



# LITTERA PUBLIC SCHOOL

**CLASS 8**

**CHAPTER 10**

**SCIENCE**

## **REACHING THE AGE OF ADOLESCENCE**

### **Adolescence**

- The time period when the body undergoes changes to reach reproductive maturity is known as adolescence.
- It begins around the age of 11 and lasts till about 18 or 19 years of age.
- Adolescence in girls can begin one or two years earlier than boys.

### **Puberty**

- The various changes that occur in the body during adolescence marks the onset of puberty.
- Puberty ends when teenagers attain sexual maturity.

### **Changes that take place during puberty**

#### **Increase in height**

- It is caused by the growth in long bones of the arms and legs.
- Girls grow faster than boys initially but both reach their maximum height by the age of 18 years.

#### **Change in body shape**

- Boys develop broader shoulders, wider chests, and prominent muscles.

- In girls the region below the waist becomes wider.

### **Change in the voice pattern**

- Voice box or larynx starts growing during puberty.
- It protrudes in males in the neck region and is called Adam's apple.
  
- Boys develop deep low-pitched voice.
- Girls develop high-pitched voice.

### **Change in activity of sweat and sebaceous glands**

- The activity of sweat glands increases during puberty, resulting in production of more sweat.
- The oily secretions from sebaceous glands increase. The accumulation of oil and bacterial action leads to acne problems in teenagers.

### **Changes in sex organs**

- Testes and penis develop completely in boys.
- Testes start producing sperms.
- Ovaries develop completely and start producing eggs in girls.

### **Change in intellectual level**

- The learning capacity of brain increases.

- Intellectual development takes place during adolescence.
- Development of secondary sexual characteristics.
- Secondary sexual characteristics in boys
- Appearance of moustaches and beard.
- Appearance of hair on chest.
- Growth of hair in genital area and other parts.
- Secondary sexual characteristics in girls
- Increase in breast size
- Growth of hair in the pubic region.

### **Hormones**

- Hormones are chemical secretions that bring about various changes in the body.
- They are produced by endocrine glands.
- These glands release hormones into blood to reach specific target site.
- Production of hormones is under the control of hormones produced from pituitary gland.
- Hormones act as chemical messengers. They are secreted by living cells/tissues or organs called glands.
- They are secreted in very small quantities by glands.
- They act upon specific cells, tissues, or organs called the target sites.
- They are generally slow in action, but have long lasting effects.
- They either accelerate or inhibit a reaction.

### **Endocrine glands**

- Hormones are secreted by endocrine gland such as the pituitary gland, thyroid gland, adrenal gland, pancreas etc.

### **Major endocrine glands in humans are**

- (i) Pituitary
- (ii) Hypothalamus
- (iii) Pineal
- (iv) Thyroid
- (v) Parathyroid
- (vi) Thymus
- (vii) Pancreas
- (viii) Adrenal
- (ix) Testis in men /ovary in women

### **Pituitary gland**

- It is a pea sized gland situated at the base of the brain. It secretes a growth hormone (GH).
- It is required for proper body growth.
- The hypo secretion of growth hormone

### **Thyroid gland**

- It is located close to trachea in the neck. It produces a hormone called thyroxine.
- It is required for regulating metabolism in the body.
- The hypo secretion of thyroxine causes hypothyroidism.
- This condition causes abnormalities like simple goitre, myxoedema and cretinism.
- Lack of iodine leads to deficiency of thyroxine, which results in a disease called goitre.
- The excess secretion of thyroxine causes hyperthyroidism. It results in high metabolism

protrusion of the eye balls, high BP, nervous tension, etc.

### **Parathyroid Gland**

- There are four parathyroid glands present on back side of thyroid glands that secrete parathyroid hormone or parathormone (PTH).
- This hormone regulates the level of calcium ions in the bloodstream.
- Excess of parathyroid hormone removes calcium from bones and makes them soft.

### **Pancreas**

- It produces two hormones- Insulin and Glucagon.
- These hormones maintain blood sugar level.
- Deficiency of insulin results in diabetes.

### **Adrenal Gland**

- There are two adrenal glands located one on upper part of each kidney.  
It has two parts- cortex and medulla.
- Cortex secretes the hormones like cortisol that regulates the rate of metabolism.
- The medulla secretes a hormone like adrenaline that prepares the body to face various stressful situations.

### **Gonads**

- It includes testes in males and ovaries in females.
- Male sex hormone is testosterone. It is produced by the testes on the onset of puberty.

- Female sex hormones produced by ovaries are estrogen and progesterone.
- Deficiency of estrogen causes infertility.

### **Process of Hormonal Action**

- Endocrine glands release their secretions (hormones) into the bloodstream.
- Hormones, on reaching their target site, bring about necessary changes to maintain proper functioning of the body.

### **Personal health and hygiene in adolescents**

- Adolescents should have a balanced diet with right proportions of various nutrients.
- Adolescents should maintain cleanliness to prevent bacterial infections.
- They should indulge in some physical exercises to keep their bodies fit.
- They should avoid the consumption of drugs and alcohol.

### **Sex determination in humans**

**Autosomes:** First 22 pairs of chromosomes that do not determine the sex of an individual.

**Sex chromosomes:** Last pair of chromosomes, represented as X and Y.

- **Females** have two X chromosomes, so can be represented as 44+XX.
- **Males** have one X and one Y chromosome, so can be represented as 44+XY.
- Each gamete receives half of the chromosomes i.e. 22+X or 22+Y.

- Male gametes have 22 autosomes and either X or Y sex chromosome. Male gametes can be of two types, 22+X or 22+Y.
- Female gametes can be of only one type, 22+X.

Sex of a baby is determined by the type of the male gamete (X or Y) that fuses with the female gamete.