

Lesson at a Glance

- **Adolescence:** The period of life, when the body *undergoes changes*, leading to *reproductive maturity* is known as *adolescence*.
- Generally, adolescence begins at the age of 11 and lasts upto 18 or 19 years of age. Adolescents are also called **teenagers** because they cover the period of the '*teens*' i.e. 13 to 18 or 19 years of age.
- **Puberty:** The period of adolescence during which a adolescent reaches sexual maturity and becomes able to have children.
- **Changes at Puberty**
 - During puberty sudden increase in height takes place. This happens due to elongation of long bones of legs and arms that make a person tall.
 - Girls grow faster than boys by about 18 years of age, both reach their maximum height. The rate of growth in height varies in different individual.
Height of an individual (male or female) depends on the genes inherited from parents. However, right kind of food during growing years is also essential.
 - Boys develop larger voice boxes (Larynx) to form a protruding part of throat called **Adam's Apple**. Boys have deep voice. In Girls, larynx is hardly visible (Adam's apple not visible). They have pitched voice.
 - **Change in Body Shape:** In boys, at the age of puberty, *shoulders generally broaden* as a result of growth. In boys, the muscles of the body grow prominently than in the girls. In girls, *the region below the waist becomes wider*. The muscles also comparatively grow less.

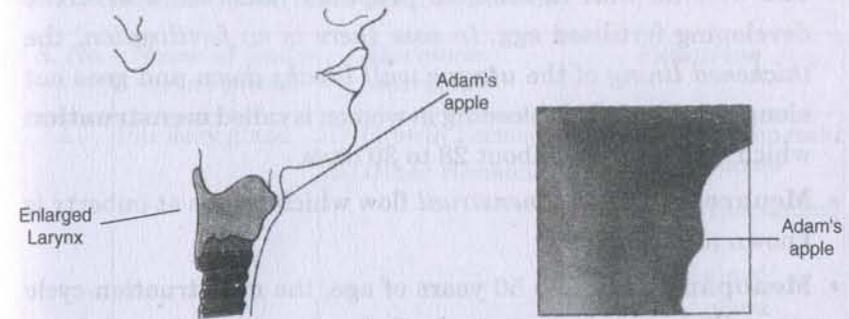


Fig. 10.1 Adam's apple in grown up boy.

- The secretion of *sweat glands* and *sebaceous glands* (oil glands) increases during puberty.
- **Development of Sex Organs:** In males, testes and penis develop completely. Tests start producing sperms. In girls, ovaries enlarge and eggs begin to mature. Ovaries start releasing mature eggs (ova).
- At puberty, individuals reach *mental, intellectual* and *emotional maturity*.
- **Secondary Sexual Character:** Such as development of breasts in girls, moustaches and beard in boys, begin to develop. *These characters that help in distinguishing the males from the females are called secondary sexual characters.* Boys also develop hair on their chest.
- **Hormones:** Hormones are chemical substances secreted in *endocrine glands*. They also known as *ductless glands*. These glands release hormones directly into the blood stream to reach a particular body part known as **target site**.
Hormones control the changes that occur at adolescence. The male hormone called *testosterone* is secreted by the *testes* at the onset of puberty and cause development of facial hair, chest hair etc. At the onset of puberty in girls, ovaries secrete **female hormone** or **estrogen** which makes the breast develop. Their secretion is under the pituitary endocrine gland.
- Reproductive phase lasts for a much longer time in males than in females.

- The uterine wall in females prepares itself to receive the developing fertilised egg. *In case there is no fertilisation, the thickened lining of the uterine wall breaks down and goes out alongwith blood. This bleeding in women is called **menstruation** which occurs once in about 28 to 30 days.*
- **Menarche:** The *first menstrual* flow which begins at puberty is known as *menarche*.
- **Menopause:** At 45 to 50 years of age, the menstruation cycle stops. Stoppage of menstruation is known as *menopause*.
- **Sex chromosome:** The thread structures present inside the nucleus of every cell are called *chromosomes*. All human beings have 23 pairs of chromosomes in nuclei of their cells. Two chromosomes out of these are the *sex chromosomes* known as X and Y. A female has two X chromosomes whereas a male has **one X and one Y chromosomes**.
- Sex of the unborn child depends on whether the zygote has XX or XY chromosome.

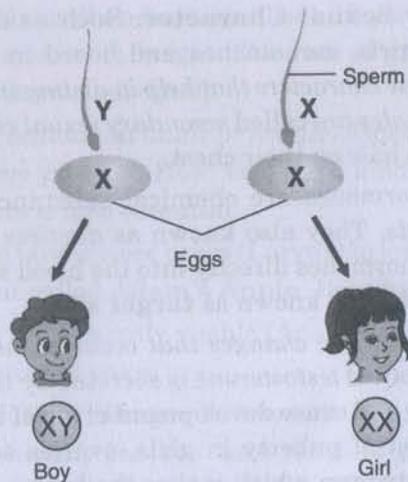


Fig. 10.2 Sex determination in humans.

• Hormones other than sex hormones

S. No.	Name of Endocrine gland	Hormone secreted	Functions
1.	Pituitary gland	(i) Growth hormone (ii) Other Hormones	Regulates normal growth of a person To regulate functioning of (a) Thyroid gland (b) Adrenal gland (c) Production of testosterone by testes and estrogen by ovaries.
2.	Thyroid gland	Thyroxine	Controls body metabolism. Lack of thyroxine causes Goitre . Sufficient iodine in diet prevents goitre.
3.	Pancreas	Insulin	Control carbohydrate metabolism. Lack of insulin secretion causes Diabetes .
4.	Adrenalin	(i) Hormone To keep salt balance (corticoids) (ii) Adrenalin	Maintains correct balance of salt-water in the blood. It helps the body to adjust to stress due to anger, worry or embarrassment.

- **Metamorphosis:** The change from larva to adult is called *metamorphosis*. In insects, metamorphosis is controlled by **insect hormones**. In frog, metamorphosis from tadpole to adult frog is controlled by **thyroxine** hormone which is produced by thyroid gland. Thyroxine production **requires the presence of iodine** in water.

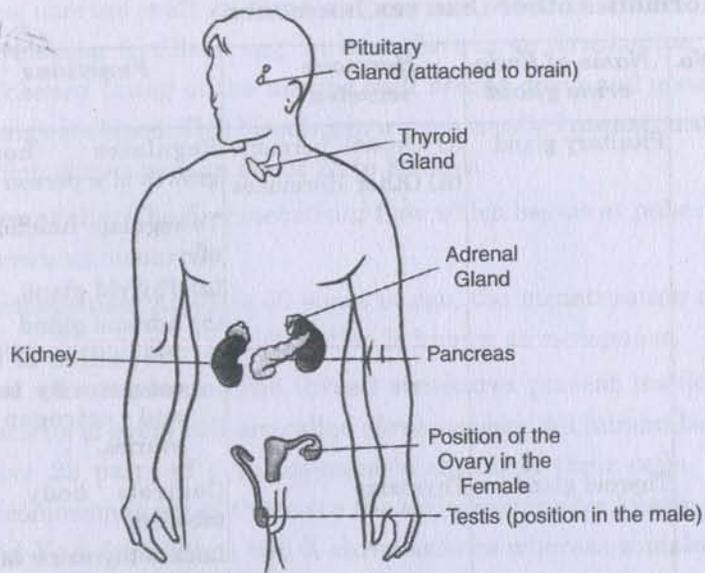


Fig. 10.3 Position of endocrine glands in the human body.

- **Nutritional need of the Adolescents:** Adolescence is a stage of rapid growth and development. Hence, the balanced diet is very important at this stage. Here, balanced diet means that the meals should include proteins, carbohydrates, fats, minerals and vitamins in requisite proportion.
- **Personal Hygiene:**
 - (a) It is more necessary for teenagers because the *increased activity* of sweat glands makes the body smelly. So, daily bath is necessary.
 - (b) If all body parts are not washed or cleaned everyday, the chances of **bacterial infection** are more.
 - (c) Girls should take special care of cleanliness during the time of menstrual flow.
- **Say "No" to Drugs:** Adolescence period is full of much activities, confusion or insecurity. Some people take advantage of this and lead adolescents to bad habits. They are addictive, and sexual contact with persons infected with HIV may happen. You should be firm to say **NO** to such activities because they run in your health and happiness.

TEXTBOOK QUESTIONS SOLVED

Q. 1. What is the term used for secretions of endocrine glands responsible for changes taking place in the body?

Ans. Hormones.

Q. 2. Define adolescence.

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

Q. 3. What is menstruation? Explain.

Ans. When the egg produced by ovary does not get fertilised, 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.

Q. 4. List the changes in the body that take place at puberty.

Ans. The changes in the body of puberty are:

- (i) Sudden increase in height.
- (ii) The bones of arms and legs elongate and make a person tall.
- (iii) Growing of hair at different parts of body.
- (iv) The voice of a boy gets hoarsed.
- (v) Development of sex organs.
- (vi) Growth of moustaches and beards in the boys.
- (vii) The breast in girls develops and hips become wider whereas in boys shoulders generally broaden.

Q. 5. Prepare a table having two columns depicting names of endocrine glands and hormones secreted by them.

Ans.

Table

Endocrine glands	Hormones
1. Pituitary gland	(i) Growth hormones
2. Ovaries	(ii) Estrogen
3. Testes	(iii) Testosterone
4. Thyroid	(iv) Thyroxine
5. Pancreas	(v) Insulin
6. Adrenal glands	(vi) Adrenalin

Q. 6. *What are sex hormones? Why are they named so? State their functions.*

Ans. The hormones which help and control the formation of secondary sexual characters are called sex hormones. They are called sex hormones because they control the sexual activities and help us to distinguish boys from girls.

The sex hormones help to develop the secondary sexual characters. Such as, in boys they control formation of sperms by testes and growth of facial hair. In girls they help to develop breasts, milk secreting glands or mammary glands.

Q. 7. *Choose the correct option.*

(a) *Adolescence should be careful about what they eat, because:*

(i) *proper diet develops their brains.*

(ii) *proper diet is needed for the rapid growth taking place in their body.*

(iii) *adolescents feel hungry all the time.*

(iv) *testes buds are well developed in teenagers.*

(b) *Reproductive age in women starts when their:*

(i) *menstruation starts.*

(ii) *breasts start developing.*

(iii) *body weight increasing.*

(iv) *height increases.*

(c) *The right meal for adolescents consists of:*

(i) *chips, noodles, cake.*

(ii) *chapati, dal, vegetable.*

(iii) *rice, noodles and burger.*

(iv) *vegetable cutlets, chips and lemon drink.*

Ans. (a) (ii) proper diet is needed for the rapid growth taking place in their body.

(b) (i) menstruation starts.

(c) (ii) chapati, dal, vegetable.

Q. 8. *Write notes on:*

(a) *Adam's apple*

(b) *Secondary Sexual characters*

(c) *Sex determination in unborn baby.*

Ans. (a) **Adam's apple:** The protruding part in the throat is called Adam's apple. It is the enlarged voice box or larynx. It makes the voice of boys coarse.

(b) **Secondary sexual characters:** The characters which help to distinguish the male from female are called secondary sexual characters. The characters like hair on chest under arms, development of breast, beard and moustaches are called secondary sexual characters.

(c) **Sex determination in unborn baby:** The sex of unborn baby is determined by the sex chromosomes. An unfertilized egg always has X chromosomes. Sperms are of two types. One contains X chromosomes and the other contains Y chromosomes. If sperm contributes a Y chromosome to the egg at fertilisation, the zygote would develop into male child. If a sperm containing X chromosome fertilises the egg, the zygote would develop into a female.

Q. 9. *Word game: Use the clues to work out the words.*

Across

3. *Protruding voice box in boys*

4. *Glands without ducts*

7. *Endocrine gland attached to brain*

8. *Secretion of endocrine glands*

9. *Pancreatic hormone*

10. *Female hormone*

Down

1. *Male hormone*

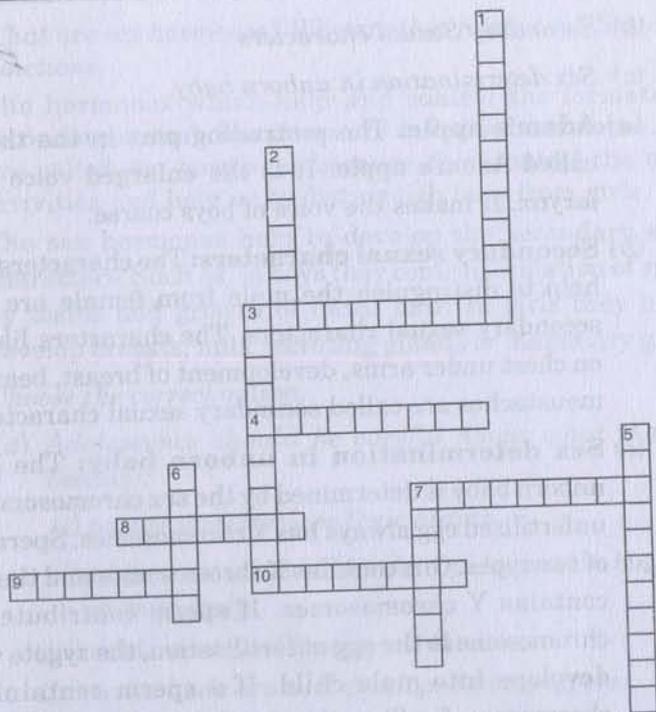
2. *Secretes thyroxine*

3. *Another term for teenage*

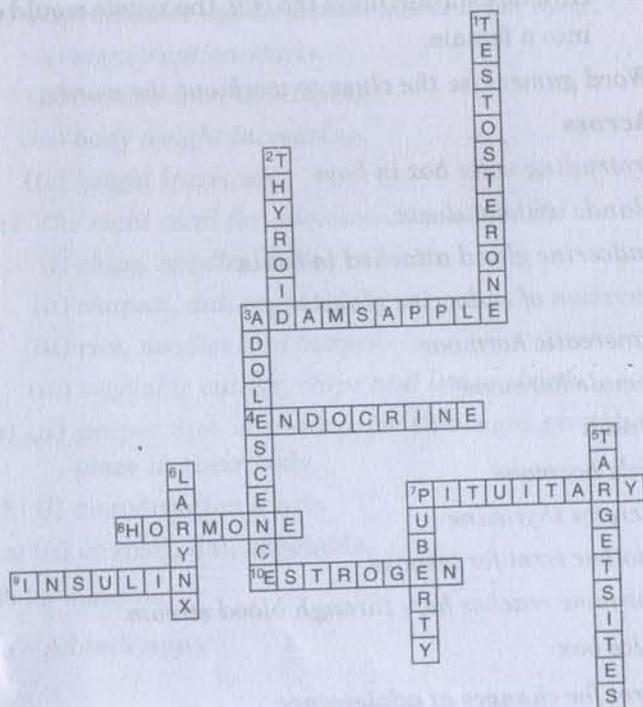
5. *Hormone reaches here through blood stream*

6. *Voice box*

7. *Term for changes at adolescence.*

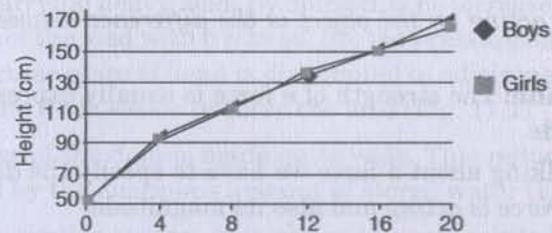


Ans.



Q. 10. The table below shows the data on likely heights of boys and girls as they grow in age. Draw graphs of height and age for both boys and girls on the same graph paper. What conclusions can be drawn from these graphs?

Age Year	Height (cm)	
	Boys	Girls
0	53	53
4	96	92
8	114	110
12	129	133
16	150	150
20	173	165



Ans. We conclude that initially, girls grow faster than boys but by about 18 years of age both reach about their maximum height. The rate of growth in height varies in different individuals.

