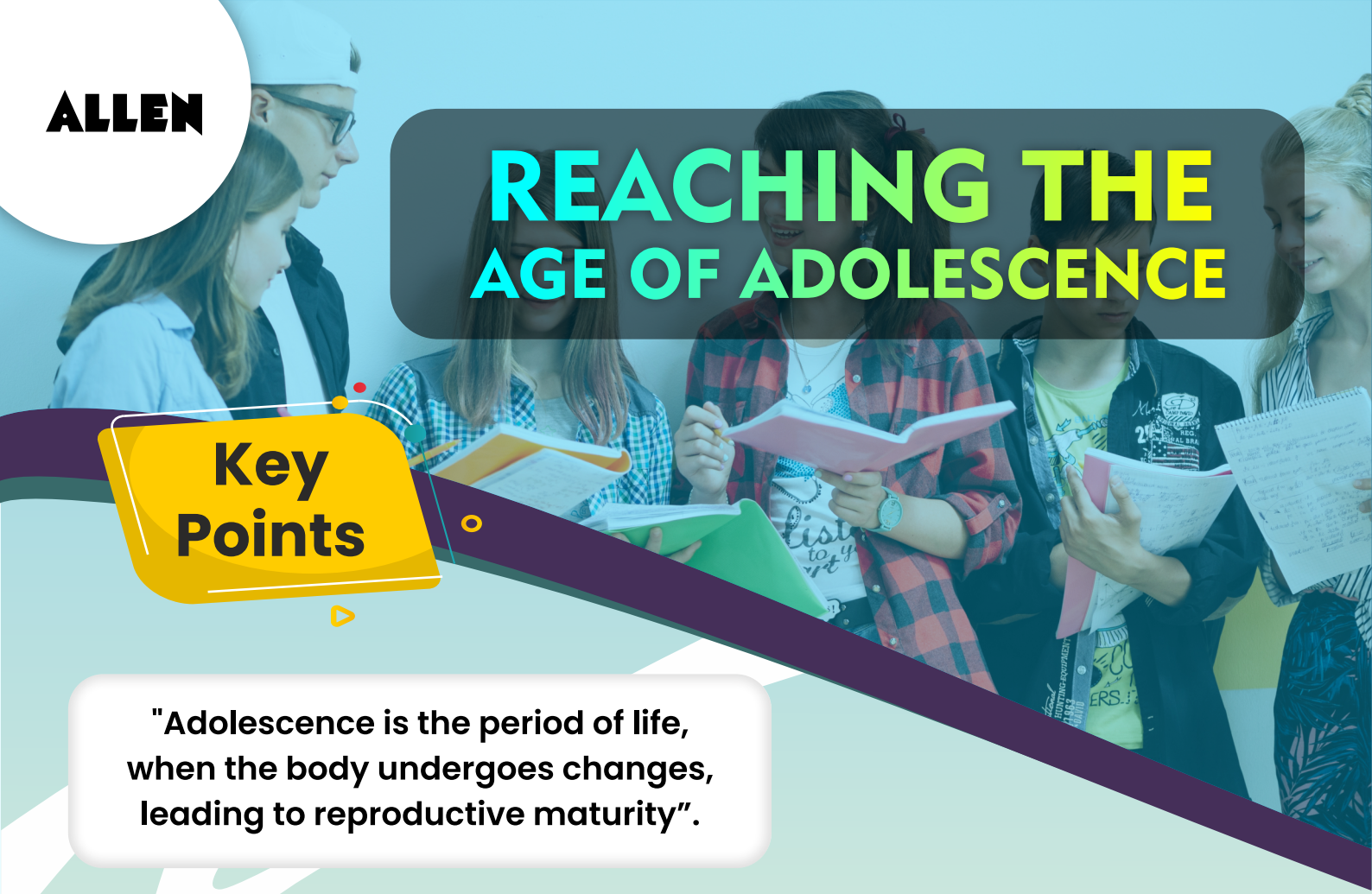
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REACHING THE AGE OF ADOLESCENCE



Key Points

"Adolescence is the period of life, when the body undergoes changes, leading to reproductive maturity".

INFANCY

The stage of growth of a baby from birth to about two years of age.

In this period-

- A Baby grows very fast.
- Learn to sit, stand, walk, eat solid food.
- Express its feeling.
- Recognizes people.





CHILDHOOD

Age of two to twelve years.

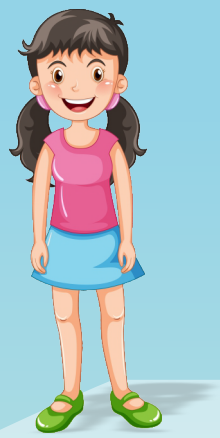
- Children grow in size and weight.
- They grow intellectually, emotionally and socially.

ADULTHOOD

- When the reproductive organs start producing gametes (sperm and ova) and the body become capable of reproduction. This stage is known as adulthood.



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ADOLESCENCE

- The period of transition from childhood to adulthood.
- Various biological and psychological changes occur.
- It is the stage of rapid growth and development which begins around the age of eleven and last up to eighteen or nineteen years of age.
- Adolescents are called 'teenagers'.This period covers the 'teens'(thirteen to eighteen or nineteen years of age).

Note

The period of adolescence varies from person to person. In girls, adolescence may begin one or two years earlier than boys. Increase in height and hairy line above the lips in boys are signs of adolescence.

PUBERTY

- The age at which sex hormones and gametes begin to be produced is called puberty.
- The rapid growth in adolescence is due to the two hormones-

(1) Sex hormones (2) Growth hormones

PUBERTY AGE	GENDER
14 to 15 years	Boys
11 to 12 years	Girls



CHANGES AT PUBERTY

- Increase in height
- Change in body shape
- Voice Change
- Increased activity of sweat and sebaceous gland

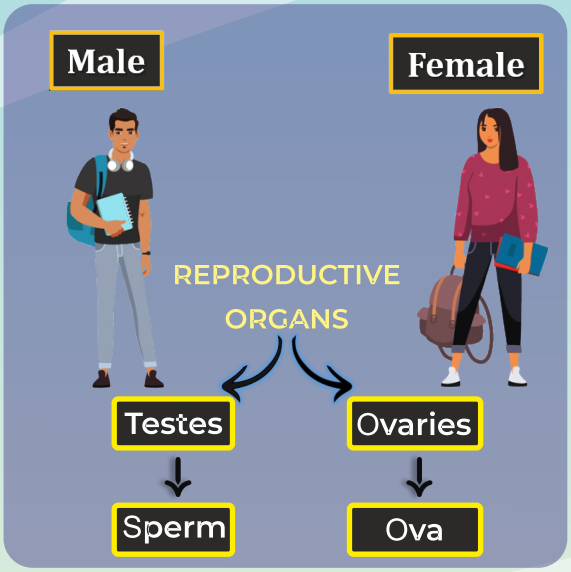
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Reaching mental, intellectual and emotional maturity

Development of sex organs

Secondary sexual characters

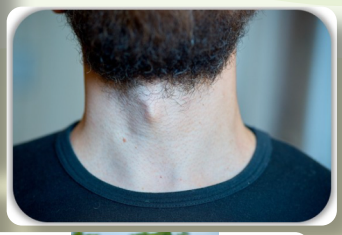
- **Secondary sexual characters–**
  The features which help to distinguish the male from the female.



- **Secondary sexual characters in male**

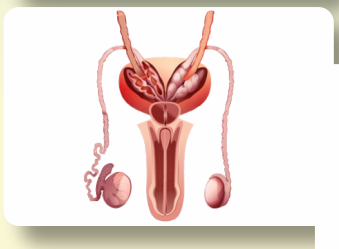
Widening of shoulders.

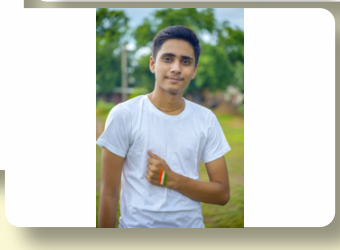




Deepening of voice.

Growth of sex organs (testes and penis).





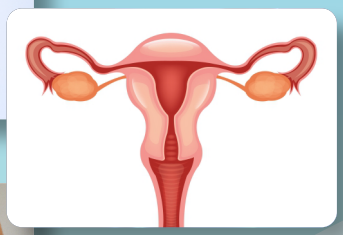
Appearance of beard and moustaches.

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Secondary sexual characters in female

Widening of pelvis and hips.





Maturation of secondary sex organs like fallopian tubes, uterus.

Initiation of menstrual cycle.





High pitch voice.

Growth of mammary glands (breasts).

Similar secondary sexual characters in male and females are :

- Growth of hair in armpits and around pubic area.
- Increased activity of sweat and sebaceous glands.
- Oily skin and appearance of pimples.
- Darkening in skin colour of the genital area.

Endocrine System

- All the changes which occur at adolescence are controlled by hormones.

Hormones

- Hormones are chemical substances which are secreted from endocrine glands, or endocrine system.

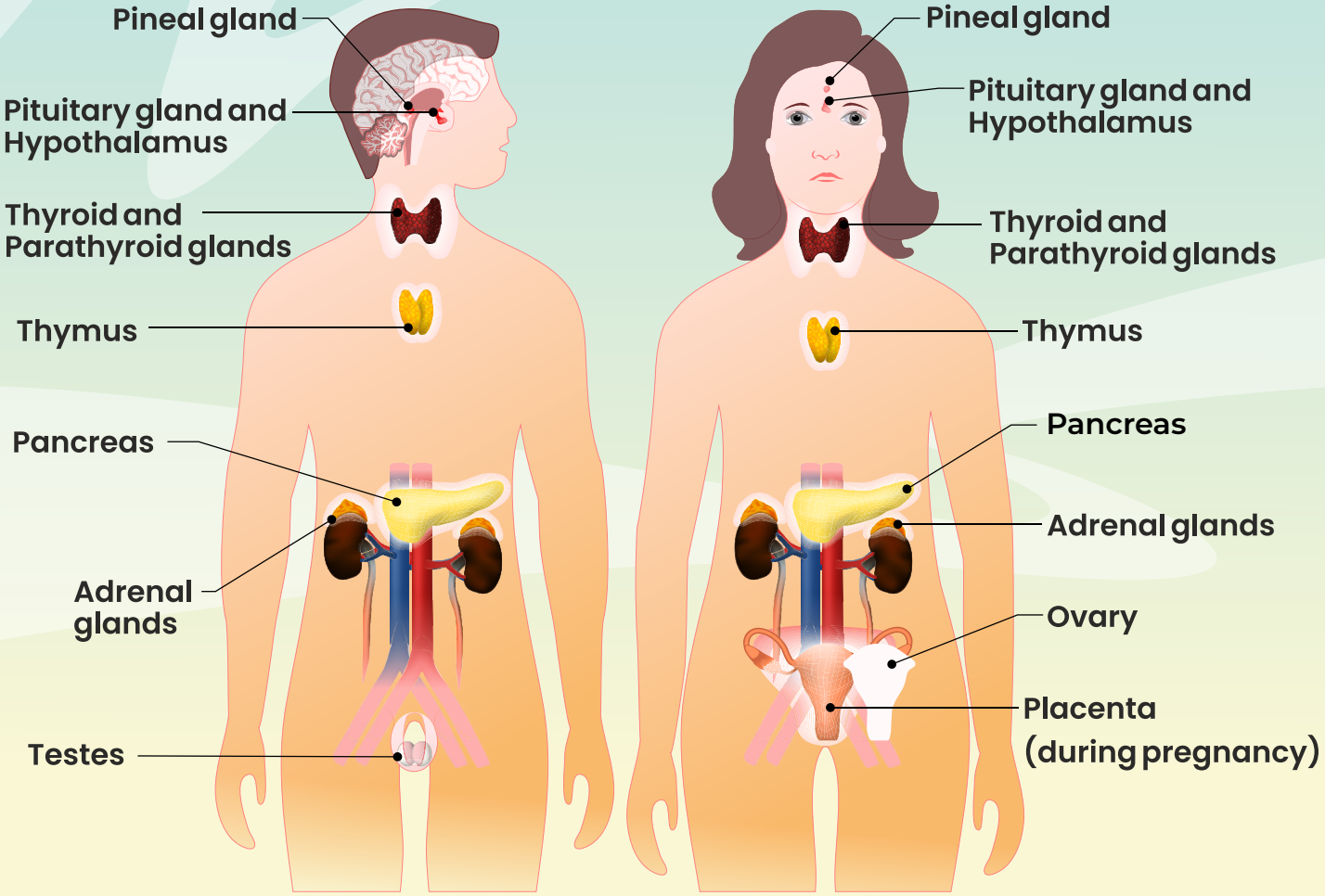


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Endocrine glands

- These are ductless glands which secrete their secretions directly into the blood.

Some important endocrine glands are as follows :



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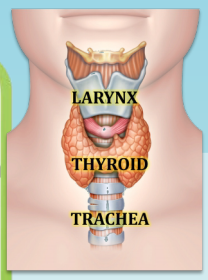


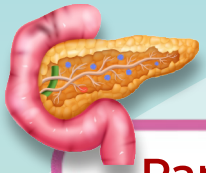
Pituitary

- In brain
- GH(Growth Hormone)
- Body Growth

Thyroid

- Located in the neck between the trachea and larynx.
- Thyroxine.
- Growth and Development





Pancreas

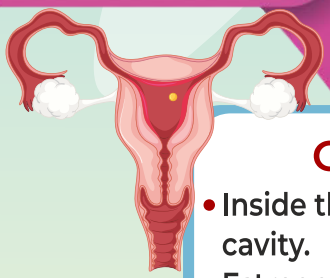
- In the loop of duodenum.
- Insulin.
- Regulates the level of glucose in blood.

Endocrine Glands



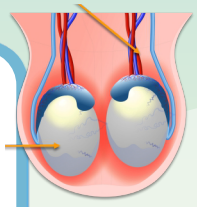
Adrenal glands

- Above kidney
- Adrenaline (Emergency Hormone)
- Increases heartbeat, blood pressure and blood glucose level.



Ovaries

- Inside the abdominal cavity.
- Estrogen & Progesterone.
- Stimulate oogenesis, Promote secondary sexual characters in females, Maintain pregnancy.



Testes

- Outside the abdominal cavity.
- Testosterone.
- Stimulate spermatogenesis, Promote secondary sexual characters in males.



Pituitary is called master gland because it produces hormones that control other glands. Many glands like thyroid secrete their hormones when they receive orders from the pituitary through its hormones.

Metamorphosis in insects, is controlled by insect hormones. In a frog, it is controlled by thyroxine, this hormone is produced by thyroid. Thyroxine production requires the presence of iodine in water.

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Note

The glands with duct are called exocrine glands. e.g. Sweat gland and salivary 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.

Male

- Male hormone - Testosterone
- At the puberty, it is released by the testes.
- Causes changes in boys.
  e.g. The growth of facial hair

Female

- Female hormone - Estrogen
- It helps Breast development
- Milk secreting glands or mammary glands develop inside the breasts.

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

↓

Released in the blood stream and reach parts of the body (Target site).

↓

Stimulate changes in the body at onset of puberty.

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Reproductive phase of life in human

- 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 fertilized and the zygote begins to develop. This results in pregnancy.
- Menstruation : If fertilization 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 known as menstruation.
- Menstruation occurs once in about 28 to 30 days.
- The first menstrual flow begins at puberty is termed menarche. At 45 to 50 years of age, the menstrual cycle stops. Stoppage of menstruation is termed menopause.

Reproductive health in human



Health is a state of complete mental, physical and social well-being.

1. Nutritional needs of the adolescents
2. Personal hygiene
3. Physical exercise
4. Say "NO" to drugs and alcohols
5. Adolescent pregnancy

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AIDS (Acquired immuno deficiency syndrome

- Caused by HIV (Human immuno deficiency virus).
- HIV virus destroys the natural defense mechanism of the body and makes it susceptible to diseases.

Transmission of AIDS

- Sharing the needle of the syringe for injecting drugs.
- Unprotected sex with an infected person.
- Transfusing blood into the body of a healthy person from an infected person.
- Infected mother can pass HIV virus through milk to an infant.

How to prevent AIDS

- Use disposable syringes.
- Get blood from registered blood banks for transfusion.
- Have safe and protected sex.
- HIV infected mother should not breast feed her baby.

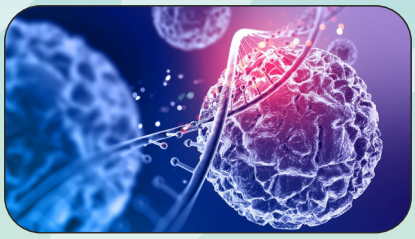


Sex determination in Human

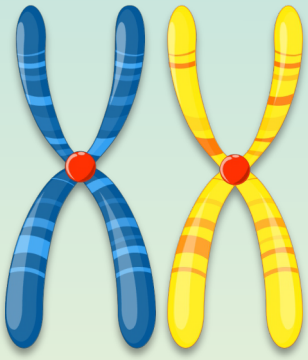
- The sex of the baby is determined by the sex chromosomes XX and XY inside the fertilised egg or zygote.



- The 23rd pair of chromosomes differs in males and females. These two chromosomes, which determine the sex of an individual, are called sex chromosomes or allosomes and are indicated by the letters X and Y.
- A female has two X chromosomes. The unfertilized egg always has one X chromosome.
- The sperms are of two kinds. One kind has an X chromosome, and the other has a Y chromosome.
- The sex chromosomes of the father determine the sex of an unborn baby.

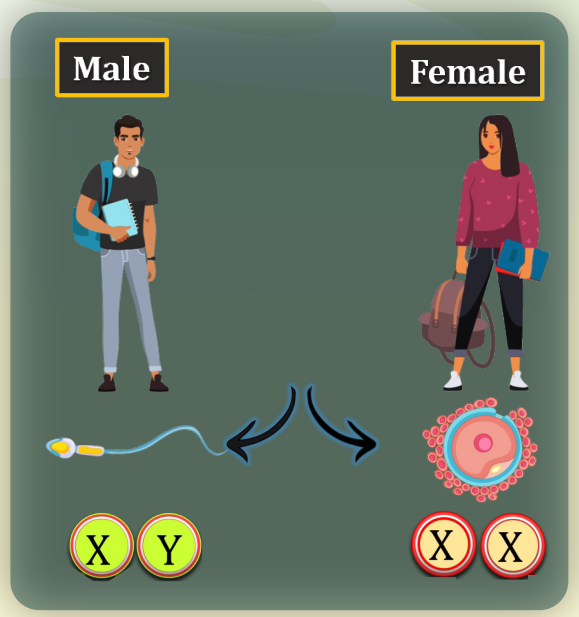


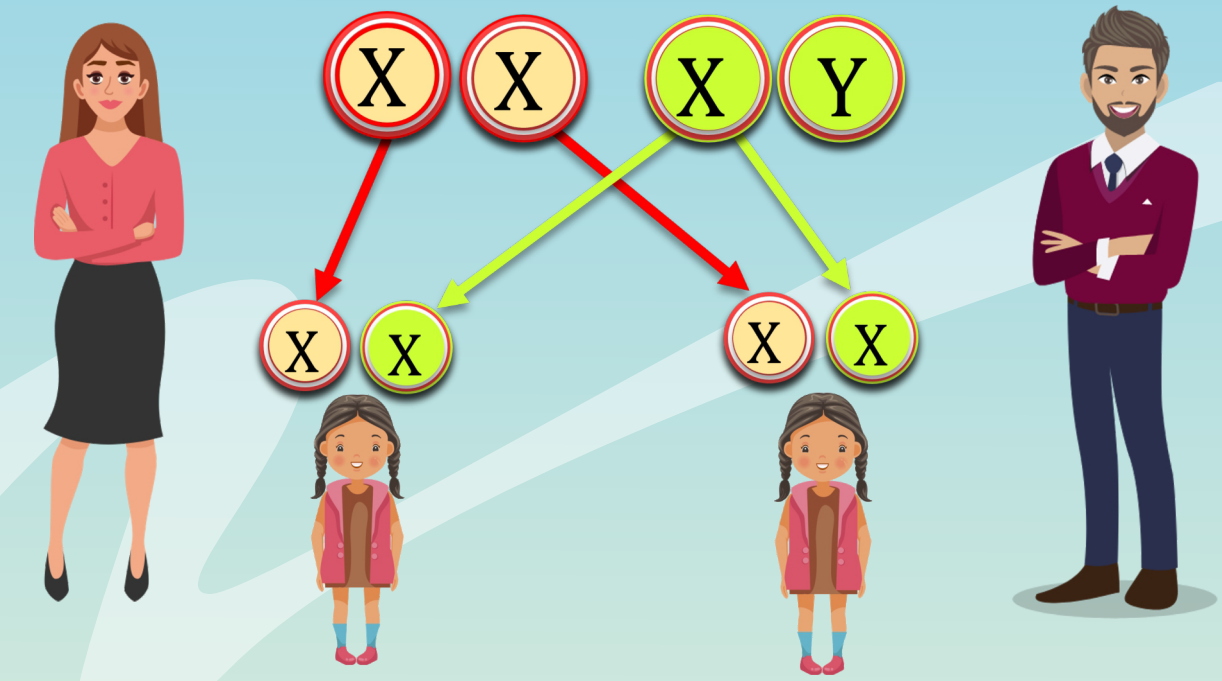
- This instruction is present in the thread-like structures, called chromosomes in the fertilized egg.

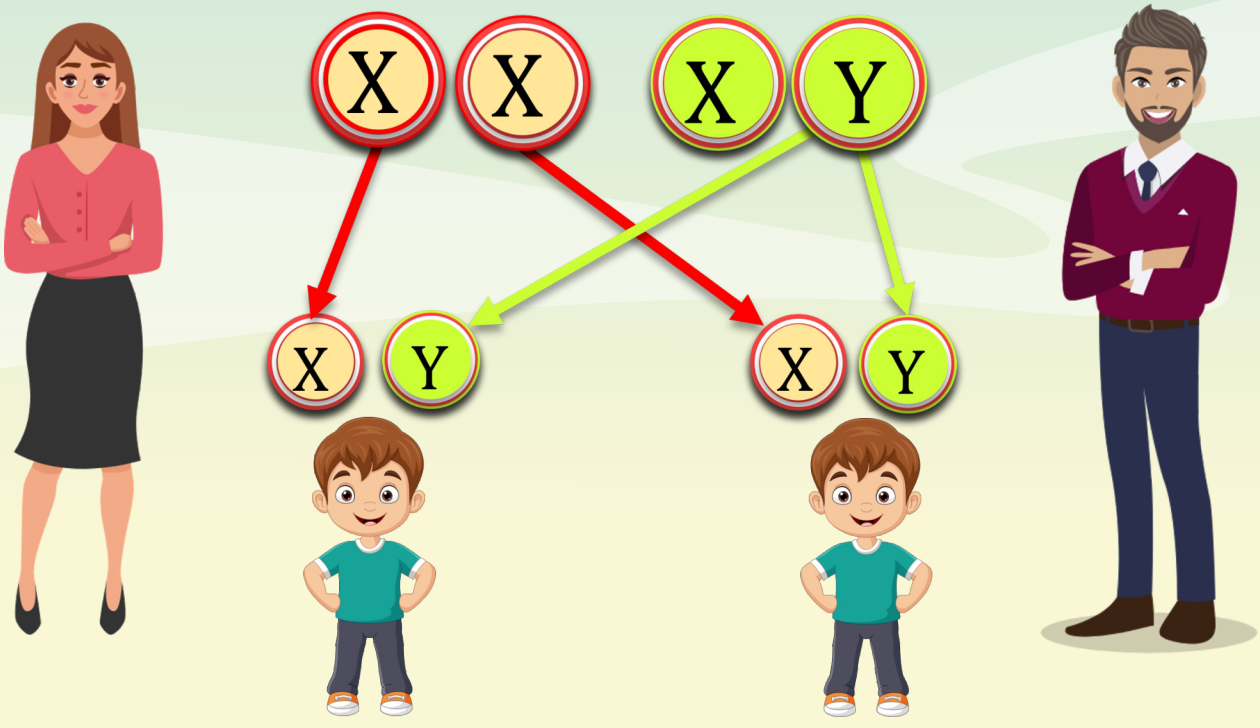


Chromosomes

- In humans, the diploid number of chromosomes is 46, or 23 pairs present in the nuclei of their cells.
- 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.







Sex determination in humans