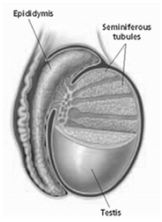
Chapter 51 Reproductive System

Table of Contents

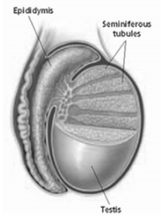
Male Reproductive Structures

- The male reproductive system contains two testes.
  - The **testes** are the gamete-producing organs of the male reproductive system.



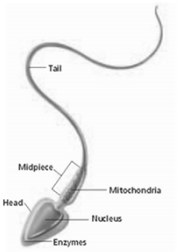
Male Reproductive Structures, *continued*

- Each testis is made up of the epididymis and the seminiferous tubules.
  - The **epididymis** is a long, coiled tubule that is closely attached to each testis.
  - The **seminiferous tubules** are tightly coiled tubules where sperm form through meiosis.

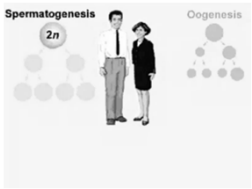


Formation of Sperm

- At puberty, sperm form through meiosis.
- Sperm contain a head, a midpiece, and a tail.
  - The head contains the enzymes and chromosomes that will be delivered to the egg.
  - The midpiece's mitochondria power the movement of the tail.



Formation of a Sperm



Formation of Sperm, *continued*

- **Path of Sperm Through the Male Body**
  - The path of the sperm through the body begins as the sperm move from the seminiferous tubules to the epididymis.

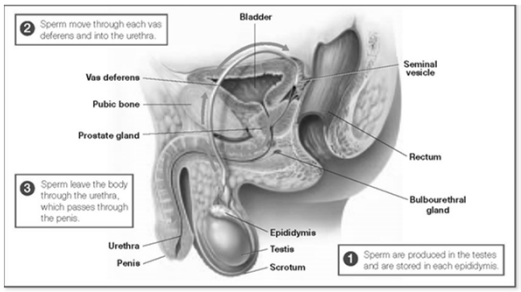
Formation of Sperm, *continued*

- **Path of Sperm Through the Male Body,** *continued*
  - From the epididymis, sperm move into the vas deferens.
    - The **vas deferens** is a duct that extends from the epididymis to the urethra. This duct is made of smooth muscle and helps sperm exit the body.
  - From the vas deferens, sperm move to the urethra.

Formation of Sperm, *continued*

- **Path of Sperm Through the Male Body,** *continued*
  - Once in the urethra, the sperm will mix with other fluids produced by the seminal vesicles, the prostate gland, and the bulbourethral glands.
    - The **seminal vesicles** lie between the bladder and the rectum and produce a fluid that sperm use for energy.
    - The **prostate gland** is located just below the bladder and produces a fluid that neutralizes the acids in the female reproductive system.
    - The **bulbourethral glands** produce a fluid that neutralizes any acidic urine left in the urethra.

Male Reproductive System

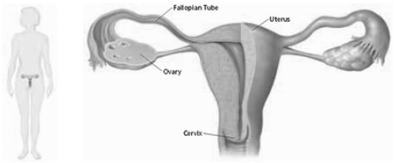


Formation of Sperm, *continued*

- **Delivery of Sperm**
  - Fluids that are excreted from glands within the penis are mixed with the sperm to produce **semen.**
  - After passing through the urethra, the semen will exit the body through the penis.
    - The **penis** is the organ that deposits sperm in the female reproductive system.
  - **Ejaculation** is the process in which semen is forcefully expelled from the penis by contractions of the smooth muscles that line the urethra.

Female Reproductive Structures

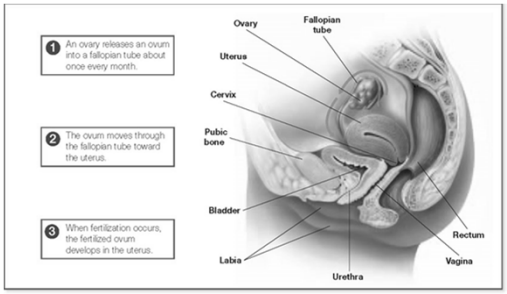
- The female reproductive system contains two ovaries, two fallopian tubes, and a uterus.



Female Reproductive Structures, *continued*

- The **ovaries** are the gamete-producing organs of the female reproductive system.
- The **fallopian tubes,** also called the uterine tubes, are made of smooth muscle and join the ovary to the uterus.
- The **uterus** is a hollow, muscular organ about the size of a small fist and is the place where the fertilized egg will develop.

Female Reproductive System



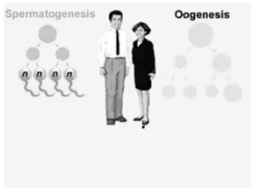
Female Reproductive Structures, *continued*

- The lower entrance of the uterus is the cervix, which leads to the female reproductive opening called the vagina.
  - The **vagina** is a muscular tube that leads to the outside of the body. The vagina receives sperm from the penis, and it is also the channel through which a baby passes during childbirth.
- The vagina is protected by the vulva.
  - The **vulva** is made up of the labia, folds of skin, and mucous membranes that cover and protect the opening to the female reproductive system.

Formation of Eggs

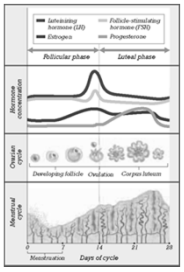
- Unlike males, a female is born with all the eggs she will ever produce.
- These immature eggs will be stimulated to mature starting at puberty. A hormone will stimulate a batch of eggs to continue to mature about every 28 days.
- However, an egg will not complete maturation until fertilized by a sperm.
- If fertilized, the mature egg, or **ovum,** will continue development as it travels through the fallopian tube.

Formation of an Ovum



Preparation for Pregnancy

- The female reproductive system will prepare and release an ovum each month in a process called the **ovarian cycle,** which is controlled by the endocrine system.
- The ovarian cycle has 3 phases: the follicular phase, ovulation, and the luteal phase.



Preparation for Pregnancy, *continued*

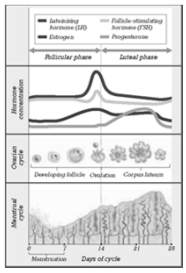
- **Follicular Phase**
  - The **follicular phase** is when the immature egg will complete its first meiotic division. This phase begins because it is stimulated by the follicle stimulating hormone (FSH).
    - FSH will stimulate the egg to mature by stimulating the **follicle,** or layer of cells that surrounds an immature egg, to divide.

Preparation for Pregnancy, *continued*

- **Ovulation**
  - **Ovulation** is when an egg is released by the follicle.

Preparation for Pregnancy, *continued*

- **Luteal Phase**
  - During the luteal phase, the cells of the ruptured follicle grow larger and create a new structure called a **corpus luteum.**
  - If the egg is not fertilized, this phase will end with menstruation.



Preparation for Pregnancy, *continued*

- **Menstruation**
  - **Menstruation** is when the lining of the uterus and blood from ruptured blood vessels are discharged through the vagina.
    - This process can last about 5 to 7 days until a woman reaches menopause.
  - **Menopause** is when most of a woman's follicles have either matured and ruptured or degenerated. Thus, menstruation ceases.

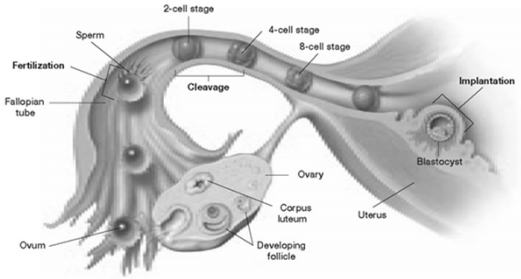
Fertilization

- If sperm are ejaculated into a female within 48 to 72 hours of ovulation, the chances of those sperm finding and fertilizing and egg are likely.
- Once any sperm encounters an egg, it will try to penetrate its outer layers, but usually only one sperm is successful in fertilizing the egg.

Fertilization, *continued*

- When fertilization occurs, the egg and sperm fuse to form a zygote.
  - A *zygote* is the diploid cell that results when the egg and sperm fuse together.
- The period of development from fertilization of the egg through the next nine months is known as *gestation.*

Early Zygote Development



Chapter 51

Fertilization, *continued*

- **Cleavage and Implantation**
  - Once the egg is fertilized, the zygote will begin a series of mitotic divisions known as *cleavage*.
  - During cleavage, the resulting cells remain the same size and produce a ball of cells called a *morula*.
  - Once the morula divides further and releases a certain fluid, it is called a **blastocyst.**

End of Slide
Chapter menu Resources

Chapter 51

Fertilization, *continued*

- **Cleavage and Implantation**
  - The morula has become a blastocyst by the time it reaches the uterus.
  - Once at the uterus, the blastocyst releases an enzyme that allows it to burrow into the thickened walls of the uterine lining. This process is called implantation.

End of Slide
Chapter menu Resources

Chapter 51

Pregnancy

- The nine-month period of growth and development that a blastocyst undergoes is called *gestation* or **pregnancy.**
- Pregnancy is divided into three equal periods called **trimesters,** and each trimester is signaled by specific events.

End of Slide
Chapter menu Resources

Chapter 51

Pregnancy, *continued*

- **First Trimester**
  - During the first eight weeks of pregnancy, the developing human is called an **embryo.**
  - The embryo during this phase looks much like all other developing animal embryos, but it will soon reorganize into the primary germ layers: the endoderm, mesoderm, and ectoderm.

End of Slide
Chapter menu Resources

Chapter 51

Pregnancy, *continued*

- **First Trimester**
  - During the first trimester, four membranes form that will be essential in the development of the embryo.
  - One membrane is called the *amnion* and forms the **amniotic sac,** which keeps the embryo moist and protected by surrounding the developing embryo.

End of Slide
Chapter menu Resources

Chapter 51

Pregnancy, *continued*

- **First Trimester**
  - The second membrane is called the *yolk sac*, which is where the first blood cells will originate from.
  - The third membrane is called the *allantois chorion*.
  - The fourth membrane is called the *chorion*, which surrounds all other membranes and forms the chorionic villi.
    - The **chorionic villi** are finger like projections that will attach and extend into the uterine lining.

End of Slide
Chapter menu Resources

Chapter 51

Pregnancy, *continued*

- **First Trimester**
  - The chorionic villi and part of the uterine lining will form the placenta. The **placenta** is the structure through which the mother nourishes the embryo.
  - The placenta connects the mother to the embryo by way of the umbilical cord. The **umbilical cord** allows substances to exchange between mother and embryo by way of diffusion.

Chapter 51

Pregnancy, *continued*

- **First Trimester**
  - From eight weeks until birth, the developing child is called a **fetus.**
  - At the end of the first trimester, all of the organs of the fetus have begun to form.

Chapter 51

Pregnancy, *continued*

- **Second Trimester**
  - During the second trimester, the heartbeat of the fetus can be heard, its skeleton begins to form, and it begins to develop body fat.
  - The baby has a layer of soft hair called *lanugo* growing over its skin.
  - The baby begins to move, sleep, and wake.

Chapter 51

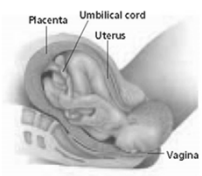
Pregnancy, *continued*

- **Third Trimester**
  - During the third trimester, the baby undergoes changes that will enable it to live outside the mother.
  - It also develops fat deposits under its skin to insulate its body.
    - These fat deposits also make the fetus look more rounded and less wrinkled.

Chapter 51

Birth

- In reaction to hormones produced by both the fetus and the mother, childbirth is initiated.
- During childbirth, the smooth muscles of the uterus begin to contract and the muscles in the vagina and cervix relax and enlarge, which allow the fetus to pass through.



Chapter 51

Birth, *continued*

- The process of muscle contractions and other related events that lead up to childbirth are called **labor.**
- After the fetus has been pushed through the vagina, contractions of the uterus help the mother expel the placenta, amnion, and uterine lining. This group of membranes is called the **afterbirth.**