

Chapter 10
Reaching The Age Of Adolescence

Topics to be covered:

- Adolescence and Puberty.
- Changes at Puberty.
- Secondary Sexual Characters.
- Role of hormones in initiating reproductive functions.
- Reproductive phase of life in humans.
- Sex determination.
- Other hormones in our body.
- Reproductive health

The period of life, when the body undergoes changes, leading to reproductive maturity, is called **adolescence**.

The period during which adolescents reach sexual maturity and become capable of reproduction is called **puberty**.

Changes at puberty

Increase in height

**Change in body
shape**

Voice change

**Increased activity
of sweat and
sebaceous glands**

**Development of
sex organs**

**Reaching mental
emotional and
sexual maturity**

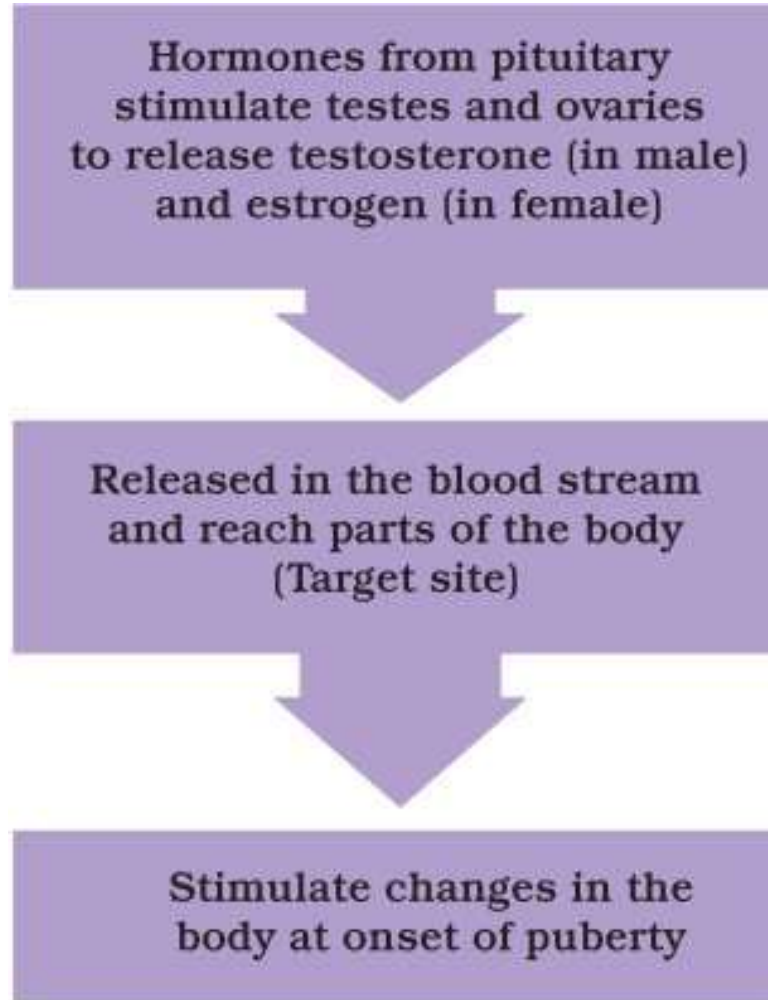
- **Increase in height-** At this time the long bones, that is, the bones of the arms and the legs elongate and make a person tall.
- **Change in body shape-** Shoulders generally broadens in boys as a result of growth. In girls, the region below the waist becomes wider. In boys, the muscles of the body grow more prominently than in the girls.
- **Voice change-** Boys develop larger voice boxes. The growing voice box in boys can be seen as a protruding part of the throat called Adam's apple. In girls, the larynx is hardly visible from the outside because of its small size.
- **Increased Activity of Sweat and Sebaceous Glands-** Many young people get acne and pimples on the face at this time because of the increased activity of these glands in the skin.
- **Development of Sex Organs-** The testes also begin to produce sperms. In girls, the ovaries enlarge and eggs begin to mature. Also ovaries start releasing mature eggs.
- **Reaching Mental, Intellectual and Emotional Maturity-** Adolescents are more independent than before and are also self conscious. Intellectual development takes place and they tend to spend considerable time thinking.

Secondary sexual characters

- The features help to distinguish the male from the female they are called **secondary sexual characters**. Boys also develop hair on their chest. In both, boys and girls, hair grows under the arms and in the region above the thighs or the pubic region.
- The changes which occur at adolescence are controlled by hormones. Hormones are chemical substances. These are secretions from endocrine glands.
- The male hormone or testosterone causes changes in boys for example, the growth of facial hair.
- The female hormone or estrogen which makes the breasts develop. Milk secreting glands or mammary glands develop inside the breasts.

Role of hormones in initiating reproductive functions.

Hormones from pituitary stimulate testes and ovaries to release testosterone (in male) and estrogen (in female)



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graph TD; A[Hormones from pituitary stimulate testes and ovaries to release testosterone (in male) and estrogen (in female)] --> B[Released in the blood stream and reach parts of the body (Target site)]; B --> C[Stimulate changes in the body at onset of puberty];
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Released in the blood stream and reach parts of the body (Target site)

Stimulate changes in the body at onset of puberty

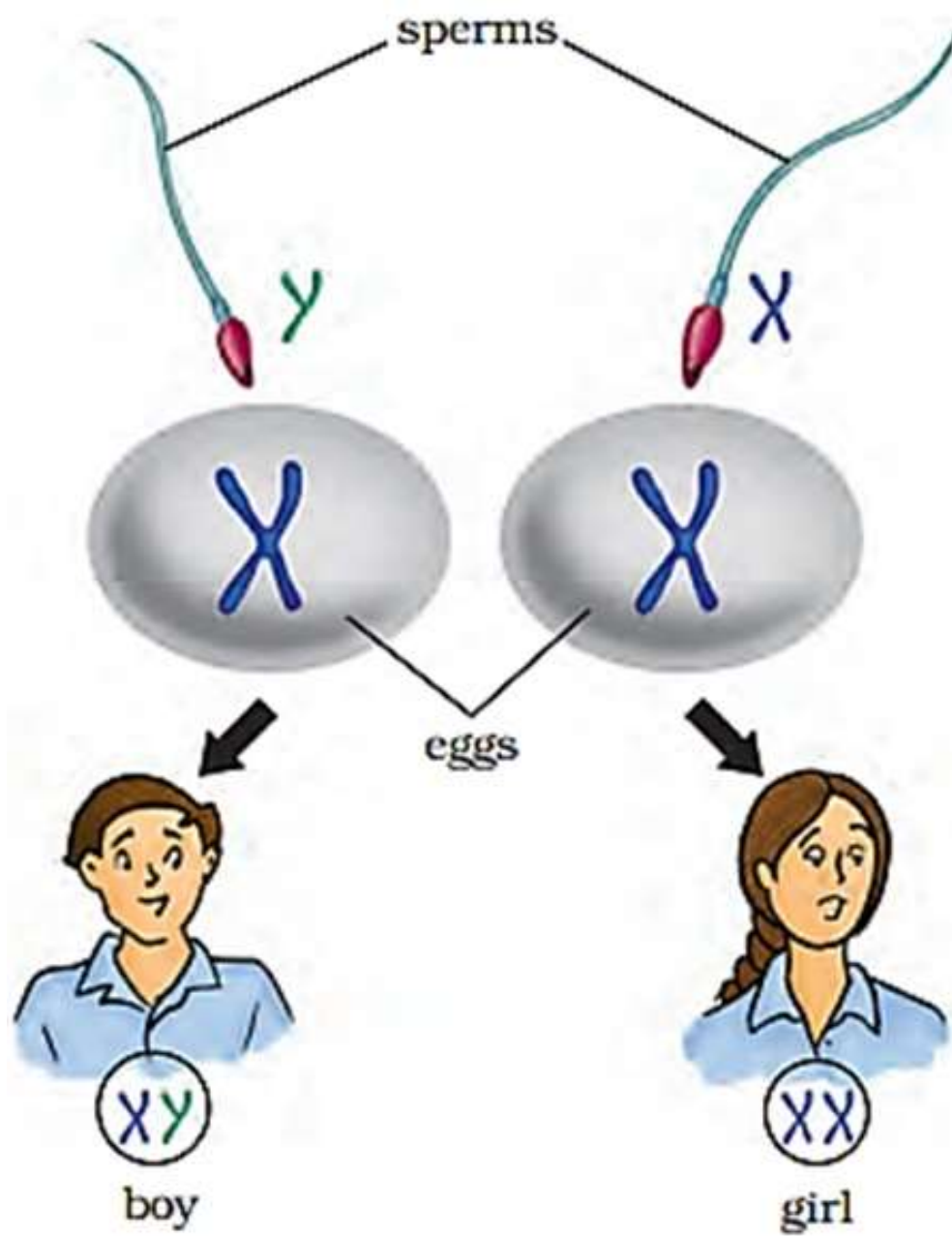
The onset of puberty is controlled by hormones

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.
- If fertilisation does not occur, the released egg, and the thickened lining of the uterus along with its blood vessels are shed off. This causes bleeding in women which is called menstruation.
- Menstruation occurs once in about 28 to 30 days.
- The first menstrual flow begins at puberty and is termed **menarche**.
- At 45 to 50 years of age, the menstrual cycle stops. Stoppage of menstruation is termed **menopause**.

Sex determination

- All human beings have 23 pairs of chromosomes in the nuclei of their cells.
- Two chromosomes out of these are the sex chromosomes, named X and Y.
- A female has two X chromosomes, while a male has one X and one Y chromosome. The gametes (egg and sperm) have only one set of chromosomes.
- The unfertilised egg always has one X chromosome. But sperms are of two kinds. One kind has an X chromosome, and the other kind has a Y chromosome.
- When a sperm containing X chromosome fertilises the egg, the zygote would have two X chromosomes and develop into a female child. If the sperm contributes a Y chromosome to the egg (ovum) at fertilisation, the zygote would develop into a male child.



Other hormones in our body.

<i>Name of the gland</i>	<i>Hormone secreted</i>
1. Thyroid gland	Thyroxine
2. Pancreas	Insulin
3. Adrenal gland	Adrenalin
4. Pituitary gland	Growth Hormone

Reproductive health

- Adolescence is a stage of rapid growth and development.
Hence the diet for an adolescent has to be carefully planned.
- A balanced diet means that the meals include proteins, carbohydrates, fats and vitamins in requisite proportions.
Milk is a balanced food in itself. Fruits also provide nourishment.
- Iron builds blood and iron-rich food such as leafy vegetables, jaggery, meat, citrus, Indian gooseberry *are good* for adolescents.

THANK YOU