

Prob ANIL KUMAR zoology

B.Sc HONS Part-III Paper - II

Topic:- Write short Notes on:

a. Types of enzyme

b. Hormones of Pancreas

c. Testes.

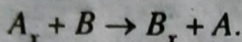
Prob ANIL KUMAR

Associate Professor zoology R.R.S College Mokama P.P.U

Ans. (a) Types of Enzyme—The systematic study of enzyme was initiated in 1837 when Berzelius recognised the catalytic nature of biological reactions. Six main divisions each with 4-13 subclasses are utilized in the classification of enzymes, on the basis that the reaction catalysed by an enzyme is the specific property that distinguishes one enzyme from another.

(i) Oxidoreductases—Enzyme catalyzing oxidoreductions between a pair of substrates A and B. Formerly known as dehydrogenases or oxidases.

(ii) Transferases—Enzymes catalyzing a transfer of a group x between a pair of substrates A and B



e.g.—Trans aminases, kinases and transacetylases

(iii) Hydrolases—Enzymes catalyzing the hydrolysis of ester, peptide, glycosyl, acid anhydride, C—C and other bonds eq. lipase.

(iv) Lyases—Enzymes that catalyze removal of groups from substrates by mechanisms other than hydrolysis e.g.—a decarboxylase would be included in this group.

(v) Isomerases—Enzymes catalyzing inter conversion or optical, geometric or positional isomers, eg.—D-3 phosphoglyceraldehyde.

(vi) Ligase—Enzymes catalyzing the linking together of two molecules coupled to the breaking of a pyrophosphate bond in ATP or a similar compound. e.g.—DNA ligase, + – RNA synthetase.

(b) Hormones of pancreas—Pancreas is a flattened, pinkish gland which secretes the digestive pancreatic juice as well as, two main protein hormones, insulin and glucagon. About 98%-99% part of the gland is exocrine and formed of pancreatic acini—Remaining 2% part of the pancreas is endocrine in nature which is called islets of Langerhans.

Insulin—It is secreted by the beta cells of Islets of Langerhans and named insulin by Schaefer. It is most important regulator of carbohydrate metabolism in the body. Its principal role is to enormously increase the permeability of cell membrane for glucose, amino acids and potassium, magnesium and phosphate ions from blood into the cells. It enhances proper utilization of glucose and other metabolites in all body cells, exception—RBCs and cells of the brain : Insulin ensures the normal basal metabolic rate and normal biosynthesis of RNA, DNA and proteins. It also ensures maintenance of proper food reserve of body in between the meals by stimulating glycogenesis in muscles and liver cells, and lipogenesis in adipose tissues. Evidently Insulin acts as an anabolic growth factor. Oversecretion of Insulin may be a genetic defect.

Glucagon—This is secreted by the alpha cells of islets of Langerhans. It was discovered by *Kimball* and *Murlin*. It is also a large polypeptide. It elevates glucose level in blood when glucose is deficient.

Modern physiologists have postulated that D and F cells of Pancreas secrete *somatostatin* (SS) and pancreatic polypeptide (PP) respectively. *Somatostatin* slows down and regulates absorption of digested nutrients into the blood from the gut and to retard the secretion of insulin, glucagon and PP. Conversely, the PP is assigned a function of restricting secretion of SS from D cells. It also promotes hepatic lipogenesis, demotes lipolysis in adipose tissues and retards secretion of both insulin and glucagon.

(c) Testes—Gonads (Testes and ovary) in vertebrates are differentiated out of indifferent or bipotential mesodermal genital ridges. Primordial germ cells migrate into these ridges and trigger the proliferation of the genital rudiment into a peripheral cortex and an inner medulla. During sex differentiation the germ cells migrate into the medulla and develop into testes but the cortex regresses.

The testes in fish is composed of weird shapes of seminiferous tubules in which sperms are produced. The mature lobules (seminiferous tubule) become flush with one another and open into the vas deferens. Testis in fishes is mostly lobular type but in some fishes it is acinar. Spermatophores are produced in acinar testes. *Leydig* cells and *Sertoli* cells are found in a fish testes. *Leydig* cell secretes androgen (testosterone).

The Testes of reptiles undergoes cyclical changes. Avian testes also exhibits cyclic variation in activity and matures usually once a year.

The activity of the mammalian testes is cyclic in some wild animals specially living in temperate and cold regions. In most other mammals testicular cycle is continuous and extends up to quite an advanced age.

The structural unit of testes is convoluted tubules called seminiferous tubules. Each testis of man contains about 800 highly coiled tubules. Each seminiferous tubule consists of connective tissue fibres and epithelial cells. These cells are of two types. Most of them are cuboidal in structure and form primordial germ cells while some of them are elongated, have broad base and narrow apical ends. The latter are called *Sertoli* cells. Cells patches of round cells lying in between the seminiferous tubules are called *Leydig* cells. These three types of cells perform three distinct type of functions.

Primordial germ cells give rise to sperm by the process of spermatogenesis.

Sertoli cells are believed to regulate the differentiation of spermatozoa and to nourish them. *Leydig's* cells work as endocrine part of the testis. These secrete hormones collectively called Androgens. These include huge amount of testosterone and less amount of estrogen.