

## Chapter- 10 Reaching the Age of Adolescence

Adolescence and Puberty

Role of Hormones in Human

Role of Hormones in Insects

Reproductive Health

## Adolescence and Puberty

The growth starts from the day we are born but there are sudden changes occurring in the body when we reach in our teens. These changes include change in voice, development of sex organs, increased activity of sweat and sebaceous glands, reaching mental, emotional and intellectual maturity and change in body shape.

The period of life, when the body undergoes changes, leading to reproductive maturity, is called **adolescence**. These changes mark the onset of **puberty**. The most important characteristics of puberty are that boys and girls become capable of reproduction.

### Changes at Puberty

There are several changes that occur at the onset of puberty.

#### Increase in Height

The most prominent change at adolescent is the increase in height. Boys suddenly grow taller in comparison to girls.

#### Change in Body Shape

In boys at puberty the shoulders broaden, muscles grow prominent and chest also widens whereas in girls the area below the waist broadens.

#### Voice Change

As air passes by the vocal cords, they open and close rapidly, resulting in pressure changes that result in the production of sound. The growing voice box in boys can be seen as a protruding part of the throat called Adam's apple. In girls larynx is small and hardly visible externally. They have high pitched voice unlike boys who have deep voice.

#### Increased Activity of Sweat and Sebaceous Glands

At puberty the secretions from sebaceous and sweat glands also increase due to which girls get acne and pimples on their faces.

#### Reaching Mental, Intellectual and Emotional Maturity

It is the time in one's life when the brain has the greatest capacity for learning. Some feel insecure and difficult to adjust to certain changes. All these changes are natural and occur in all.

### Development of Sex Organs

The sex organs also develop fully. The boys start secreting sperms from mature testes while in girls the ovaries enlarge and egg begin to mature and release every month.

### Secondary Sexual Characters

Secondary sexual characters are the characters that distinguish male from female. Like in boys the facial hair grows, that is, moustaches and beard along with hairs on chest. In girls breast begins to develop. Apart from these both in boys as well as girls, hair grows under the arms and in the region above the thighs or the pubic region.

## Role of Hormones in Human

Hormones are chemical messengers. These are secretions from **endocrine glands**, or endocrine system. Like the circulatory or reproductive system we also have endocrine system.

The endocrine glands secrete these hormones into the blood stream which reach the target site. This target site then further responds to the hormone. The endocrine glands secrete hormones directly into the bloodstream hence are called ductless glands whereas sweat glands and salivary glands produce their secretions through ducts.

At puberty, the ovaries and testes start secreting estrogen and testosterone respectively that is responsible for the secondary sexual character. Milk secreting glands called as the mammary glands develop inside the breasts. The production of these hormones is under the control of another hormone secreted from an endocrine gland called **pituitary gland**.

From the onset of puberty the reproductive phase of an individual starts, that is he or she becomes capable of reproduction because the male or female gametes are secreted from their respective sex organs.

In girls during this time the uterus walls thicken and prepare itself to receive the egg. If the fertilization occurs the embryo gets embedded in the uterus wall and if no fertilization occurs then the released egg and the thickened lining of the uterus along with its blood vessels are shed off. This leads to bleeding or menstruation. The menstrual flow marking the beginning of the puberty is called as **menarche**. The reproductive phase last for 45-50 years of age after which it stops. This Stoppage of menstruation is termed **menopause**.

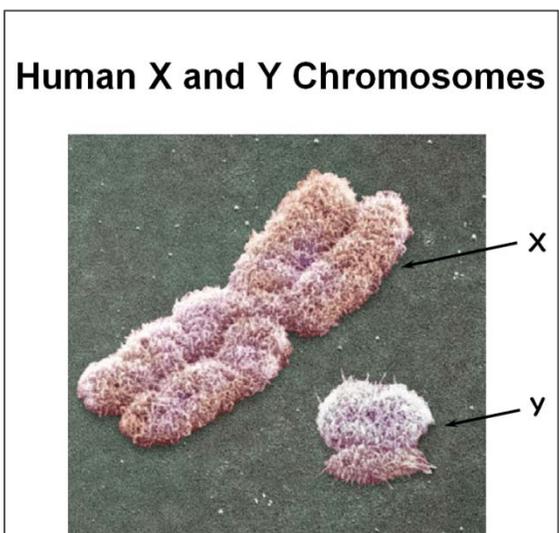
Menstrual cycle is also controlled by hormones. The cycle includes

- The maturation of the egg, its release,
- Thickening of uterine wall
- Breakdown if pregnancy does not occur.

### How is the Sex of the Baby Determined?

#### Boy or Girl?

Humans have 23 pairs of chromosomes. These chromosomes are thread like structures present in the nucleus of the cell. These contain DNA that posses the genetic information which is passed on to the next generation. Females have two X chromosomes while males have 1 X and 1 Y chromosomes. These are the sex chromosomes.

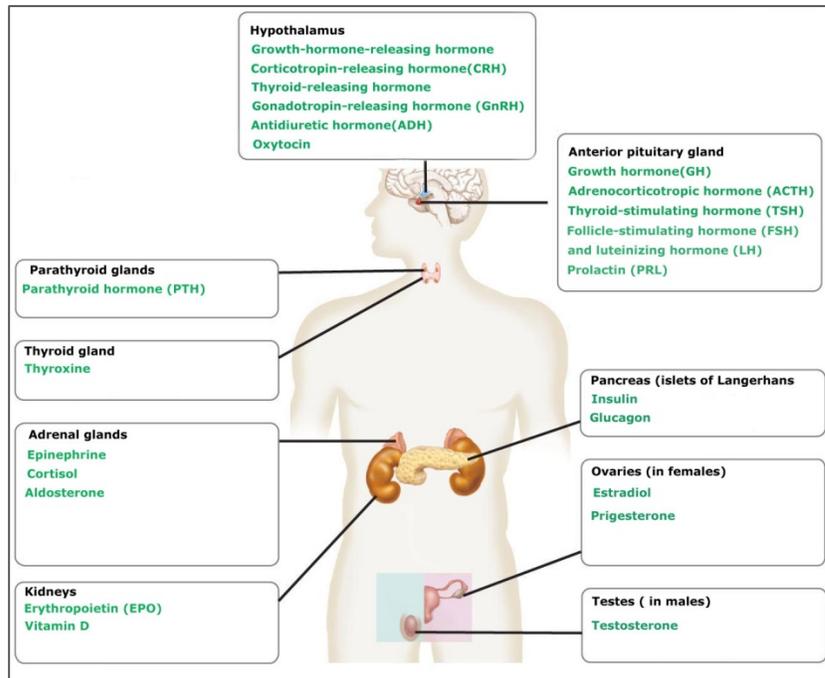


The rest of the 44 chromosomes are called as **autosomes**.

## Hormones other than Sex Hormones

There are other hormones also which are secreted by various glands of our body. The thyroid gland secretes **thyroxine** hormone which increases the rate of cell metabolism and regulates growth. It is caused due to deficiency of iodine in diet.

When the pancreas are not able to produce **insulin** in sufficient amounts the blood glucose level increases which causes diabetes.



## Glands and hormones secreted by them

**Adrenalin** helps the body to adjust to stress when one is very angry, embarrassed or worried. These are secreted by adrenal glands. These glands also secrete hormones that maintain the salt balance in blood.

Pituitary also secretes **growth hormone** which is necessary for the normal growth of a person.

## Role of Hormones in Insects

### Role of Hormones in completing the Life History of Insects and Frogs

This change from larva to adult is called **metamorphosis**. Metamorphosis in insects is controlled by **insect hormones**. The thyroxine hormone secreted by the thyroid gland is required for metamorphosis. Thyroxine production requires the presence of iodine in water. If it is not present in water, growth in tadpole stagnates.

## Reproductive Health

### Nutritional Needs of the Adolescents

For the proper development and well being, one should have a balanced diet which contains all the essential nutrients.

### Personal Hygiene

Adolescents should also take care of personal hygiene like bathing daily to avoid any bacterial infections.

Girls should be keeping extra cleanliness during menstrual flow and keep a track of their menstrual cycle.

### Physical exercise

Physical fitness is also essential hence boys and girls should exercise.

### Say "NO" to Drugs

Drugs are addictive. If you take them once, you feel like taking them again and again. They harm the body in the long run. They ruin health and happiness.

Another concern is HIV. This virus can spread by sharing the syringes used for injecting drugs. It can also be transmitted to an infant from the infected mother through her milk. The virus can also be transmitted through sexual contact with a person infected with HIV.



Balanced Diet

