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Reaching the Age of Adolescence

Adolescence

- The period of life of a person when the body undergoes a lot of changes leading to reproductive maturity is called **adolescence**.
- It begins around the age of 10 or 11 years and lasts up to 18 or 19 years.

Puberty

- The period during which adolescent boys and girls reach sexual maturity and become capable of reproduction is called **puberty**.
- Girls attain puberty at the age of 10–13 years, while boys reach puberty at the age of 12–14 years.

Changes at the Time of Puberty

Increase in height	• Sudden increase in height occurs due to elongation of the bones of the arms and legs.
Change in body shape and appearance	• Boys develop broader shoulders and hips and wider chests than girls. • Girls develop breasts while boys develop facial hair.
Change in voice	• The voice box or larynx becomes bigger in boys which imparts a deep or low-pitched voice.
Increased activity of sweat and sebaceous glands	• Several young boys and girls suddenly get a lot of acne and pimples on their face due to increased secretion from the sweat glands and sebaceous glands during puberty.
Development of sex organs	• In males, the male sex organs i.e. the testes and the penis enlarge and develop completely. The testes begin to produce sperms. • In females, the female sex organs i.e. the ovaries, the oviducts and the uterus enlarge and develop completely. The eggs begin to mature. The ovaries start releasing mature eggs.
Reaching mental, intellectual and emotional maturity	• Adolescence brings about physical, emotional and intellectual changes. There is a change in the individual's way of thinking. • They become more independent and self-conscious.

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Secondary Sexual Characters in Humans

- Secondary sexual characters are controlled by hormones.
- **In males**- hair growth on the face, broadening of shoulders and chest, deepening of voice, Adam's apple.
- **In females**- development of breasts, broadening and curving of hips thereby leading to their prominence, development of a shrill voice.

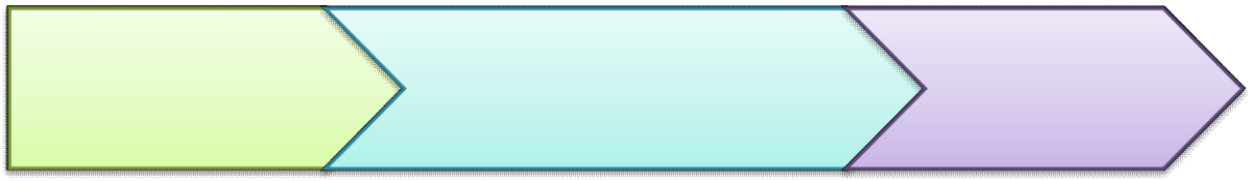
Hormones

- **Hormones** are chemical substances secreted by the endocrine glands which coordinate the activities of living organisms along with their growth.
- **Endocrine glands** are ductless glands which secrete hormones directly into the bloodstream.

The endocrine glands produce hormones in very small quantities.

A hormone produced in one part of the body produces an effect in another part of the body called the target site.

The target site then responds to the effect of the hormone.



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Role of Hormones in Initiating Reproductive Function

- At the onset of puberty, the male sex hormone **testosterone** is released by the testes in males. In females, the ovaries begin to produce the female sex hormone **oestrogen**.
- The production of both these hormones is controlled by **gonadotropin-releasing hormone** secreted by the **pituitary gland**, which is an endocrine gland.

Hormones Other than Sex Hormones

ENDOCRINE GLAND	HORMONES PRODUCED
Pituitary gland	Secretes various hormones such as Growth hormone (GH), Thyroid-stimulating hormone (TSH), Follicle-stimulating hormone (FSH) etc. some of which regulate the activities of other endocrine glands.
Thyroid gland	Secretes thyroxine which controls metabolism of carbohydrates, fats and proteins and calcitonin which regulates calcium and phosphate levels in the blood.
Pancreas	The alpha cells of the pancreas secrete the hormone glucagon. The pancreatic beta cells secrete the hormones insulin and amylin. Glucagon and insulin together regulate the metabolism of sugars in the body.
Adrenal gland	The adrenal gland secretes aldosterone which regulates the metabolism of minerals, specifically sodium Na^+ and potassium K^+ ions. It also produces adrenaline which regulates the heart rate, the blood pressure, the breathing rate and the carbohydrate metabolism.

Role of Hormones in Metamorphosis

- Insects and amphibians produce hormones for regulating their development. They undergo changes in their form through the process of **metamorphosis**.
- In the **silk moth**, the changes in the life cycle from an egg to larva to pupa and finally to an adult are controlled by hormones produced by the insect.
- In **frogs**, metamorphosis is controlled by the hormone **thyroxine** produced by the thyroid gland.

Reproductive Phase of Life in Humans

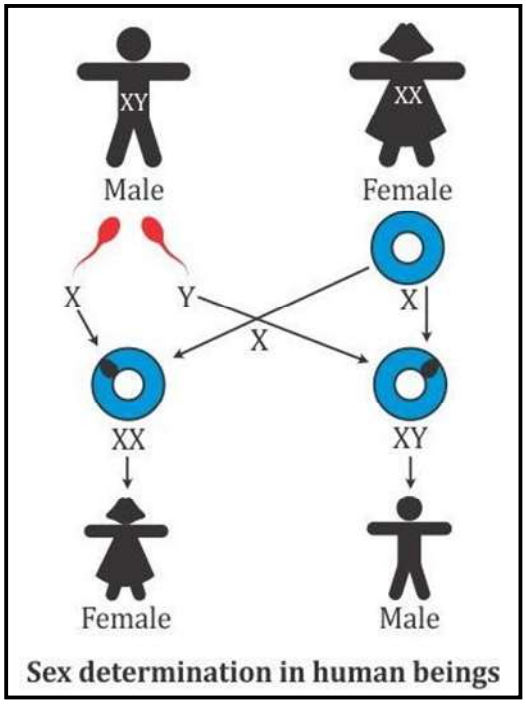
- The reproductive phase in males lasts throughout their life while in females, it begins around the age of 10-12 years and lasts until the age of 45-50 years.
- The release of an ovum from an ovary is termed as **ovulation**. Once in every 28-30 days, a single

ovum matures and is released by one of the two ovaries.

- Several changes begin to occur in the uterus before ovulation. The inner lining or the walls of the **uterus become thick, soft and spongy**, full of tiny blood vessels to receive the fertilized egg.
- If the ovum gets fertilized, it results in pregnancy. If fertilization does not occur, the released egg, and the thickened lining of the uterus along with its blood vessels are shed off.
- **Menstruation** or menstrual flow is the breaking off and removal of the inner thick lining of the uterus along with its blood vessels and tissues in the form of vaginal bleeding.
- It occurs once in about 28 to 30 days and lasts for about 3 to 5 days.
- The menstrual cycle is controlled by **hormones**.
- The first menstrual cycle begins at puberty and is known as **menarche**. It begins at around the age of 13 years.
- The menstrual cycle stops around the age of 45-50 years. It is known as **menopause**. It marks the end of the reproductive phase in females.

Sex Determination

- The phenomenon or the process which determines whether the developing embryo will be a male or a female is known as **sex determination**.
- The sex of the baby is determined by the type of sex chromosome present in the fertilized egg from



Sex determination in human beings

which the baby develops.

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Reproductive Health

- **Reproductive health** is defined as a state of physical, mental and social well-being of a person in all matters relating to the reproductive system at all stages of life.

Conditions to Maintain Good Reproductive Health during Adolescence

Nutritional needs of adolescents	• A balanced diet which contains each food constituent in the correct amount sufficient for the normal growth and development of the body to keep one healthy should be consumed.
Personal hygiene	• Maintenance of personal hygiene is necessary for preventing diseases and preserving good health.
Physical exercise	• Physical exercises such as brisk walking, jogging, swimming, cycling, dancing, playing outdoor games etc. should be performed regularly.
No consumption of drugs	• Drugs are addictive. • They cause damage to the liver, brain, lungs and kidney.

Myths and Taboos Regarding Reproduction

- A widely held but false belief is known as a **myth** and something prohibited by social customs is called a **taboo**.
- An important myth in the minds of many people is that the mother is responsible for the sex of her child. Scientifically, it is the father who determines the sex of the unborn child.
- An important taboo in the minds of many people is that a girl should not be allowed to work in the kitchen during the days of menstruation. Menstruation is a natural process and there is no harm if a girl works in the kitchen or goes out for work. However, proper care of personal hygiene should be taken during the days of menstrual flow.