

Reproduction and Development

Key Words

testes:	primary reproductive organs of the male where sperm are produced
hormones:	chemicals that direct body activities
ovaries:	primary reproductive organs of the female where eggs are produced
ovulation:	monthly release of a mature egg from an ovary
menstrual cycle:	monthly cycle during which an egg matures and is released from an ovary while the uterus prepares to receive a fertilized egg
zygote:	fertilized egg
embryo:	offspring that develops inside the uterus
placenta:	organ that supplies the embryo with nutrients and oxygen and eliminates carbon dioxide and wastes
umbilical cord:	tissue that connects the embryo with the placenta and that carries nutrients and oxygen from the mother to the embryo

KEY IDEAS

The reproductive system produces, stores, and releases specialized sex cells called gametes. Male gametes, called sperm, are produced in the testes. Female gametes, called eggs, are produced in the ovaries. Human development begins when an egg is fertilized by a sperm.

Think about how much you have changed since you were born. Now think about how different you will be when you are 35. These changes occur as you pass through various stages of growth and development. For example, puberty is a time when the body gains the ability to reproduce sexually.

The reproductive system is different in males and females. However, the *function* of the reproductive system is the same in both females and males. Both male and female reproductive systems produce, store, and release specialized sex cells called gametes.

Male Reproductive System. Male gametes are called sperm. Sperm are single cells with a head and a tail, as shown in Fig. 47-1. The head contains genetic information. The tail aids in movement.

Sperm are produced in the **testes** (TEHS-teez) (sing. *testis*). The testes are the primary reproductive organs of the male. The testes lie outside the body cavity in a sac called the **scrotum**. This location makes the temperature of the testes slightly lower than that of the body. The cooler temperature is necessary for sperm production.

Sperm production begins at puberty when hormones are released in the testes. **Hormones** (HAWR-mohnz) are chemicals that direct body activities. One kind of hormone triggers the production of sperm.

Sperm travel from the testes through a network of tubes. The urethra is the tube that leads out of the body through the penis. During ejaculation, sperm exit the reproductive system through the penis. The male reproductive system is shown in Fig. 47-2.

Fig. 47-1

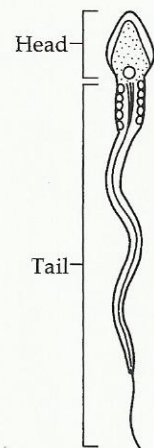
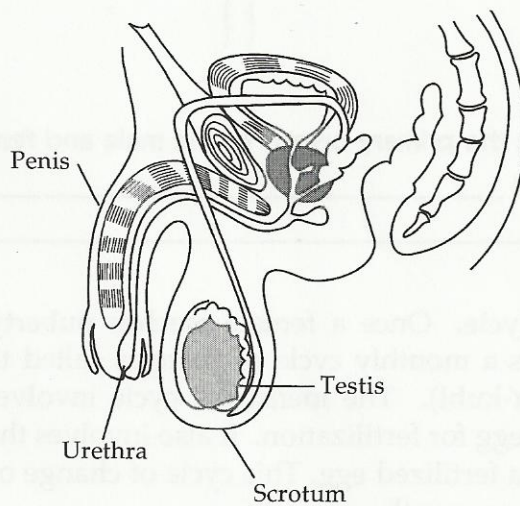


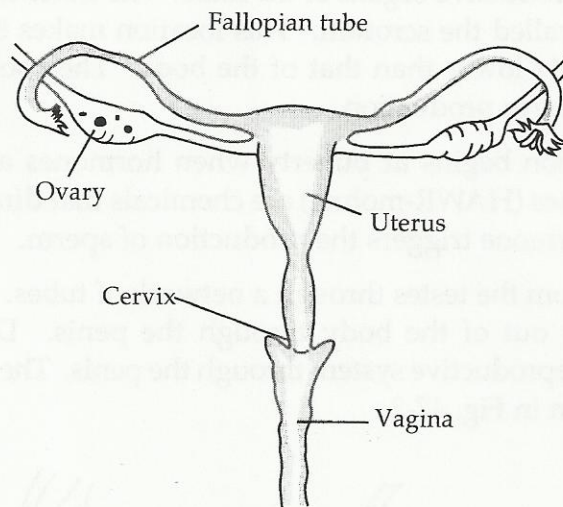
Fig. 47-2



Female Reproductive System. The primary reproductive organs of the female are the **ovaries** (OH-vuh-reez). The ovaries are two egg-shaped structures located inside the female's body cavity. When a female reaches puberty, hormones are produced in the ovaries. These hormones trigger the production of female gametes, or eggs. About once a month, a mature egg is released from an ovary. This process is called **ovulation** (ahv-yoo-LAY-shun).

Located near the ovaries are two fallopian tubes. The fallopian tubes lead to the uterus. As a mature egg leaves an ovary, it travels through one of the fallopian tubes to the uterus. The uterus is a hollow organ where a fertilized egg develops. The narrow end of the uterus connects to the cervix. The cervix leads to the vagina, or birth canal. The offspring leaves the female's body by passing through the vagina. The female reproductive system is shown in Fig. 47-3.

Fig. 47-3



1. What are the primary organs of the male and female reproductive systems? _____

The Menstrual Cycle. Once a female reaches puberty, her reproductive system undergoes a monthly cycle of changes called the **menstrual cycle** (MEHN-struhl SY-kuhl). The menstrual cycle involves the development and release of an egg for fertilization. It also involves the preparation of the uterus to receive a fertilized egg. This cycle of change occurs in four stages over a period of one month.

The menstrual cycle begins with the release of a hormone. The hormone causes an egg in an ovary to mature. The ovary then releases another hormone. This causes the walls of the uterus to thicken. About halfway through the cycle, ovulation occurs. The mature egg moves through one of the fallopian tubes.

If sperm are not present in the fallopian tube, the egg is not fertilized. However, the unfertilized egg still moves into the uterus. The walls of the uterus, which had thickened in preparation for a fertilized egg, begin to break apart. Cells from the uterus and the unfertilized egg pass from the vagina during a process called menstruation. Menstruation lasts an average of four days. As menstruation ends, a new menstrual cycle begins.

✓ 2. What happens during menstruation? _____

Fertilization. If sperm are present in the fallopian tube during ovulation, then fertilization can occur. Recall that fertilization is the joining of an egg cell and a sperm cell. The fertilized egg, or **zygote** (ZY-goht), moves to the uterus. The zygote undergoes a series of cell divisions to form a hollow ball of cells. This ball of cells attaches to the thick wall of the uterus. When this occurs, the developing offspring is called an **embryo** (EHM-bree-yoh).

Tissues in the uterus develop into the placenta. The **placenta** (pluh-SEHN-tuh) supplies the embryo with nutrients and oxygen and eliminates carbon dioxide and wastes. The **umbilical cord** (uhm-BIHL-uh-kuhl KORD) connects the embryo with the placenta. Blood vessels in the umbilical cord carry nutrients and oxygen to the embryo. Other vessels carry carbon dioxide and wastes from the embryo to the mother. The mother releases these wastes with those of her own body.

✓ 3. What does the umbilical cord do? _____

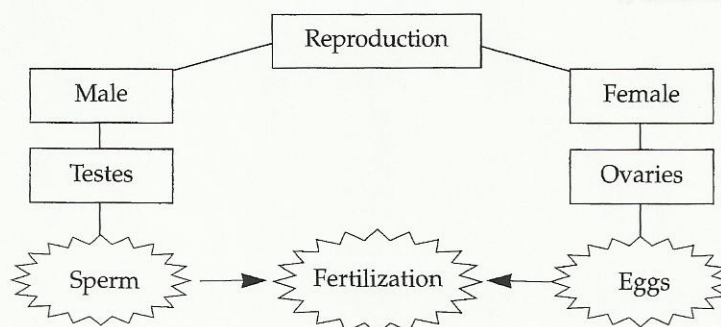
The embryo develops inside the mother's uterus for about nine months. During this time, the embryo is surrounded by a clear sac filled with fluids. This sac cushions and protects the embryo.

Birth. Birth occurs when the baby leaves the mother's body. Birth begins when hormones trigger contractions of the uterus. The contractions cause the amniotic sac to break. They also push the baby out of the uterus and out of the mother's body through the vagina.

At birth, the offspring enters the first stage of its life cycle. A life cycle is the series of stages of growth and development that an organism passes through. Stages in the human life cycle include infancy, childhood, adolescence, adulthood, and old age. Each stage has its own unique traits.

Fig. 47-4 summarizes the relationship between the male and female reproductive systems.

Fig. 47-4



**TAKE
ANOTHER
LOOK**

Check Your Understanding

Write a sentence explaining the connection between each pair of words.

4. sperm, testes _____

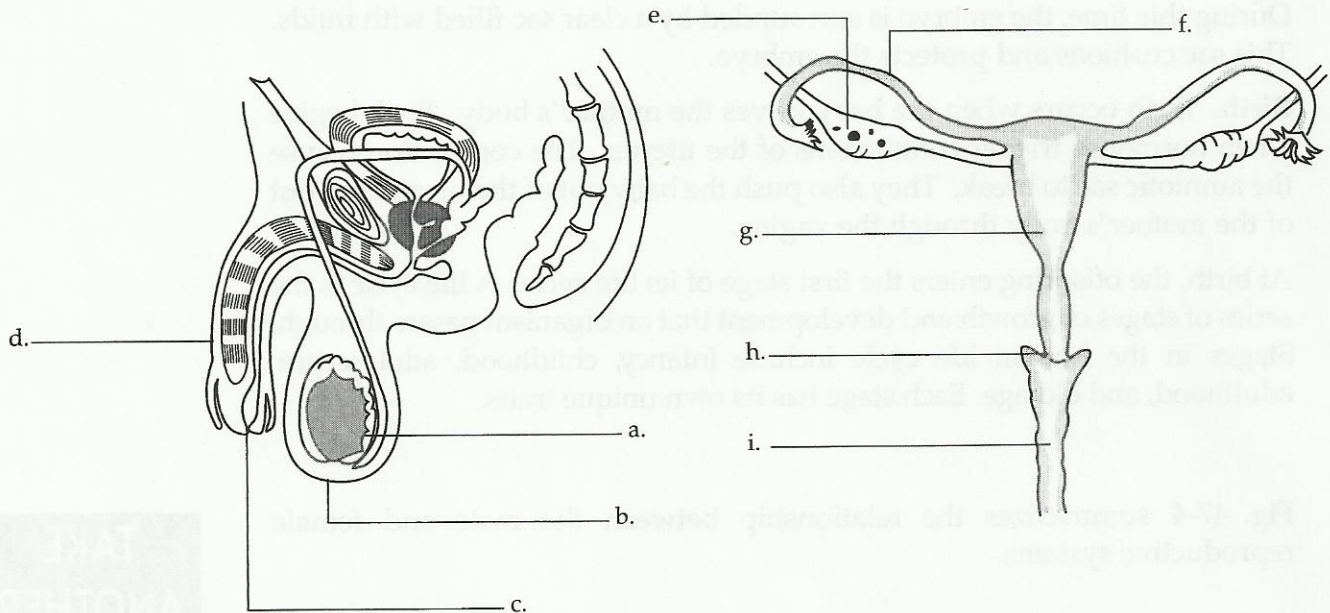
5. ovaries, eggs _____

6. ovulation, menstrual cycle _____

7. zygote, fertilization _____

8. Label the diagrams in Fig. 47-5 with the following words: *cervix*, *ovary*, *fallopian tube*, *scrotum*, *penis*, *testes*, *urethra*, *uterus*, *vagina*.

Fig. 47-5





9. What is the job of the reproductive system?

10. How does the location of the scrotum help sperm to produce?

11. Describe the path an unfertilized mature egg takes as it leaves an ovary.

12. Describe the changes that the uterus undergoes during the menstrual cycle.

13. Can fertilization occur before ovulation? Explain why.

14. How does an embryo receive nutrients and oxygen?

15. What are the stages of the human life cycle?
