



- DNA fingerprinting cannot be altered by any known treatment and is same for every cell.
- It is now used :
 - (i) For determining paternity of an individual
 - (ii) in forensic laboratories for identification of criminals.
 - (iii) for identifying racial groups to rewrite biological evolution.
 - (iv) for identifying the dead bodies in any accident by comparing the DNA's of parents or children.

Biological Functions of Nucleic Acids

- During cell division a DNA molecule is capable of self-duplication and identical DNA strands are transferred to daughter cells.
- In the cell various RNA molecules can synthesize proteins but for a particular protein the message for the synthesis is present in DNA.
- DNA is the chemical basis of heredity and can be considered as the reserve of information about genetic.
- Over millions of years DNA is exclusively responsible to maintain the identification of different species of organisms.

The Major Complex Biomolecules of Cells

Biomolecule	Building Block	Major Functions
Protein	Amino acid	Basic structure and function of cell
DNA	Deoxyribonucleotide	Hereditary information
RNA	Ribonucleotide	Protein synthesis
Polysaccharide	Monosaccharide	Storage form of energy
Lipids	Fatty acids & glycerol	Storage form of energy for meeting long term demands

Concept Ladder



The process by which a single DNA molecule produces two identical copies of itself is called cell division (mitosis) or replication.

Previous Year's Questions



An example of biopolymer is

[AIPMT]

- (1) teflon (2) neoprene
(3) nylon-6, 6 (4) DNA



HORMONES

- They are the molecules that act as intercellular messengers.
- Hormones are substances or biomolecules manufactured in minute amounts in endocrine or ductless glands.
- They are carried directly into different parts by the blood stream.
- The major hormone secreting glands include the intestinal mucosa pancreas, adrenals, thyroid, pituitary, ovaries and testes.

Types of Hormones

(1) Steroids

- These type of hormones are produced by adrenal cortex and gonads (testes in males and ovaries in females).

Ex : estrogens and androgens.

- For various functions of the body hormones released by the adrenal cortex play very important role.

(i) Glucocorticoids

- They control the modulate inflammatory reactions, carbohydrate metabolism and are involved in reactions to stress.

(ii) Mineralocorticoids

- They control the level of excretion of salt and water by the kidney.

(2) Polypeptids — e.g. insuline and endorphins.

(3) Amino Acids Derivatives — epinephrine and norepinephrine.

Definition

Hormones are produced by endocrine glands in the body and are poured directly in the blood stream which transports them to the site of action.

Concept Ladder



If adrenal cortex does not function properly then one of the results may be Addison's disease characterised by hypoglycemia, weakness and increased susceptibility to stress.

Previous Year's Questions



Which of the following hormones is produced under the conditions of stress which stimulate glycogenolysis in the liver of human beings?

[NEET-2014]

- | | |
|----------------|---------------|
| (1) Thyroxin | (2) Insulin |
| (3) Adrenaline | (4) Estradiol |



Functions of Hormones

- Hormones have several functions in the body.
- In the body they help for maintaining the balance of biological activities.
- The example of this function like insulin keeps the blood glucose level within the narrow limit. When there is rapid rise in blood glucose level in response insulin is released.
- Hormone glucagon tends to increase the glucose level in the blood. Insulin and Glucagon hormones will regulate the glucose level in the blood.
- Growth and sex hormones play role in development and growth.
- Thyroxine formed in thyroid gland is an iodinated derivative of amino acid tyrosine.
- Lethargyness and obesity are the characteristics of hypothyroidism which is due to abnormally low level of thyroxine.
- Hyperthyroidism is caused due to increased level of thyroxine.
- Hypothyroidism and enlargement of the thyroid gland are caused by low level of iodine in the diet. By adding sodium iodide to commercial table salt ("iodised" salt), it can be controlled.
- Hormones released by gonads are responsible for developing secondary sex characters.
- Testosterone is responsible for developing secondary male characteristics (facial hair, deep voice, general physical constitution) and for males it is the main sex hormone.
- Likewise estradiol is the main female sex hormone. It participates in the control of menstrual cycle and is responsible for development of secondary female characteristics.
- Progesterone is responsible for preparation of uterus for implantation of fertilised egg.

Rack your Brain



Which disease is caused by deficiency of insulin?

Previous Year's Questions



Which of the following statements is not correct?

[NEET-2017]

- (1) Ovalbumin is a simple food reserve in egg-white
- (2) Blood proteins thrombin and fibrinogen are involved in blood clotting.
- (3) Denaturation makes the proteins more active.
- (4) Insulin maintains sugar level in the blood of a human body.



S.No.	Name	Organ of Secretion	Functions
(A)	Sex hormones		
	(a) Androgens (Testosterone)	Testes	Control the development and normal functioning of Androsterone and male sex organs.
	(b) Estrogens (Estrone, Estradiol, Estriol)	Ovary	Control the development and normal functioning of female sex organs.
	(c) Gestogens (Progesterone)	Corpus luteum	Control the development and maintenance of pregnancy.
(B)	Adrenal cortex hormones or corticoids (Cortisone, Corticosterone, Aldosterone etc.)	Adrenal cortex	Regulate the metabolism of carbohydrates, fats & proteins and; control the balance of water and minerals in the body.

Name	Organ of Secretion	Functions
(i) Adrenaline or Epinephrine	Adrenal medulla	It is an amine compound and was the first hormone to be isolated. Prepares animals and humans for emergency in many ways by raising the pulse rate, blood pressure etc. stimulates the breakdown of liver glycogen into blood glucose and fats into fatty acids during emergency. These properties make adrenaline as one of the most valuable drugs used in medicine.
(ii) Thyroxine	Thyroid gland	Controls metabolism of carbohydrates, lipids and proteins.