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Chapter -

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**REACHIING THE AGE
OF
ADOLESCENCE**

ADOLESCENCE AND PUBERTY

Growing up is a natural process. The period of life, when the body undergoes changes, leading to reproductive maturity, is called adolescence. Adolescence begins around the age of 11 and lasts upto 18 or 19 years of age. Since this period covers the 'teens' (13 to 18 or 19 years of age), adolescents are also called 'teenagers'. In girls, adolescence may begin a year or two earlier than in boys. Also, the period of adolescence varies from person to person.

The human body undergoes several changes during adolescence. These changes mark the onset of puberty. The most important change which marks puberty is that boys and girls become capable of reproduction. Puberty ends when an adolescent reaches reproductive maturity.

CHANGES AT PUBERTY

1. Increase in Height: The most conspicuous change during puberty is the sudden increase in height. At this time the bones of the arms and the legs elongate and make a person tall. Initially, girls grow faster than boys but by about 18 years of age, both reach their maximum height. The rate of growth in height varies in different individuals. Height of an individual is more or less similar to that of some family member. This is because height depends on the genes inherited from parents.

2. Change in Body Shape: When boys entered the age of puberty their shoulders generally broaden 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. Thus, changes occurring in adolescent boys and girls are different.

3. Voice Change: At puberty, the voice box or the larynx begins to grow. 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. Generally, girls have a high pitched voice, whereas boys have a deep voice.

4. Increased Activity of Sweat and Sebaceous

Glands: During puberty the secretion of sweat glands and sebaceous glands (oil glands) increases. Many young people get acne and pimples on the face at this time because of the increased activity of these glands in the skin.

5. Development of Sex Organs: At puberty, male sex organs like the testes and penis develop completely. The testes also begin to produce sperms. In girls, the ovaries enlarge and eggs begin to mature. Also ovaries start releasing mature eggs.

6. Reaching Mental, Intellectual and Emotional

Maturity: Adolescence is also a period of change in a person's way of thinking. Adolescents are more independent than before and are also self-conscious. Sometimes, however, an adolescent may feel insecure while trying to adjust to the changes in the body and mind.

SECONDARY SEXUAL CHARACTERS

Testes and ovaries are the reproductive organs. They produce the gametes, that is, sperms and ova. In girls, breasts begin to develop at puberty and boys begin to grow facial hair, that is, moustaches and beard. As these 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, or endocrine system.

The male hormone or testosterone begins to be released by the testes at the onset of puberty. Once puberty is reached in girls, ovaries begin to produce the female hormone or estrogen which makes the breasts develop. Milk secreting glands or 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.

ROLE OF HORMONES IN INITIATING REPRODUCTIVE FUNCTION

Endocrine glands release hormones into the bloodstream to reach a particular body part called target site. The target site responds to the hormone. There are many endocrine glands or ductless glands in the body. The testes and ovaries secrete sex hormones.

Further, the sex hormones are under the control of hormones from the pituitary gland. The pituitary secretes many hormones, one of which makes ova mature in the ovaries and sperms form in the testes.

REPRODUCTIVE PHASE OF LIFE IN HUMANS

Adolescents become capable of reproduction when their testes and ovaries begin to produce gametes. The capacity for maturation and production of gametes lasts for a much longer time in males than in females.

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. The ova begin to mature with the onset of puberty. One ovum matures and is released by one of the ovaries once in about 28 to 30 days. During this period, the wall of the uterus becomes thick so as to receive the egg, in case it is fertilised and begins to develop. This results in pregnancy. 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. Initially, menstrual cycle may be irregular. It takes some time to become regular.

Menstrual cycle is controlled by hormones. The cycle includes the maturation of the egg, its release, thickening of uterine wall and its breakdown if pregnancy does not occur. In case the egg is fertilised it begins to divide and then gets embedded in the uterus for further development.

HOW IS THE SEX OF THE BABY DETERMINED?

Boy or Girl?

Inside the fertilised egg or zygote is the instruction for determining the sex of the baby. This instruction is present in the thread-like structures, called chromosomes in the fertilised egg.

Chromosomes are present inside the nucleus of every cell. 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.

HORMONES OTHER THAN SEX HORMONES

The hormones secreted by the pituitary stimulate testes and ovaries to produce their hormones.

Pituitary gland is an endocrine gland. It is attached to the brain. Apart from the pituitary, the testes and the ovaries, there are other endocrine glands in the body such as thyroid, pancreas and adrenals. 'Goitre', a disease of the thyroid gland. Thyroid gland was not producing the hormone thyroxine.

'Diabetes' is because pancreas was not producing the hormone insulin in sufficient quantities.

Adrenal glands secrete hormones which maintain the correct salt balance in the blood.

Adrenals also produce the hormone adrenalin. It helps the body to adjust to stress when one is very angry, embarrassed or worried.

Thyroid and adrenals secrete their hormones when they receive orders from the pituitary through its hormones.

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

Role of Hormones in Completing the Life History of Insects and Frogs

The tadpole passes through certain stages to become a frog. This change from larva to adult is called metamorphosis. Metamorphosis in insects is controlled by insect hormones. In a frog, it is controlled by thyroxine, the hormone produced by thyroid. Thyroxine production requires the presence of iodine in water. If the water in which the tadpoles are growing does not contain sufficient iodine, the tadpoles cannot become adults.

Reproductive Health

The physical and mental well-being of an individual is regarded as an individual's health. To keep the body healthy, every human being, at any age, needs to have a balanced diet. The person must also observe personal hygiene and undertake adequate physical exercise.

During adolescence, however, these become even more essential as the body is growing.

Nutritional Needs of the Adolescents

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.

Personal Hygiene

Everyone should have a bath at least once every day. It is more necessary for teenagers because the increased activity of sweat glands sometimes makes the body smelly. If cleanliness is not maintained there are chances of catching bacterial infection.

Girls should take special care of cleanliness during the time of menstrual flow. They should keep track of their menstrual cycle and be prepared for the onset of menstruation. Use sanitary napkin or clean homemade pads. Change pads after every 4–5 hours as per the requirement.

Physical exercise

Walking and playing in fresh air keeps the body fit and healthy. All young boys and girls should take walks, exercise and play outdoor games.

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