THE ENDOCRINE SYSTEM AND REPRODUCTION

Hormones and the Endocrine System

The **endocrine system** controls long-term and short-term changes of the body and many of the daily activities of the body. The system is made up of glands, which are organs that produce and secrete chemicals.

Hormones

Endocrine glands release chemicals called hormones into the bloodstream, which will then be carried throughout the body.

There are many hormones, and each controls different functions of the body. They speed up or slow down and/or turn on or off activities of the body. Because hormones are transported by the blood, they are able to regulate body activities far away from the glands in which they are produced.

Hormones can cause quick changes that are short-term, such as adrenalin to help you move or think quickly during an emergency, or slow responses that are long-term, such as human growth hormone which works over time to spur your body's growth. Hormones are able to target specific organs because they all have a unique chemical structure. A particular hormone will only react with specific target cells.

A **target cell** is a cell that will only recognize a hormone that has a certain chemical structure. An organ that does not have the specific target cells for a hormone will not react with that particular hormone. Each endocrine gland produces a particular hormone and releases it into the bloodstream.

Lesson Checkpoint:
Does every endocrine gland respond to every hormone

Endocri

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The endoc that your house is heated during the winter months. Once the heat drops down to a certain point, the heat will turn on and warm the house to the set temperature and then turns off. This system is called negative feedback.

The endocrine system uses **negative feedback** to learn when it is time to stop secretion of a particular hormone within the blood once it reaches a certain level.

Hypothalamus

The **hypothalamus** is a small part of the brain that links the nervous system and the endocrine system together.

The hypothalamus sends nerve impulses to the endocrine glands that control hunger, sleep, and other important body functions.

Pituitary

The structure immediately below the hypothalamus that is the size of a peanut communicates with the hypothalamus to control many body functions. This is the **pituitary gland**.

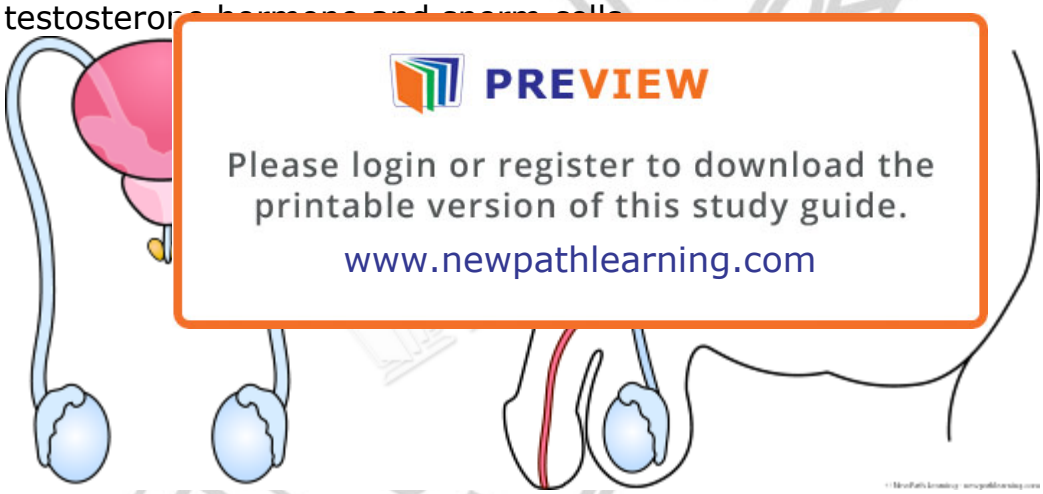
The pituitary gland releases hormones in response to receiving nerve impulses from the hypothalamus. The hormones from the pituitary gland direct other endocrine glands to take action.

Lesson Checkpoint:
Where is the hypothalamus located?

Male and female reproductive systems

As we learned in Topic 5, a male produces a sperm sex cell and a female produces an egg sex cell. When the two sex cells come together, the egg is fertilized and becomes a **zygote**.

The **male reproductive system** is specialized to produce the testosterone hormone and sperm cells.



The structures within the **scrotum**, a pouch of external skin, are called the testes. The **testes** produce the testosterone and the sperm cells.

Testosterone is the **hormone** that controls the physical characteristics of men. **Sperm** starts being produced in a male at some point during their teenage years. The sperm is composed of a head with the male DNA inside and a tail.

Once the sperm are formed in the testes, they mix with a fluid. The fluid produced is called **semen**. When the semen leaves the body, they exit through the urethra and a structure called the penis.

The **female reproductive organs** produce egg sex cells and nourish the developing offspring until birth if an egg is fertilized.

There are two **ovaries** that are located on each side of the body. The ovaries produce the egg cells and the hormone called **estrogen**. Estrogen is the **hormone** of the female reproductive system that controls the physical characteristics of a female. The ovaries are connected to the uterus by structures called **oviducts**. The uterus is a muscular organ where the egg develops after fertilization. Once the baby is fully developed, it exits through a muscular structure that leads to the outside of the body called the **vagina**.

A female goes through a monthly cycle of changes called the **menstrual cycle**. During this cycle, an egg is released from the ovaries while the uterus prepares for the arrival of a fertilized egg. The menstrual cycle begins when an egg matures in one of the two ovaries. The uterus starts to thicken at the same time.

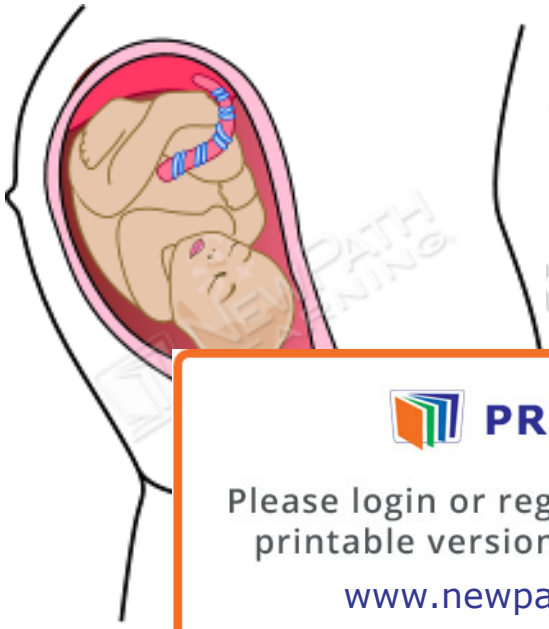
In a process called **ovulation**, the egg is released from the ovary into the oviduct. This is the time that an egg may be fertilized by a sperm cell. If the egg is not fertilized, both the egg and the lining of the uterus will begin breaking down and pass through the vagina in a process called **menstruation**. This process takes between 4 and 7 days. During menstruation another egg starts to mature. Menstruation begins in females from the ages 10 through 14 years of age.

Lesson Checkpoint:
What is happening in one ovary while a female is menstruating?

The Human Life Cycle

As we know, a fertilized egg becomes a **zygote**. The zygote develops into an **embryo**. Then the embryo develops into a **fetus**. Nine months after fertilization takes place, a baby will be born.

Once the zygote develops into an embryo, the embryo will attach to the lining of the uterus. A membrane will then surround the embryo and develop into a sac that is fluid-filled called an **amniotic sac**.



Another membrane will form that links the mother to the developing embryo called the **placenta**. Here the blood of the mother and the offspring will flow next to one another in capillaries. Nutrients and oxygen will diffuse across the capillaries supplying the embryo with those materials. Wastes will be brought out in the opposite manner. The blood of the mother does not mix with the blood of the developing embryo.

The **umbilical cord** forms between the embryo and the placenta. At about the 9th week of pregnancy, the embryo is called the fetus. Organs have already begun to develop at this point. After approximately nine months, the baby is ready to be born.

Lesson Checkpoint:
Why is the placenta important?

Three stages of childbirth

There are three separate stages of child birth: **labor, delivery, and afterbirth.**

Labor: The first stage of child birth called labor is when the muscles of the uterus begin to contract. These contractions cause the cervix to widen so that the baby can fit through the vagina.

Delivery: The second stage of birth is delivery. This is the process of the baby exiting the uterus through the vagina. The umbilical cord is cut moments after delivery.

Afterbirth: Shortly after delivery, the third stage of birth begins called the afterbirth. During this stage, the placenta is delivered through the vagina. Moments after a child is born, the child will begin to breathe on its own.

Stages of Human Growth

- **Infancy** is the first two years of a child's life when many changes occur and the child learns a tremendous amount of information. **Childhood** begins at the age of two.
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- **Adoles** e, when a child de During the trar l will enter **pubert** dy will be capable of reproduction. Other major mental and social changes occur during adolescence, which help to shape the individual.