



Chapter-10

Reaching the Age of Adolescence

Notes:

Adolescence is the period of life, when the body undergoes changes, leading to reproductive maturity. It begins around the age of 11 and lasts upto 18-19 years of age.

Adolescents are also known as **teenagers** since this period covers the teens (13 to 18 or 19 years of age).

Puberty is the process of several changes taking place in the body during adolescence leading to reproductive maturity.

Changes at puberty

- **Increase in height** due to elongation of long bones, i.e., the bones of the arms and legs.
- **Change in body shape.** In boys shoulders become broader and chest becomes wider. In girls the region below the waist becomes wider.
- **Voice change.** At puberty, the voice box or the larynx begins to grow. Boys develop larger voice box and can be seen as protruding part of the throat called Adam's apple. Boys have a deep voice, Girls have high pitched voice.
- **Increased activity of sweat and sebaceous glands** due to which appearance of pimples and acne on the face begin.
- **Development of sex organs.** In boys, sex organs like penis and testes develop completely. Testes begin to produce sperms. In girls, the ovaries enlarge and eggs begin to mature. Ovaries start releasing mature eggs.
- **Development of secondary sexual characters** .Secondary sexual characters are features that help to distinguish the male from the female. Boys begin to development hair on their face (moustaches and beard) and chest. Girls begin to development breasts. In both, boys and girls, hair begins to grow under the arms and in the pubic region.
- **At puberty, individuals reach mental, intellectual and emotional maturity.**

Hormones

Hormones are the chemical substances secreted by endocrine glands or ductless glands into the blood stream. Ex. Thyroxine hormone secreted by thyroid gland, adrenalin hormone secreted by adrenal gland, etc.

Sex hormones

- Hormones secreted by sex organs are called sex hormones.
- The male sex organs, testes secrete the male hormone or **testosterone**.
- The female sex organ, ovaries secrete the female hormone or **estrogen**.
- These hormones are responsible for the changes in the body of the adolescents.
- The production of these hormones is under the control of another hormone secreted from an endocrine called pituitary gland.

Role of hormones in initiating reproductive function

- Pituitary gland secretes hormones that stimulate testes and ovaries to release testosterone in male and estrogen in female.
- These hormones are released in the blood stream and reach the target site of the body.
- The target site responds to the hormone and stimulates changes in the body at the onset of the puberty.

Reproductive phase of life in humans

- In females, the reproductive phase of life begins at puberty (10 to 12 years of age) and generally lasts till the age of approximately 45 to 50 years.
- **Menstruation.** Menstruation is the process of shedding of the uterine lining of the body. With the onset of puberty, the ova (eggs) begin to mature and one matured ovum is released by one of the ovaries once in about 28 to 30 days. During this period, the wall of the uterus becomes thick and supplied with blood vessels so as to receive the fertilised egg. If the egg is left unfertilised, then the lining of the uterus breaks down and get released in the form of blood. This cycle occurs once in about 28 to 30 days.
- If fertilisation of the egg takes place then the fertilised egg begins to divide and then gets embedded in the uterus for further development into a baby.

- **Menarche.** The first menstrual flow begins at puberty (10 to 12 years of age) and is termed as menarche.
- **Menopause.** At 45 to 50 years of age, the menstrual cycle stops. Stoppage of menstruation is termed as menopause.

Determination of sex of unborn baby

- The sex chromosomes of the father determine the sex of an unborn baby.
- All human beings have 23 pairs (46) chromosomes in the nuclei of their cells. Two chromosomes out of these are sex chromosomes, named X and Y chromosomes.
- A female has two X chromosomes (44+ XX chromosomes).
- A male has one X and one Y chromosomes (44+XY chromosomes).
- The gametes (egg and sperm) have only one set of chromosomes (23 chromosomes).
- The unfertilised egg always has one X chromosome (22+X chromosomes).
- But sperms are of two kinds. One kind has an X chromosome (22+X chromosomes), and the other has a Y chromosome (22+Y chromosomes).
- When a sperm containing X chromosome (22+X chromosomes) fertilises the egg (22+X chromosomes), the zygote would have two X chromosomes (44+XX chromosomes) and develop into a female.
- If the sperm containing Y chromosome (22+Y chromosomes) fertilises the egg (22+X chromosomes), the zygote (44+XY chromosomes) would develop into a male.

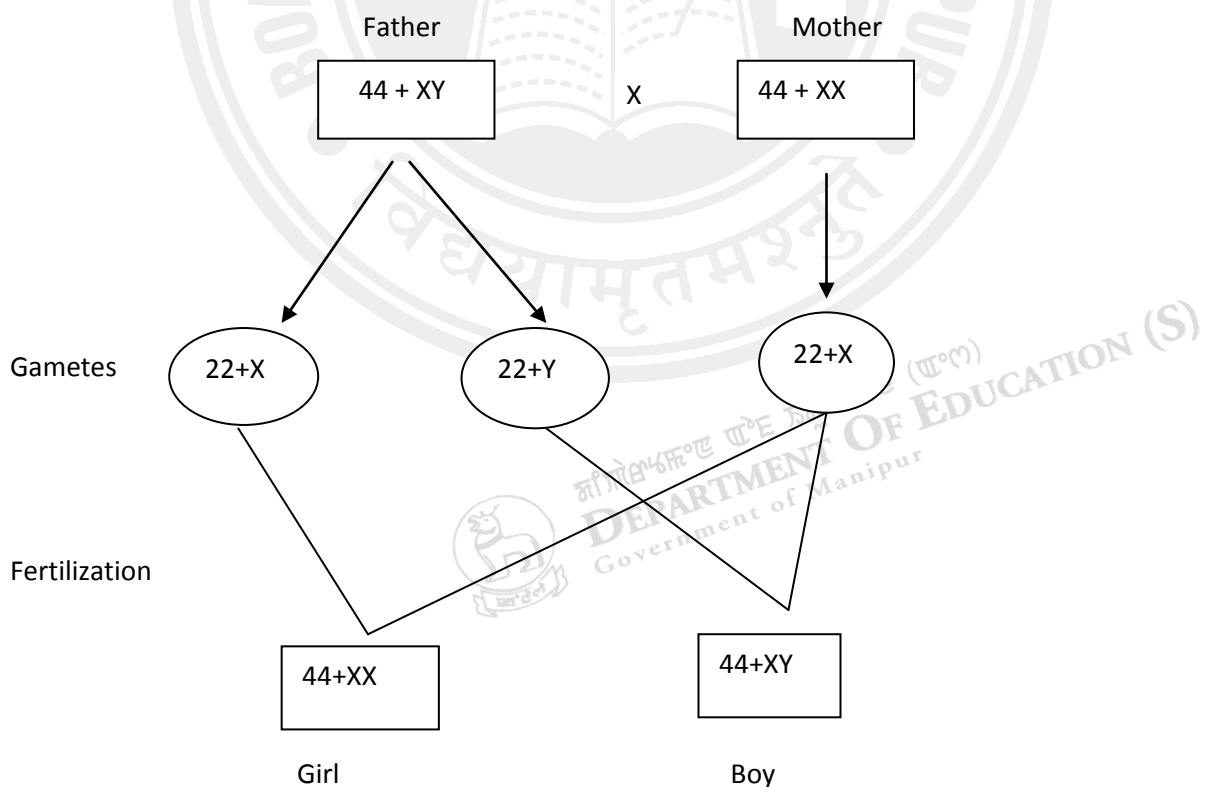


Fig.: Sex determination in humans.

Hormones other than sex hormones

- **Pituitary gland:** It secretes hormones that stimulate testes, ovaries, thyroid and adrenals to secrete their hormones. It also secretes growth hormone which is necessary for the normal growth of a person.
- **Thyroid gland:** It secretes the hormone **thyroxine**. Improper production of thyroxine causes enlargement of thyroid gland in the throat leading to **goitre**.
- **Pancreas gland:** It secretes the hormone **insulin**. Insufficient production of insulin causes **diabetes**.
- **Adrenal gland:** It produces the hormone **adrenalin**. It helps to adjust to stress when one is very angry, embarrassed or worried. It also secretes hormones which maintain the correct salt balance in the blood.

Role of hormones in insects and frogs

Hormones also play important roles in completing the life history of insects and frogs.

Metamorphosis is the process of transformation from an immature form to an adult form in two or more distinct stages. For example, the changes of silk moth larvae into adult moth, the transformation of tadpole into adult frog, etc.

Metamorphosis in insects is controlled by **insect hormones**.

In frogs thyroxine hormone produced by thyroid glands control their metamorphosis. However, thyroxine production requires the presence of iodine in the water.

Reproductive health

- Adolescents should eat balanced diet as at this period of life rapid growth and development takes place.
- Personal hygiene should be maintained during adolescence.
- The increased activity of sweat glands sometimes makes the body smelly. Therefore, one should bath at least once everyday.
- All the parts of the body should be washed and cleaned everyday to prevent from bacterial infections.
- Physical exercises should be done to keep the body fit and healthy.

Say no to drugs

- Say No to drugs unless prescribed by the doctor.
- Drugs are addictive.
- They harm the body in the long run.
- They ruin health and happiness.
- Drug users are at the high risk of HIV infection .

AIDS

- AIDS (Acquired Immunodeficiency Syndrome) is caused by HIV (Human Immunodeficiency Virus).
- This virus can be transmitted from infected person to a normal person by:-
 - a. Sharing syringes used for injecting drugs.
 - b. From the infected mother to an infant.
 - c. Blood transfusion from the infected person.
 - d. Sexual contact with the infected person.

Myths, taboos, dos and don'ts

Myths is a belief or an idea widely held but false.

Taboo is something prohibited by social customs.

There are myths and taboos regarding bodily changes that adolescents experience. Some of them are

- A girl becomes pregnant if she looks at boys during menstruation.
- The mother is responsible for the sex of the child.
- A girl should not be allowed to work in the kitchen during menstruation.

You may come across many other myths and taboos. Discard them.



DEPARTMENT OF EDUCATION (S)
Government of Manipur