H.S SECOND YEAR

Unit6:Human Reproduction

Pregnancy and embryonic development

Parturition and lactation

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HUMAN FERTILIZATION AND DEVELOPMENT

Key Terms

Term	Meaning
Gamete	: A reproductive (sex) cell. In males, sperm; in females, eggs
Fertilization	: The process in sexual reproduction in which a male gamete and female gamete fuse to form a new cell
Zygote	: Cell resulting from fertilization
Diploid (2n)	: Cell that contains two sets of homologous chromosomes
Haploid (n)	: Cell that contains only a single set of genes
Apoptosis	:The process of programmed cell death
Differentiation	: The process by which cells become specialized in structure and function

Human fertilization and development

Fertilization is the process in which haploid gametes fuse to form a diploid cell called a zygote. To ensure that each zygote has the correct number of chromosomes, only one sperm can fuse with one egg.

Stages of human development

Zygotic stage: The zygote is formed when the male gamete (sperm) and female gamete (egg) fuse.

Blastocyst stage: The single-celled zygote begins to divide into a solid ball of cells. Then, it becomes a hollow ball of cells called a blastocyst, attaching to the lining of the mother's uterus.

Embryonic stage: The major internal organs and external features begin to emerge, forming an embryo. In this stage, the heart, brain, and spinal cord become visible. Arms and legs start to develop.

Fetal stage: Once the formed features of the embryo begin to grow and develop, the organism is considered a fetus. Differentiation and specialization of structures happens during this time.

REPRODUCTIVE SYSTEM REVIEW

Key terms

Term Meaning

Gamete: A reproductive (sex) cell. In males, sperm; in females, eggs

Puberty: Process during which adolescents reach sexual and reproductive maturity

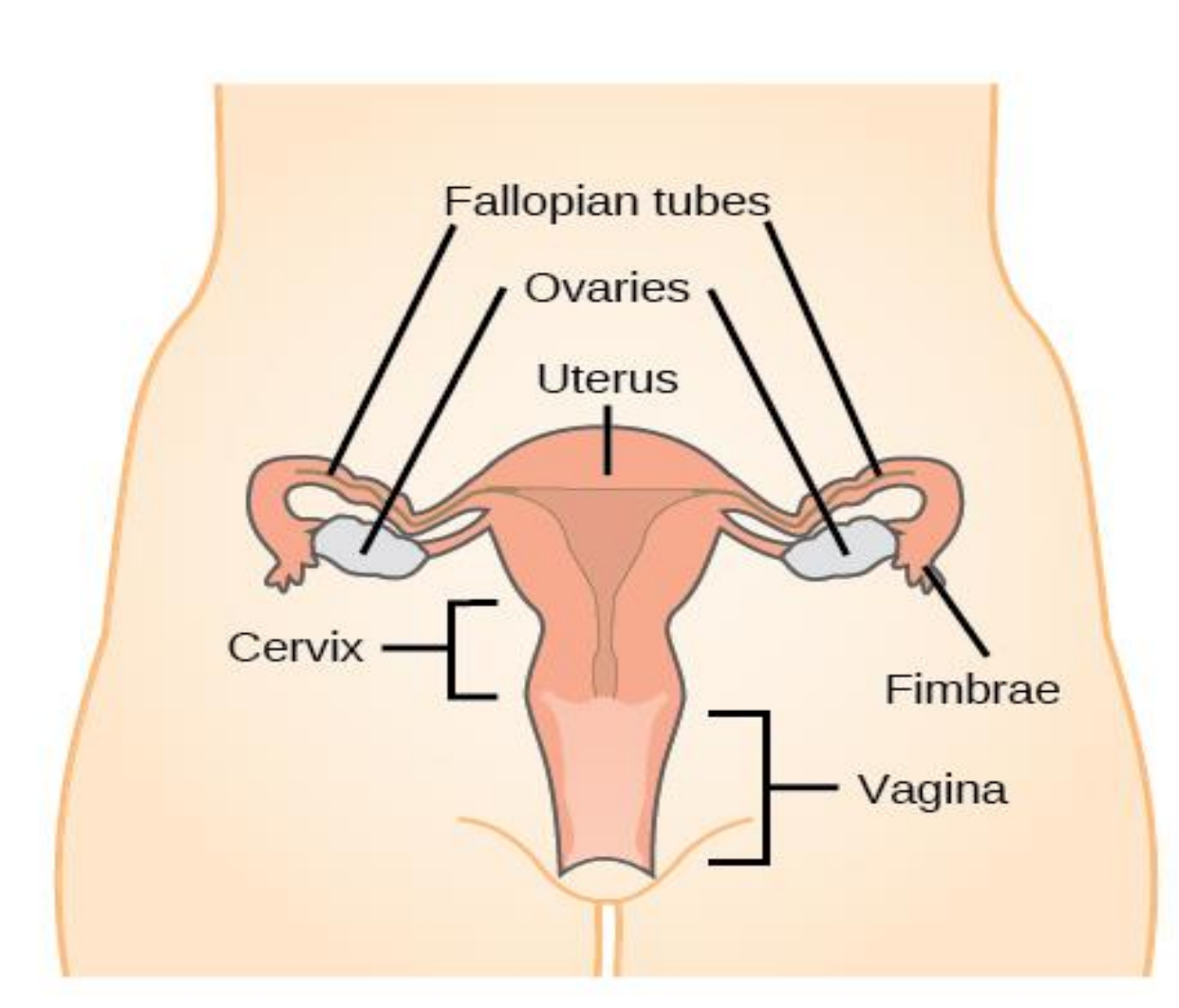
Testes :Male reproductive gland that produces sperm and male hormones

Ovaries :Female reproductive gland that produces eggs and female hormones

Menstrual cycle: Pattern of events in females involving the development and release of an egg

Fertilization: The process in sexual reproduction in which a male gamete and female gamete fuse to form a new cell

The female reproductive system



Organ Function

Ovaries: Produces and develops eggs

Fallopian tubes (oviducts): Transports egg to uterus, acts as site of fertilization

Uterus :Supports a developing embryo

Cervix :Allows passage between the uterus and the vagina

Vagina :Receives penis during intercourse, acts as birth canal, passes menstrual flow

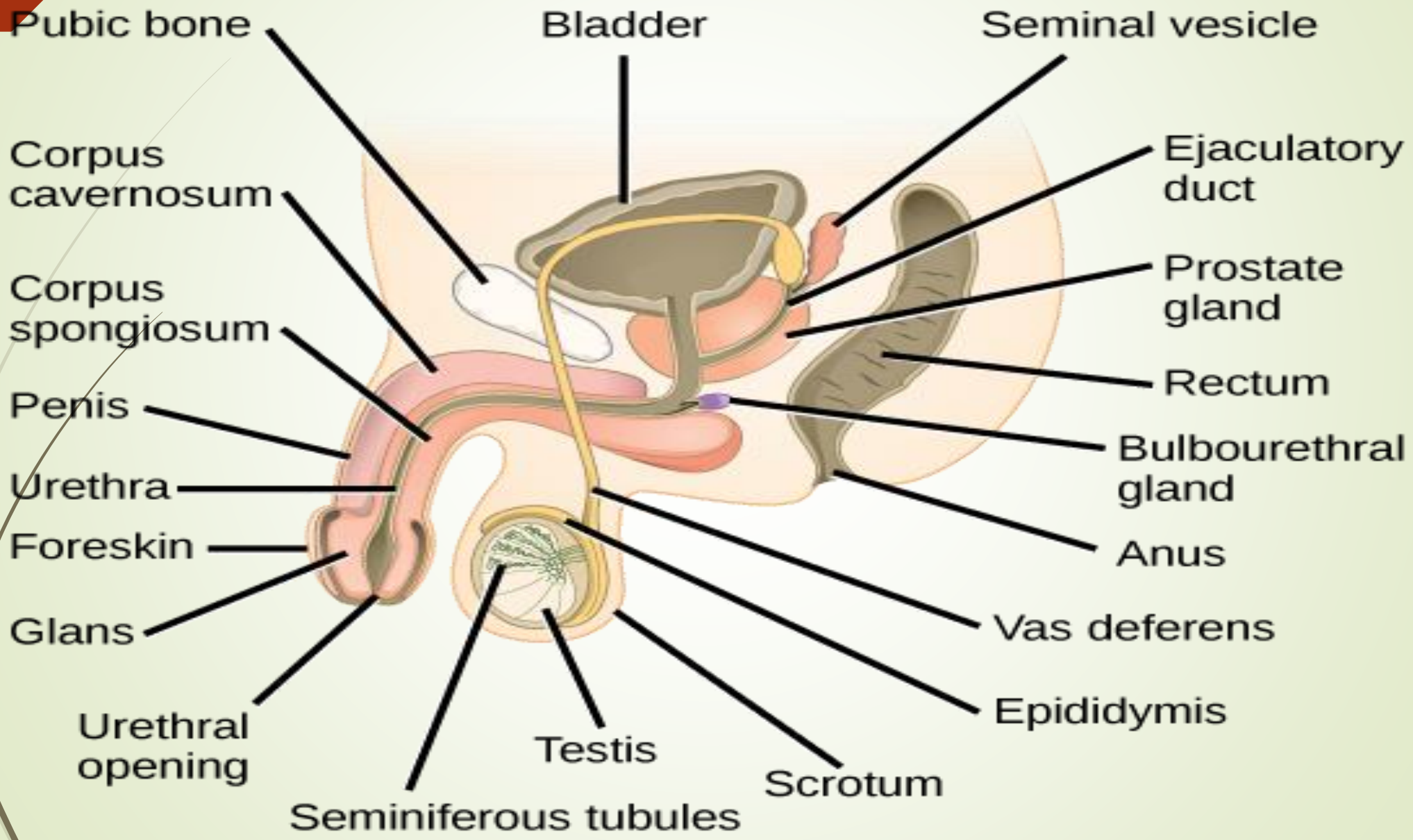
Breasts :Produce and deliver milk

During puberty, the hypothalamus signals the pituitary gland to produce two hormones, follicle-stimulating hormone (FSH) and luteinizing hormone (LH). In females, FSH and LH stimulate the ovaries to produce the female sex hormones, estrogen and progesterone. This results in the development of secondary sex characteristics (such as breasts), and causes the ovaries to begin producing mature eggs.

OVULATION…….EGG RELEASE

Egg release (ovulation) occurs approximately every 28 days, and is part of a larger process called the menstrual cycle. If an egg is fertilized after ovulation, it attaches to the wall of the uterus and embryonic development begins. If an egg is not fertilized (or a fertilized egg does not attach to the wall of the uterus), the egg and the lining of the uterus are discharged from the body.

MALE REPRODUCTIVE SYSTEM



Organ Function

Testes :Produce sperm and male hormones

Scrotum :Supports testes and regulates their temperature

Seminal vesicle :Contribute fluids to semen production

Prostate gland :Secretes prostate fluid (component of semen), aids in ejaculation

Epididymis : Stores mature sperm

Vas deferens :Transports sperm from epididymis

Penis :Transfers sperm into female

Puberty begins the same way in males as it does in females: the hypothalamus signals the pituitary gland to produce FSH and LH.

In males, LH stimulates the testes to produce testosterone, and with FSH, causes sperm development to occur. Testosterone is also responsible for the development of secondary male sex characteristics, such as a deepened voice and growth of body hair.

Common mistakes and misconceptions

Fertilization occurs in the fallopian tube (oviduct) of the female reproductive system. Once fertilized, the egg attaches to the lining of the uterus. It becomes a ball of cells over time, then develops in the uterus of the female to become a baby.

Only females are born with reproductive sex cells. Females are born with immature eggs already in their ovaries. When puberty occurs, the eggs mature and are released by the ovaries. Males only produce sperm after reaching puberty.

Females do not urinate through the vagina. In men, both semen and urine pass through the urethra, a passageway that terminates at the end of the penis.

Females urinate through a urethra as well, but it is not connected to their vaginal opening.

The female urethra is located above the vagina and urine may pass over or around the opening, but the two passageways are not connected.

HUMAN DEVELOPMENT OVERVIEW

Differentiation and apoptosis

During development, the number of cells must increase through division so that body axes, tissues, organs, and structures must form. Individual cells become specialized in their structure and function through the process of cell differentiation.

Unnecessary cells also must be removed in order to help form important structures. This occurs is through the process of apoptosis. For example, human hands start out as a paddle-like block of tissue. Eventually, the block was “carved” into fingers by apoptosis of the cells in between the developing fingers.

Common mistakes and misconceptions

Human fertilization occurs in the fallopian tube. Many people believe that human fertilization occurs in the vagina, but this is not the case. Once sperm enter the vagina, they can move through the cervix, into the uterus, and to the end of a fallopian tube. If a sperm is able to penetrate an egg, fertilization occurs.

Development is sort of pre-determined. While it IS true that all humans in early development look the same, many of the features that later develop in a fetus are already pre-determined by its genes. For example, the biological sex of the fetus is already decided based on whether it received two X chromosomes (one from each parent) or an X from its mother and a Y from its father, despite the fact that sex-specific characteristics do not appear until later in development.

PARTURITION AND LACTATION

The average duration of human pregnancy is about 9 months called as the gestation period.

Vigorous contraction of the uterus atthe end of pregnancy causes expulsion/delivery of the fetuscalled as parturition.

The signals for parturition originate from the fully developed fetus and the placenta which induces mild uterine contraction is called fetal ejection reflex.

Fetal ejection reflex releases oxytocin hormone from the pituitary gland of mother which acts on the uterine muscle and causes contraction of uterus which in turn stimulates further oxytocin secretion.

Production of milk at the end of pregnancy by the differentiation of mammary glands is called lactation.

He milk produced during the first few days of lactation is called colostrum.

Colostrum contains antibodies necessary to develop resistance against diseases of the new born baby.

THANK YOU