction of the myometrium of the uterus and helps prepare the breasts for milk production**

**\_MAMMARY GLANDS…**

 **-the mammary glands are present in both sexes but they normally function only on females**

 **-their function is to produce milk to nourish a new born baby in response to hormonal stimulation**

 **-stimulating by female sex hormones especially estrogen causes the female mammary glands to increase in size at puberty**

 **-each mammary gland is containing within a rounded skin cover breast anterior to the pectoral muscles**

**-slightly below the center of each breast is pigmented are called areola, which surrounds a nipple**

**-each mammary gland consists of 15-25 lobes, the lobes are padded and separated from one another by connective tissue and fat**

**-each lobe contains lobules, which clusters of alveolar glands that produce the milk**

**-the alveolar glands of each lobule pass milk into the lactiferous ducts, which open to outside at the nipple**

**-just deep to the areola, each duct has a dilated region called lactiferous sinus, where milk accumulates during nursing**

**\_PREGNANCY AND EMBRYONIC DEVELOPMENT…..**

**-embryo: from fertilization through week 8, the embryonic period, the concepts called embryo**

 **-fetus: the concepts from week 9 through birth at birth called infant**

**\_ACCOMPLISHING FERTILIZATION…**

 **-before fertilization can occur, the sperm must reach the ovulated secondary oocyte**

**-the oocyte is viable for 12-24 hrs. After it is cast out of the ovary**

**-the sperm retain their fertilizing power , within female reproductive tract for 24-48hr
-when the sperm reach oocyte , their cell surface hyaluronidase enzyme breakdown the coment that holds the follicle cells of corona radiate around the oocyte**

**-once a path has been cleared, thousands of sperms undergoes the acrosomal reaction in which the acrosome membrane breakdown, releasing enzymes that digest hole in the oocyte membrane**

**-when the membrane is adequately weakened and single sperm makes contact with the oocyte's membrane receptors, the head (nuclei) of sperm is pulled into the oocyte cytoplasm**

**-once a single sperm has penetrated the oocyte, the oocyte nucleus completes the secondary meiotic division, forming the ovum and polar body**

**-after sperm entry, changes occur in the fertilized egg to prevent other sperm from gaining entry**

**-fertilization occurs at the moment the genetic material of sperm combines with that of an ovum to form a fertilized egg (zygote)**

**-the zygote the first cell of new individual**

**\_EVENTS OF EMBRYONIC AND FETAL DEVELOPMENT,,,**

**-as the zygote journeys down the uterine tube, it begins to undergo rapid mitotic divisions**

**-the early stage of embryonic development, called cleavage**

**-by the time the developing embryo reaches the uterus (on day 17 of women's cycle) it is a morula ant the uterine endometrium is still not fully prepared to receive embryo so it is floats free in uterine cavity , using the uterine secretion for nutrition**

**-by day 14 after ovulation, the young embryo (blastocyst) has implanted in the endometrium**

**-the blastocyst secretes human chorionic gonadotropin (HCG) maintain hormone production of corpus luteum, preventing menses, until the placenta assumes its endocrine role**

**-the blastocyst has 2 important areas:**

 **1) The trophoblast ,,, which form the large fluid-filled sphere**

 **2) Inner cell mass,,, a small cluster of cells on one side**

**-after attaching with endometrium ,development is continuing ant the 3 primary germ layers are being formed from the inner cell mass ,the germ layers are :**

 **1) Ectoderm….. Give nervous system and epidermis of skin**

 **2) Endoderm… form mucosa and associated glands**

 **3) Mesoderm…. Which give rise to everything else.**

**-the trophoblast (part of blastocyst) develop projections called chorionic villi, which combine with tissue of the mother's uterus to form the placenta**

**-Once, the placenta has formed, the embryonic body now surrounded by fluid –filled sac called amnion is attached to the placenta by umbilical cord**

**-by third week, the placenta is functioning to deliver nutrients and oxygen to and remove wests from the embryonic blood**

**-all exchanges are made through the placenta barrier**

**-by the end of second month of pregnancy ,the placenta produce progesterone and estrogen and other hormones that helps to maintain pregnancy ,at this time the corpus luteum of the ovary becomes inactive**

**-all major organ systems have been laid down by 8th week**

**-at 9th week the embryo called fetus from this point on, the major activates are growth and organ specialization, accompanied by changes in body proportions**