

GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES AN INTRODUCTION TO ENDOCRINOLOGY AND ITS ROLE IN BIOLOGICAL SCIENCE

Dr. Deepika Vats*

*Himalayan Garhwal University

ABSTRACT

From the extracellular space endocrine of and serest their products the harmones and enter into the circulatory system endocrine as duties gooneys differ from exocrine like solitary globes. Harmones acts on a sp icy organs and then secreted into the blood stream to act on specific target tissues

Keywords: hormones, relicense, blood.

I. INTRODUCTION

From the extracellular space endocrine of and serest their products the harmones and enter into the circulatory system endocrine as duties gooneys differ from exocrine like solitary globes, whose products're relicense in to the ducts which leads to the digestive tract and then to exterior to the body endocrinology is the branch of science which deals the study of ductkss gloads or tissues and their hormonal products. There is no structural unity. In may scattered all over the body. Elaborating several hormones as tissues, inividual cells, or harmones.

These glands have association of embryological from different types of tissues including nervous tissue . Harmones acts on a sp icy organs and then secreted into the blood stream to act on specific target tissues it stabilises and voice specific physiological response endocrine cells and targets cells avoided direct rascals connections of haromones such as. Portal circulation between hypothalamus and hypothesis it carries the hypothalamic harmones to the pituitary cells or tissues may secrete specific substances act oves on short distances of aeljacent cells or tissues.

II. ENDOCRINE GLANDS AND HARMONES

Role of harmones:- In vitro harmones are regulated by endocrine glandular cells within the body or in cultures of endocrine cells. These are usually transported by the blood stream from endocrine cells to serve as chemical messenger my acts as endocrine cells.

A hormone does't provide energy or building materials but it exerts profound regulatory effect on growth cells by effecting on membrane permeability, activation, deactivation of enzymes, formation of cycles A.M.P, etc Now Harmones form a group of heterogeneous substances some are steroids, eg. Aclrenocantical harmones, and sex harmones. Most of the harmonce are proteins parley peptides, released by exocytose and released by granules for hours or digs.

The anterior pituitary hormone hypothalamic harmones parathyroid, calcitonis, insulin. Glucagon. Gastrointestinal harmones (secretion, gesturing etc) and posteriors pituitary harmones are all particles.

They are the derivatives of amino acids. Thyroxin and iodo tyrosine. Similarly adrenaline and no adrenaline are also defined from tyrosine the binding forms a reservoir from which harmons are released and diffuse to act on target cells are released and diffuse to act on target cells. Whereas cateehalomines are not boundy to plasma proteins and play short life in blood for a few minutes thyroxin bound to carrier proteins as long biological half life.

They are target on the liver spleen, bone marrow. Few harmones are not specceffican or target cells or organs and affected or almost cells of the body or parts of the body. They serve as binding effects on these tissues or growth

hormones they specific receptor it initial their actions. Eg. adrenoecrteo tropic secreted by anterior pituitary stimulates the adrenal cortex to produce adrenocrtio steroid harmons.

History of endocrinology:-

Endocrinology is study of science on the in eternal organs site and target tissues mainly experiment perform on harmons by Berthold in 1849. E. clinical relationships between tissue and organ abnormalities such as atrophy or enlargement and changes in particles physiological rates eg. Castration of cockerels led to no development of their comes and wattles and failure to exhibit male dominant behaviours, replacement of testes led to the development of the combined wattles, behaviour in moles agnostic.

Hypertrophy- increase in sine of an organ to compensate functionally for the activity of the other best organ Testosterone was purified and crystallized in 1935. Bugloss and starling (1902) demonstrated that asbestos produced by the intestinal mucosa stimulated the secretion pancreatic juice. The active substance was hammed as secreting. Now Cells are essentially chemical machines and respond to chemical signs, messages are carried by two well defined systems hormonal system in which the chemical messenger harmons are produced by specific glands released into the blood stream and slowly act open the target cells in the body and the nervosas system in which messages travel across the body in milliseconds. The chemical substances harmons produced endogenously by endocrine glands, and certain nerve cells save as special receptors. ‘The term “endocrine” refers to the system of glands or tissues that synthesize the harmons and secrete them directly into the circulatory system.

The endocrine system is more precisely a never endocrine system it not only include the glands, but also sites in the control nervous system with which the system interacts. The coordinated activity of these two major systems in responsible for the stability of the internal environment (homeostasis) in the body.

Homeostasis of calcium –

Blood clothing, contraction cellular secretion and number of cellular functions there is a need of requirement of calcium. It minted the need th constant level and a narrow range Fluctuation may effects homeostatic mechanisms to bring it back to normal.

Parathyroid release poratharhormone it decrease in blood calcium level. Bone release store calcium. Absorb piton of calcium form the gut and reabsorption by urine tubeless in the kidney is favoured so that the blood calcium level is brought back to its original level.

After consumption food to release of another harmons above normal levels. Calcium form the thyroid gland calcite in promotes. Deposition of calcium in the bone and redoes the absorption of calcium in the gut and kidney.

Inter-relationship of endocrine glands endocrine glands are independent in its action it it may be inter related and inter dependent. It can be synergistic, complimentary, permissive and antagonistic resulting in hypo or hyperactively of the endocrine glands. These action goes to be positive or negative hyperactively leads to hyperactively. there is the secretion of hypothalamic releasing or release inhibiting harmons also synthesized in the hyperactively harmones (median eminence and released blood into the portal blood system.

Three hyperactively harmons are also released i.e. production, soma atrophic and melanin stimulating harmones.

Hyperactively hormone from the anterior pituitary TRH is a tripe tide promotes the secretion of TSH it is not oleic and release production. Neurons can be inter connected by other neurons of the central nervous system they show the differential release of GSH and LH dopamine is a stimulator , and serotonin is an inhibitory neurotransmitter e.g. prolactin (Lactogenic harmonies) stimulates overdoes of some animals. It acts on the female breasts and not one sex glands. The growth harmones (jomatotrophton) release is promoted by GRF. It is released from the hypothalamus under adrenergic control Dextramphetamine stimulates. GRF Release by alpha adrenergic stimulation where as it is inhibited by betadrenergic stimulation.

The hypothalamic hormones are thought to be regulated as a result of aminergic neuronal activity of dopamine, noradrenalin and serotonin.

Hormones and vitamins hormones and vitamins are inter-related to each other due to imbalance of hormones and vitamins deficiencies may occur on restricted diets, malabsorption syndromes or in states where the body needs increases eg. During body growth, pregnancy and lactation.

Endocrine glands and hormones

Endocrine glands are heterogeneous collection of glands distributed throughout the body in the head, neck and abdomen.

Now the pituitary gland has been traditionally termed as the master of the endocrine systems these are regulated by the hypothalamus thus, the secretion of the tropic hormones from the anterior pituitary gland is controlled in two ways.

By the hypothalamic and by feedback of hormones from the endocrine target cells

Fig.

The negative feedback control of the anterior pituitary secretion environmental and endogenous stimuli act upon the hypothalamus. Which secretes specific releasing factors converged to the anterior pituitary.

Feedback control:- Over all connotations of hormones producing and secreting activity of the anterior pituitary is also influenced by the hormones of the endocrine glands. Thus plasma levels of hormones of the adrenal, thyroid and gonads fall the hypothalamus is stimulated to secrete the appropriate releasing hormones.

Now production of corticotrophin thyrotrophic and gonadotrophy may occur. On other sides the blood levels of the target glands hormones are high, the release of the hypothalamic releasing hormone is inhibited thus, such a negative feedback mechanism is responsible for the maintenance of normal target gland hormones blood levels eg. Contraceptives, adverse effect like adrenal insufficiency and failure resulting from administration of androgenic corticosteroids in high doses which depress the production of endogenous corticosteroids.

Homeostasis of glucose :- The concentration of glucose in blood is maintained at a constant level through many factors such as food intake, rate of excretion, exercise, reproductive state and psychological condition influence its level. Decrease in the level of blood glucose after muscular exercise is recognized by alpha cells in the body of the islets of Langerhans. Which release hormone glucose into glucose and these the blood glucose level brought to the normal level after meal the beta cell release insulin pancreas release a hormone. Induces capture of glucose by liverless to convert into glucose. This reduces the blood glucose level and bring it back to the normal level. Vitamin D is ineffective in cases of renal rickets and hypoparathyroidism rickets the vitamin D₃ analogue, alfacalcidol (1- α -hydroxycholecalciferol) is used for the treatment of renal osteodystrophy osteomalacia – responds favourably to vitamin D therapy. It is also used to raise and maintain serum calcium level in hypoparathyroidism the treatment of hypoparathyroidism consists of withdrawal of the vitamins low calcium diet and administration of hydrocortisone. And vitamin E is isolated from wheat germ oil and named alpha-tocopherol. In muscle weakness increased oxidation of polyunsaturated fatty acids, vitamin E supplements the germinal epithelium treatment is done for infertility in women, habitual abortion, progressive muscular dystrophy, peripheral vascular disease, refractory anaemia's and haemolytic anaemia's they behave as catalytic surfers.

Functional classification of hormones

Three major classes of endocrine mentioned effects can be recognized.

- (I) Kinetic effects- includes muscle contraction, pigment migration and glandular secretions
- (II) Metabolic effects- Changes in rate and balance of reaction and tissue consists
- (III) Morphogenic effect- It concerned with growth and differentiation thyroids are morphogenic effects on certain tissues. Thus a single hormone can produce multiple effects hormones are specific to receptor or enzymes for different channels of action of different hormones.

Now chemistry of hormones are on the basis of polypeptides and proteins

Steroids

Derivatives of tyrosine's

These hormones show a great range of molecular weight from tripeptide like thyrotrophic releasing (TRH) to growth hormones (GH) with 190 amino acid residues and large glycoprotein hormones such as TSH.

They comprise single peptide chain. Peptide hormones are formed as prohormones or pre-hormones eg. Insulin. The C-peptide (connecting) called single chain peptide leaving insulin, which is a peptide, comprise of two chains A and B connected by two disulfide bonds. They are synthesized by cistern space of ribosome carbohydrate resolves transform into vesicles. They release to the exterior exocytosis.

Stored not stored in cell like peptide hormones. They form when the time of requirement steroids comprises 3-4 carbon rings and a five-carbon ring fused to each other.

All the steroids are synthesized from acetate cholesterol is converted into pregnenolone in the mitochondria catalyzed by enzyme cholesterol desmutase and they to progesterone or 17-hydroxy pregnenolone in the smooth endoplasmic reticulum. Cortisol is formed from

Pregnenolone by 17 hydroxylation and androstenedione, by successive hydroxylation and dehydrogenation. The side chain of 17 hydroxylation pregnenolone is cleaved to form Androgen. Tyrosine derivations are the monoamines adrenaline, nor adrenaline and dopamine and the thyroid hormones thyroxine and triiodothyronine eg. Dopamine is formed from tyrosine. Now noradrenaline and adrenaline formed by the action of phenyl ethanolamine N-Methyl transferases. Thyroid hormones are formed from two molecules of iodinated tyrosine linked through oxygen molecule.

Hormonal Effects :-

It exerts their influence on almost all types of cells in the body.

It influences cellular synthesis and secretion of endocrine glands and neurons.

It effects on digestive tract, and its products such as enzyme hydrochloric acid by gastric glands and bile salts.

It Effects the integument. Mucus production Peeling, Plumage, pigmentation and color change production and secretion of sweat sebaceous and milk is also controlled by hormones.

Production of pheromones body controls the process of contraction relaxation and metabolism of muscles in the body. Hormones controls animal behaviours, also controls the processes of excretion and osmoregulation.

Histology of endocrine glands:-

It's how was great variation in their histological architecture some endocrine glands are defined from a single germ layer during their development while other arise from more than germ layer most of the endocrine organs are defined from the endodermis of the embryo. These include the thyroid, parathyroid and glands associated with the gastro intestinal tract such as pancreas. The pituitary gland is derived from the ectoderm. The adrenal medulla is derived from neural crest material which is also ectodermic in origin the adrenal cortex and the gonad includes testes and ovary are derived from the mesoderm the embryo. The pineal gland is nervous in nature and is therefore derived from the neural ectoderm. The thyroid and testes are tubular structures with central space. All the endocrine cells have well developed endoplasmic reticulum and Golgi complex required for the synthesis and packaging of the hormones. The histological characters of the cytoplasm of the endocrine cells also reflects the function carried upon by the endocrine cells. Cells of refractile granules in the cytoplasm in the adrenal cortex.

Thyroid gland :- It is dumb bell shaped, banded gland located in the thorax region at the root of the throat. The two lobes are almost symmetrical lie one on either side of the tracheal tube. Each lobe measures above 5 x 2 x 2 cm. The two lobes are connected to each other by a narrow strip of tissue called isthmus or middle lobe which crosses the 2-4th tracheal rings the right lobe is bigger than the left lobe. A pyramidal lobe varying in size extends from the isthmus opened in the neck. Accessory thyroid bodies are located beneath the main thyroid gland.

The weight of thyroid gland varies up to 20 to 25 gm is influenced by diet age, sex and reproductive state of the individual. Thyroid gland is highly vascular blood is supplied by the paired superior and inferior thyroid arteries and directly from the aorta venous blood collected by internal jugular and innominate veins. Blood flows ensure adequate supply of inorganic iodine of the gland it is derived from the superior, middle and inferior cervical ganglia and parasympathetic fibers derived from the superior and inferior large ganglionic branches of the vagus nerve. These have control the blood supply to the gland.

Development:-

It is endodermis in organ origin from the primitive foregut.

During embryonic development] the primitive thyroid gland arises out pushing from the middle of the neck in front of the thyroid cartilage. It is derived from the fourth pharyngeal pouch, which gives rise to the lateral lobes of the gland. During intra uterine development thyroid gland develops the follicular structure of gland is evident by 12-14th week of the foetus.

Histology:-

The biosynthesis of thyroid hormones is carried out in the thyroid follicular cells of numerous small about 200 in diameter large follicles are found near the periphery of the gland while smaller follicles are arranged at the center. Each follicle is made up of a cubical follicles epithelium in the resting condition, the epithelium is low but the height is dependent upon the extent of stimulation of the gland thyroid stimulating hormones the low cubical epithelium becomes converted into tall columnar epithelium.

Thyroid follicles are measure about 20-150 um in diameter. A single layer of cubical follicular epithelial cells lines each follicular. It is surrounded by a basement membrane these are consisting of fine connective tissue fibers on which rest the bases of the follicular cells. These follicles are surrounded by a highly vascular stroma containing lymph channels and nerve endings. The follicular lumen is filled with a colloid material, the thyroglobulin. It consists of 75% of the colloid material is the main storage form of thyroid hormones thyroglobulin constitutes about 75% of the colloid material.

Granular cytoplasm containing large number of mitochondria and distinct Golgi apparatus follicular cells facing the colloid material is thrown into a number of microvilli. Nucleus is situated at the periphery of the follicular cells and the cytoplasm is filled with the well developed rough endoplasmic reticulum and Golgi complex cytoplasmic vesicles filled with the colloidal material are also found in the cytoplasm these on the basis of staining are of three types eosinophilic, acidophilic and basophilic and mixed two types of follicular cells have been distinguished on the basis of electron microscopic and histochemical studies principal cells one contained small number of mitochondria and different proteases and oxidases required for the synthesis of thyroid hormones. Small numbers are scattered in large number of mitochondria and parafollicular cells or C-cells-which secretes calcitonin.

Functions- They show iodide trapping they leads to form monoxide tyrosine (MIT) and diiodo tyrosine (DIT)

The thyroglobulin with T₃ and T₄ attached to it by peptide linkage. On the proteolysis which is under the control of TSH. These are bounded by plasma proteins. It is mainly bound to thyroxine binding globulin (TBG) and T₃ is mainly bound to thyroxine-binding prealbumin (TBPA) Thyroid secretions are increased in cold environment. Thyroid hormones have a variety of effects on the cardiovascular system it stimulates Na⁺, K⁺ ATP are directly and these by increase ATP turnover and oxygen consumption these hormones are used in the treatment of myxedema in adults, cretinism and juvenile myxedema in children. It increases the degradation of adrenal corticosteroids, other

disorders including obesity deluged union of fractures, hypogandio infertility, menopausal arthralgia, infertility menstrual disorders, nephritic syndrome refractor, and chronic constipation and refractory eczema.

Toxicity- It resembles the manifestations of hyperthyroidism, like hyperirritability, insomnia nervousness, tachycardiac, palpitation, arrhythmic angina pectoris, polyphasia and emaciation. It leads to hypertension and gastrointestinal disturbances. Thyroidal preparations must be used with caution in patients with hypertension and coronary artery disease.

Source. Sea fish, used in goitre belts, Treatment.

- (i) Lugol's iodine
- (ii) Iodized table salt.

Hypersensitivity reaction like angioedema swelling of the larynx and multiple cutaneous haemorrhages may occur.

Radioactive iodine (I^{131}), Propranolol, Guanethidine, thiocyanates, Perchlorates.

Dosage- Propyl thiouracil (Propacil) 75-100 mg every 8 hourly

methylthiouracil (Methicil) 50 mg every to hourly.

Methimazole (tapazole) 5-10 mg every 8 hourly.

Therapeutic uses:-

To prepare hyperthyroid patients for surgery. It is administered potassium iodide 60 mg thrice daily is given for 14 days before operation. Gland becomes less vascular, reducing bleeding at the time of surgery combined therapy of carbimazole or propyl thiouracil to suppress hormone synthesis and avert thyrotoxic crisis prevents inhiptions.

One parallel is a recently introduced gastric antisecretory agent that inhibits the final common pathway in the secretion of HCl i.e. proton pump or H^+K^+ ATPase pump.

It is also an effective anti-secretory drug. I^+ produces an anti-secretory effect for a very long duration normal secretory upon the treatment therapy miscellaneous agents.

The normal healthy gastric mucosa has a variety of defence mechanism against digestion by acid and pepsin- these are (a) gastric mucus (b) epithelial tight junction (c) high epithelium cell turnover and (d) Bicarbonate secretion.

Constipation is a condition in which defecation is delayed and hard stool is formed for various reasons. It may be due to consciously ignoring or preventing defecation or ageing, emotions a low bulk diet, atonic or spastic colon, chronic constipation or drug effects.

Irritant cathartics :-

These agents cause irritation of gastrointestinal tract mucosa and thereby increase reflex peristalsis i.e. the motility to produce cathartic action.

Osmotic purgatives:- These agents act by increasing the bulk of intestinal content by increasing the bulk of intestinal contents by administering the materials which are not digested e.g. Cellulose, giving the materials which absorb water and swell e.g. Agar

Giving the substances which prevent water absorption in the gastrointestinal tract e.g. Liquid paraffin employing the material also which by their osmotic properties. Draw fluid in the tract. Eg. Saline

Saline purgatives are poorly absorbed from solutions retain water to increase in the bulk in the gut they act quickly and do not injure the mucosa. Food evokes secretion in the mouth rich in mucus and enzyme ptyalin waxes lubricants of the food when secretion is reduced some common drugs are used for maintaining secretion in a normal manner.

These drugs are called sialogogues and those inhibiting are known as anti sialogogues eg. Benzo dazedness sedative, cyprohaptadine (5Ht antagonist) and hypoglycaemic agents also increase appetite.

Gastro intestinal protections and adsorbents these agents adsorb noxious substances such as gases, bacteria and bacterial taxing they protect gastro-intestinal mucous membrane from the irritants by coddling it mechanically. These agents might absorb either anti-injective or ant cholinergic material.

Prostaglandins in (diarrhoea), lacto bacillus acid phallus (chronic diarrheal) antibiotic streptomycin locally chloromycetin, neomycin etc.

Pancreas zamia- cholecystokin secreted by the mucosa of duodenum. When food material contain acid lipids, peptones and fatty acid comes in contact with the duodenal mucosa.

Sere tin, is also a polypeptide hormone it stimulate the secretion and release of the liquid non-enzyme component of pancreatic juices, and inhibits gastric secretion. Entero glucagon is secreted by the wall of small intestine and colon in response to glucose intake cerulean. It has strong stimulatory effect on the contraction of gall bladder.

Gastrone It is a substance of gastric mucosa it inhibits the secretion of gastric acid stimulated by hasten and gastric rill kin in. It stimulates the movement of intestinal rill. They are used in the treatment of severe diarrhoea only use of drugs like looranle may be harmful if diarrhoea is due to bacterial or amoebic agents.eg. kalin pectin, Abdicated wood charcoal, Bismuth salts, coconut shells, zinc chloride etc.

III. REPRODUCTION

The ability of reproduce itself in all living matter is a cardinal characteristic the conception until it has produced its kind. The term in which process resulted the formation of new individuals of some kind it results genetic, structural, and physiological variations.

Reproduction is a source and a renewal source for the genetic material which appears to have an inborn process of ageing. It is a process of increasing efficiency in the reproduction processes of vertebrates. So, it is a general tendency towards a reduction of the number of young and increasing parental care, so they follow the stages of vertebrate evolution. They show the convergent adaptation with birds and mammals.

Patterns of Reproduction:- Two processes of reproduction may occur these are asexual and sexual. By asexual mode two special sexes are distinct called gametes, fusion to form cell-structure the zygote which in divides repeatedly to grow into a fully developed new-individuals sex organs in females have to perform the cyclic functions, like menstruation, and changes during pregnancy, parturition, lactation and menopause. The ovaries in women secrete one ovum every month, which may unite with the male sperm, to form a zygote, thus woman's unit of life, with its genetic contribution. In males, only one internal secretion is for the production of sex organs, secondary sex characters and anabolic stimulation this is controlled by gonadotropic hormones of the pituitary as in women.

External secretion is production of spermatozoa which contains the unit of life with its genetic contribution.

An organism that produces both types of gamete is called hermaphrodite. In most hermaphrodite the two gametes do not mature at the same time, so that self-fertilization does not usually occur, cross-fertilization is common sexual reproduction is of the biparental but may also be coniparental depending up on the species.

Parthenogenesis:- The development of an egg cell- into a new individual without the participation of sperm cells from the opposite sex is called the parthenogenesis eg. Crustaceans, rotifers, insects. Not involve the fusion of gametes. Parthenogenesis is rare in the vertebrates. Eg. white two kegs

Gamogenesis and androgenesis:- Development of new individual takes place from the egg which is activated by sperm. However, the sperm does not contribute any genetic material to the egg. Resulting offspring carries only maternal chromosomes. Eg. Fish, poecilia, planaria, a taro beetle.

Androgenesis:- Is a veneers condition of gynogenesis. Chromosome contribution in the developing egg comes exclusively from the male it is called androgenesis.

Sexual reproduction:- Mostly multi cellular animals consist by the union of two dissimilar gametes, A egg nucleus with sperm nucleus to produce a single called diploid zygote which ultimately develops into a multi cellular organisms resembling two parents.

The production of gametes by organ is known as gonads. Also which produce sperm cells are called testes, while which produces egg. Cells are called the ovaries sexual reproduction involves two most fundamental events, meiosis and fertilization meiosis is the process by which gametes from the germinal epithelium of the gonads are formed and reassortment of different genes takes place in the formation fertilization inclines the fusion of two dissimilar genes in the production of offerings of sexual reproduction.

External fertilization in external fertilization there is no union between opposite sexes. Sperm and eggs may unite in the aquatic water

Internal fertilization :- Two opposite sexes of the some species undergo copulation, where fertilization takes place the fertilization is internal.

Embryonic development :- The animals which close eggs are oviparous major part of embryonic Development takes place outside the female body even though fertilization, has been internal but in viviparous reproduction.

Another types is ovoviviparous reproduction large egg which furnishes food for the developing embryo but due to internal fertilization egg remains in the females until it hatches. Eg. Divest development

Reproduction in vertebrates:- All the reproduction phase are change due to environmental factor or change in adaptations thus internal fertilization foetal membranes and control of temperature the physiology of reproduction is dealt with special reference to vetch brutes.

Fishes:- Join like toolsets, place or trout produce a clergy Humber of yolky eggs. So- stimulus for ripening of gonads is supplied by pituitary hormones depend on the secretion rhythmical environmental changes. All fishes show anti mutant sparing(against the current) migrations.

So they actually release eggs up-current of the feeding grounds which allow larvae to drift down towards the latter. Some nest fines secure their eggs to present them from the drifting down stream eg. Cod, stick back. There the species of cat fish and species of sea-horse, which retain their young in their mouths or in the brood pouches eg. Guppy fishes are or in elasmobranches.

It involves internal fertilization helped by claspers of the male. And the female lays a small number of eggs with a quantity of yolk to produced. In th dog fish, scyliorhinas conical internal fertilization is followed by the recreation of a protective case around the eggs and they are attached by its training threads to objects on the sea bed. Eg. Must lees vulgarise its developing embryos take muck the uterine secretions contain urea, forms an important part of embargo.

Eg. Mustiest lairs is true viviparous though true fish form placenta which secrete nutritive fluids. Loss of lines weight does not occur in mammals during gestation.

Amphibian :- They are stimulated by dog light and others factors. Frogs endocrine controls reproduction, Actins during hibernation mostly amphibians frogs return to water for reproduction and they migrate several miles to find their original spawning ground. Croaking of the males frogs, enlarged bellies of the females are two of the stimuli leads to mating accomplished by male grasping the female which his nuptial pads. Fertilization takes place externally and sperms must penetrate the eggs before its coating of albumen swells. Sperms pass down to the testis via the anterior part of the kidney and the Wolffian ducts both sexes name a cloaca where genital as well as excretory products are passed to the exterior once the just are passed that egg load have limited protection of their albumen coating and the fact that the black pigment contain bitter taste corral amphibians or tad poles are well adapted to life in water having respiratory and low motory systems as well as sensory adaptations such as the lateral line. There are a good number of exceptions. It is adversely external failure of the reproductive system. Eg. Female moelle toad clog eggs in their packets for fertilization.

Reptile Rapid colonic station of the land achieved by the reptiles we see many changes from the amphibian condition fishes and amphibian and re passed as an amniotes they the amnion characteristics of the reproduction mechanism of reptiles birds and mammals which are passed as amniotes.

Amnion is an extra- embryonic membrane evolved in junction with shelled egg and it facilitates the embryo to develop within a stable fluidic environment. In conjunction with the yolk a further extra-embryonic membrane the chorion develops. It has role in respiratory changes and excretion there is yolk enclosed in a sac. Proliferating raw material for the developing embryo. Albumen of eggs contains water and porous shell allows gaseous exchange, so the level of reptiles a great deal of provision is made for both the nutrition and protection of the developing offspring.

Eg. Snakes guard their eggs and turtles and crocodiles, among others bury eggs to provide them with an uniform and protected environment lizards and snakes have developed viviparity but there is no exchange of materials between mother and offspring.

Birds :- Eggs of birds are some in appearance shows wider range of colour and shape birds open nests usually have camouflaged eggs (eg. Planes) while some has concealed or domed nests have white eggs (eg. out) there is a general tendency to reduce the number of eggs laid in the more advanced birds one but on the whole the number of eggs related to the number of eggs of offspring that the variation is due to species of nesting, late time and immediate ecological conditions. During their reproduction phase of male and female parental care is well-developed they do the sub care of their young ones. Birds being homeothermic. They maintain their at constant temperature. Female assist for construction of nest male develops the construction of increased supply the akin as well as losing feathers from her breasts. She also drine to incubate which is very strong and can be clearly seen in the behaviour of a 'broody hen after hatching the young are usually cared for both by parents the gap of the fledging's beak acting as the releaser to the parents, feeding responses. Hormone of feet is by the pituitary lactogen which causes the secretion of milk from the regains crop.

Mammals :- The cerebral hemispheres and complex behaviour, Mammals owe their success to the efficacy of their reproduction system, now the class of vertebrate of the offspring, exceedingly highly developed.

Egg similar goes through a similar gastrulating to the reptile and bird egg. Is quite small in the placental mammals. so the shelled eggs of the primitive monodromas are quite large mammalian eggs have reduced yolk they the tissues oviducts are well prepared for specialized and muscular region uterine perforated in the developing embryos. Now the wall of uterus establishes contact with the foetal membranes of the developing embryo placenta serves as physiological function and forms by the extra-embryonic membrane allantois grow out from the foetal endoderm and fusing with chorionic give rise to chorioallantoic placenta, inner wall of chorion and the inner lining of the allantois are lined with mesoderm and in this fold resells arise forming the umbilical artery and vein. Foetal or terge and between foetal and maternal circulations countless current exchange system may develop food, water and oxygen are passed from the maternal circulation and carbon-dioxide metabolites are returned. Mammalian orders have a tendency to reduce the layers involved in the placenta. Maternal epithelium, connective tissue and

endothelium are absent in the placentas the uptake of ions and presumably other substances is greatly each onced they are more efficient than the placental with many layers. The intervening layers are lost during development in various mammalian orders to increase the intimacy between maternal and foetal tissues and to increase the efficiency of functioning of placenta.

Maturity goes to be during age. This is called puberty the reproduction functions commence reproductive periods extend throughout the life. It ends when at Ropak changes accurse and gradual oppression of sexual activity 13 to 15 year puberty occurs earlier in gnl than boys. Secondary sexual characteristics may develop on the public region occur.

The placentas depends upon the type of sexual cycle fall into categories (i) oestrous and (II) Menstrual the first category include these which breed only in specific period of the year when ovulation takes place and the animals break the desire of sexual mating the breeding period is followed by resting phase. Mostly animals may bred once. Twice or many times. Breeding period continued by resting period oestrous animals may be mono, bi or polyestrous second category goes on annual breeding ovulation occurs every month periodically form the two ovaries breeding phase may followed by pregnancy, discharge of unfertilized ovum the endometrial tissue and blood in the form of menstrual fluid.

Pinnacle body Pineal is a small cone shaped pineal is situated beneath the corpus coliseum between the two superior calliculli originates from the third ventricle. The cavity of the diverticulum later on gate obliterated his to logically it consists of parenchyma cells. Which re large with easonophills cells and neuralgia cells. Atrophy at the age of seven years and is filed with calcium and magnesium phosphates and carbonates. Its function is still unknown and represents possibly dying gland.

Thymus:- Thymus is particularly a endocrine gland and partly lymphoid gland and is situated below the thyroid it gradually enlarges on until puberty and then atrophies. Now initially thymus consists of number of lobules. Each of consist of outer cortex and medulla.

Functions:- It controls the growth of the skeleton

It helpin the development of sex-glands control of secretion:- Thymus activity is accelerated by anterior pituitary and thyroid where gonads and adrenal cortex are known to inhibit its activity.

Placenta:- The fertilized ovum enters ther terms and gets its way into the hyper trophled endometrial and the ovum embedded in the walls of uterus. That portion of mucous membrane which intervenes between the ovum and the muscular lager of the uterus undergoes extensive proliferation. And forms placet. It is a developing connection of embargo and the maternal tissue. It develop because of two stimuli one from the corpus lithium progesterone and other developing entropy others placenta coasts of both maternal and foetal tissues.

Endocrine function of placenta:- Both estrogens and progesterone's have anti androgen activity it is only for target ongons.

The secretion is on the late pregnancy. Phase and of its bilateral overiceto my and it produced a third harmonic while is known as the chorionic gonad tropic some effect on luteinizing harmonic. It maintains the function of corpus lustrum and placenta is capable of producing estrogens and progesterone which are necessary for the maintenance of placenta. They are also con troinalicated in patients with enlarged prostate eg. Tes to sterna therapy mifepristone has effects onovalabon it impairs development of secretary endo metirtum and produces menses.

Function :- Growth and development of vagina uterus and breasts.

Growth of axillary and pubic hair

Pigmentation of genital region

Growth of uterus during pvegnocy. During proliferative stage uterus devdop and menstval cycle depends on the secretions of estrogens from the ovaries.

Growth of skeletal muscles is also stimulated by oestrogens.

Anti estrogens are compounds that inhibit estrogen action by competing for its receptors useful in the treatment of breast and uterine cancer. Eg. Clomifen, Tamoxifen.

During the meta bolic processes progesterone gets reduced into an active derivative known as pregnandiol. Appear in the cerine sodium-pregnandiol glucuronate. Period duration of progesterone is a week before menstruation and ceases before the period starts.

At the one set of pregnancy maximum secretion is eight or ninth month as it is produced by the placenta in large amount and concentration falls before the parturition or deliver the knowledge of biological actions of estrogens contraceptives and hormone replacement therapy (HRT). This affect on post menopausal women, bone mineralisation, gynecectomy.

Ovary:- The female sex-Steroids secreted from ovaries. The oestrogens (estradiol from ovaries) have 18 carbon atoms and progesterone (from corpora lutea of the ovaries) having 21 carbon atoms. The ovaries lie in the abdominal cavity on either side hanging from the broad ligament by a fold of peritoneum called the mesovarium.

It shows venation on life most active at puberty and breeding period. The development stages of the ova may be seen at all the phases of life. The ovary consists of a layer of germinal epithelium stroma consisting of connective tissue developing the follicles and the bundles of interstitial cells. It secretes a estrogens Harmon. Corpus luteum developed from the ruptured follicles after ovulation they produce progesterone.

Estrogens- are the hormones which produce oestrus in ovariectomized rats or mice. They are derived from supra-renal cortex, placenta and few Leydig cells of the testis.

Classification of estrogens:-

Natural estrogens- eg estradiol, estrone, estriol semi-synthetic estrogens eg. Ethinyl diethyl oestradiol, mestranol, norgestrel.

Synthetic estrogens eg. Diethylstilbestrol, Chlorotrianisene, methylenoestril.

Non steroidal agents with estrogenic activity eg. Dienestrol, Mestranol, norgestrel, methylenoestril, chlorotrianisene.

The FSH stimulates the metabolic activity of the Sertoli cells in the seminiferous tubules. And promotes spermatogenesis. The LH stimulates the development of the interstitial cells of Leydig which synthesise and secrete testosterone. The feedback mechanism leads hypothalamic-pituitary. There is need of physiological levels. Development of accessory sex organs and the secondary sexual characters less potent is androstenedione and dehydroepiandrosterone. Are secreted by adrenal cortex and the ovary which are bio transformed as in the liver and kidney to testosterone. Sexual maturation concerned androgens in males. Eg. Facial hair, musculinity, boldness, texture of the skin. Lower pitched voice.

Function:-

Induce secondary sex character of males (body hair, deep voice, penile growth, and body hair in females. Support spermatogenesis.

Influence sexual and aggressive behaviours in males and females.

Regulate secretion of gonadotrophins for muscle metabolism. Increased respiratory rate and bronchodilation stimulate respiratory exchange of gases. Spleen contracts and release erythrocyte rich blood into circulation.

Piloerection as in agouti appearance.

Control of Adrenal medulla secretion.

Adrenal medulla produces no hormones in resting condition whereas in stressful conditions stimulus the secretion.

These as my asthenia, hyper tensrens, psychosis diabetes mellitus, osteoporosis, glaucoma, pregnancy, herpes simples kerotites and infections, peptic ulcers jungal and exonthenatoco diseases likechicke pox.

Testis:- The malesex harmones or androgens are mainly secreted by the testes, and adres cortex and the ovary. Each testis is consisted with large number of somniferous tubules and many other is elated groups of interstitial cell which secrete the mole harmone the mast potent natural anelragen is testosterone, and is secreted by the testicular intestinal cell of lag dig.

Androgens:- At puberty is an increased secretion of pituitary gonads trephine follicle stimulating harmons (FSH) and luteinizing hormones ICSH in males. Collagen diseases is marked by defects in connection tissue protein (collagen) in the joints various organs and deeper lugers of f the skin.

Allergic disorclers used in atopic and contact dermatitis, allergic rhinitis, allergic conjunctivitis, certain allergic skin conditions corticosteroids are effective in psoriasis, seborrhoea dermatitis pvaritus rulri or ani dermatitis herpetipri mis and pemphigus.

Ophthalmic c diseases It induele irtis, iridocyclitis, chordates, ureitis, corneal ulcers and secondary glaucoma.

Hematologic disorders used in the management of blood dyscrasios including acquired or auto immune haemolytic anemia and idiopotinic thrombocytopenia or drug-induced thrombocytopenia, asronolocgtosis and a plastic anaemia. Used in lines, disorders like chronic hepatitis cirrhosis of liner with as cities which is refractory to diuretic therapy alone. Acute infectious diseases messier doses of steroids used in the artis tressand anti toxic effects used in cases of gram-negative septicaemia and enti toxic shock and to control complications of tuber colossi meningitis acute pneumonic rival infections.

Sympathetic discharge:- Adrenal medulla do discharge of adrenal or noradrenalin prepared actions of animals for fight. Blood presume and cardiac out put increases. Blood diverted to skeletal mused and glycogenolysis and lipases provide fuel

Respiration and skeleton muscle :- Bronchioles are dilated secretion of mucus is reduces and mucosa undergoes shrinkage. Respiratory and death rate ar inversed. On set of fatigued deluged muscular excitability and contralti is inversed

Metabolism:- Adrenaline and novadranitine primate glycogen lyses in liner muscle and lipolysis heat production are increased and tissues degrade to Oxygen consumption. All these are B effects liberation of gluco corticoids , Now blood glucose level rise due to gluco-geno-lysis and glucogenesis and A.C.T.H production is increased.

Other Effects:- Sweating increased sweat glands are stimulated. Adrenocortica insufficiency is due to inadequate ACTH secretion. Acute adrenocortical insufficiency addisonian crisis is characterized by extreme weakness dehydration, hypotension, and gastro intes tinal sympton.

ACTH is released from the pitebtery cussing and adrenal hyperplasia, and hyper secretion of steroids also occurs from an alternate path.

In conditions like crushing's syndrome, adrenogenital syndrome and aclrenal virilise the aim of therapy is to suppress pituitary ACTH production which may be excreted in urine or oxidised ultimately to vainly mandolin acid and excreted in urine.

Actions of Adrenaline or non-adrenaline:- There poetically useful anti inflammatory activity has been intensified and the sodium retaining of mineral corticoid activity has been minimized. Therefore naturals cortices steroids can be obtained as such from of steroid animals synthesed from chalice acid, attained from cattle, or from steroid sapogenins like diosgenin.

Both adrenaline and noradrenaline are known as emergency hormones released under conditions of "fright, fight or flight."

These are associated with the sympathetic nerve-system

Adrenergic receptors:- The hormones are bind to specific receptors located inside the cells the adrenergic receptors. These receptors are of two types. A and B. Receptors respond to adrenaline and U-actions involve contraction of smooth muscles. B receptors responds to adrenaline and involve relaxation of smooth muscles or metabolic effect U-actions are due to inhibition of adenylyl-cyclase while B actions involve activation of enzyme U-receptors are excitatory where as B receptors are inhibitory.

Heart and blood vascular system:- Adrenaline and nor-adrenaline increase heart rate by stimulation the sino-auricular node myocardial contractility and excitability are increased as a result of which the force of contraction is increased contraction of bundle of his is also increased now the beta-effects are increases cardiac-output. The action of nor-adrenaline increases the vasodilation on of the coronary blood vessels and vaso constriction of the peripheral vessels. Now the adrenaline modulates vasodilation of the skeletal blood vessels. The Blood pressure becomes increases and becomes quietly normal.

Adrenal Medulla

Morphology:- It is ectodermic in origin. It is derived from the precursor of the cells of sympathetic ganglion cells that separates from the neural crests. Cells these occurs in two directions some of them give rise to sympathetic ganglion cells are stained yellowish brown with phaeochromic reaction while others are stained in yellowish brown with chromic acid they are known as chromaffin cells.

Metabolism of catecholamines

Catecholamines are derived from the amino-acid phenylalanine. The amino acid is first hydroxylated to form amino acid tyrosine. At the time of blood circulation the adrenal medulla secretes tyrosine. The adrenal medullary cells. Tyrosine hydroxylase converts dihydroxyphenylethylamine and then to dopamine by the action of aromatic L-amino acid decarboxylase. From the adrenal medullary cells dopamine enters the dense core vesicles in which medullary cells vesicles of cytoplasm and converted into noradrenaline by dopamine cells, noradrenaline passes into the cytoplasm under methylation catalyzed by the enzyme phenylethanolamine N-methyltransferase and noradrenaline undergo rapid degradation after the release. During course of circulation the two hormones are removed on the noradrenergic normal endings or other tissues or the metabolized into blood tissues by an enzyme catecholamines or methyltransferase. The products formed are metadrenaline or nor metadrenaline.

Regulation of secretion :- Regulation and synthesis is done by glucocorticoids. Is regulated by the hypothalamic - pituitary- adrenal axis controlled by A.C-TH and CRH.

Circadian Rhythm and plasma control.

The secretion of adrenal gland (cortical) and anterior pituitary (ACTH) hormone doesn't occur in steady rate It follows diurnal rhythm. Which is a 24 hour cycle human anterior pituitary in the usual sleep/awake cycle starts producing larger amounts of ACTH after midnight. Peak 6.00AM to 9.00 AM. The blood steroid level is the lowest in the late evenings.

Stress:- By the administration of various physiologic doses of glucocorticoids.

Hans Selye suggest the concept of stress is an agent which attempts to alter the internal environment. Eg. Physical injury infection, high or low temperature, radiation injury neurons clear fatigue, emotions, noise, environmental pollutants It generates two types of syndromes. Eg. Local adaptation syndrome. Or general adaptation syndrome. These diseases respond to glucocorticoid therapy. Under severe stress the cortical secretion may be raised up to ten-fold of the normal daily output.

The cells of the adrenal cortex are arranged in three zones: (I) the outer zone glomerulosa (II) The inner zone reticularis. They work as single functional unit and secrete cortisol, corticosterone and small quantities of male

and female sex hormones. They are formed by desk brows chromaffin cells which secretes coto chloramines. Landrenaline and no rod renalinl.

Harmones released:-

There main hormones secreted by the adrenal cortex.

- Glucocorticoids (cortiso), Corti costerone anti allergic effect
- mineral corticoids coldostenone, deoxy corticostorone,
- Sex hormones cprogestroneis formed, trace of oestrogen eg. Homeostasis.

Biosynthesis:-

All steroids are derived from cholesterol derived from acetate or dietary source conical fats) now cholesterol is converted into pvegnolone. Steroids derived from the pvegendone the oestrogens, the progestogens the androgens, and the cor ticos teracids. Three closes are regards as steroids- C-21, C-19, C-18. (Progesterone) (condrogens) (Oestrogens).

Synthesis is controlled by ACTH.

The enzyme 3-B- dehydrogenise is involved in the conversion of pregnatone to progesterone and 17-hydroxy pregncnolone or 17-hydro progesterone.

Adrenal cortex:-

Morphology:- Adrenal glands are composed into two. These are triangular flattened cap like structure situated on the dorsal swface of the kidney. The supra-renal is derived from its position ocupted size and 8-10 gm in weght. A connective tissue capsule is surrounded the gland underlying the kidney. Position occupied by the gland she and shape from species to spelies. The right gland is owner left. This gland consist of two parts (i) cortex (ii) medulle. The two parts different their embrological origin structure and function.

These are highly rascularized receiving about 6-7 ml of blood gm. Of tissue per minute. Now blood carried by the branches of phenyls medially adrenal and in ferior adrenal arteries white right and left adrenal rein collect blood from the adrenal glands. Blood ussels enter from the surface to form a rich rascular plexus in the cortex from that side blood enters diluted to inner medulla.

Development it is mesoderm in origin it is derived from the loclomic epi thallium covering the anterior part of the mesonephros. At the time of development of cmbroga, an inner lager of provisional cortex is formed from groups eosinophillic, large, granular, cells. Now the permanent cortex is well developed at the maturity cortex undergoes on degeneration while the permanent cortex starts to develop and envelop the medulla.

Histology:- Palyhedral parenchyma cells forming two cells thick cords running radiolloy from the cortex to the medulla. The blood copallirias forms a close network around the chords ensuring blood supply to each other. They their cells characterized by well-deigned nuclei mite Chandra and Golgi. All insulin preparation are usually given subcutaneously. Only insulin injection or regular insulin coan be given intravenously eg. Atrophied (nusol), ropitand Mentored,

Adverse reaction on hypaglycemir, insulin allrgy, insulin presbiopia, insulin newropoty, Insulin resistance, obesity.

Therapeutic was, diabetics mellitus schizopimonia, myarection, Anorexia nervosa burns.

Treatment:

Ins all in first discovered by bunting 1921 used in the treatment of diabetes mellitus in 1922. It was completely synthesized in 1966 It is a polypeptide with a molecular weight of about 6000 consist of a-and b- chain 21 and 30 amino acid liked by two disulphide bone. Connecting Peptide (c-bond) forms eg. Pancreas of cattle (bovinge).

The pig (porcine) beef or pork insulins conimalelarind human insulin. (low anti genity) is produced by E.coli by recombinant technique or by chemical technique of pork insulin, replacement of lone amino acid is different from human insulin. The normal pancreas contains about 200 units of insulin secretion to man so units daily metabolized in the lines.

Transport, metabolism and Excretion :-

Rapidly proteolysed in the gut, it has to be given parenterally, usually by subcutaneous injection. Insulin circulates in plasma in a free state and negligible fraction is bound to the plasma globulins in liver and kidneys. The disulphide bridges are split in the liver by the enzyme glutathione insulin transhydrogenase (insulinase). Which breaks insulin molecular into A and B chains. It is bound by muscle and fat tissue no- free insulin is excreted in the urine and faeces. The plasma half life of intravenously injected insulin is less than 1 minute in man.

Pancreas/ islets of langerhans:-

Morphology:- endocrine function are performed by the islets of langerhans. It is leaf like situated between stomach and duodenum. They are small or highly vascularized masses of cells spread over the pancreas, on entire organ.

Histology:- It may be grouped on epithelial cells among exocrine pancreatic acini. It is of four types of secretory cells.

- (i) Alpha (A) Cells
- (ii) Beta (B) Cells
- (iii) Delta (D) Cells somatostatin
- (iv) PP (E) Cell, secretes pancreatic polypeptide

The insulin-secreting beta cells are most numerous (upto 70 to 80% of islet cells). Alpha cells comprises 20 % of cells D and F cells of 4 percent and class than 2 percent. The physiological role of glucagon and insulin in the regulation of intermediary metabolism is well established the diabetes mellitus is a chronic disorder resulting from insulin deficiency, characterized by hyperglycemia, altered metabolism of carbohydrates, proteins and lipids. Metabolic abnormalities leads to polyuria, polydipsia, polyphagia and fatigue by term complication include, proliferative retinopathy myocardial infarction polyneuropathy and uraemia include gangrene.

Hypersensitivity may occur and leads to demineralization of bone and metastatic calcification in the kidneys (heparinocalcemia urithiasis) the development of antibodies may cause intolerance and resistance.

Calcitonin or (Thyrocalcitonin) is a small polypeptide mol.wt 3600 with 32 amino acids synthesized by secretory cells. It produces hypocalcemia by inhibiting bone resorption, and by promoting the urinary excretion of calcium and phosphate. It has no action on transport of intestines. Salmon calcitonin 40 to 160 units daily by subcutaneous, intramuscular or intravenous injection. Human calcitonin is usually given in a dose of 0.5 mg/day.

Dihydroxycholesterol is used to correct hypocalcemia of hypoparathyroidism and to treat acute chronic and latent forms of parathyroid tetany. Etidronate (didronel) is a non-hormonal substance (biphosphonate) that reduces the rate of bone turnover. It is related to pyrophosphate which has a role in bone mineralization. It is used in treatment of Paget's disease, malignancy, and reduction of heterotrophic bone fusion. Due to spinal cord injury.

Hyperparathyroidism- hypercalcemia may be due to a diffuse hyperplasia of the glands adenomas, carcinoma and aberrant production of PTH. Symptoms include polyuria, polydipsia, disordered cardiac rhythm, renal calculi and subperiosteal bone resorption, with hypercalcemia and hypercalciuria.

Structure of parathyroid gland:

Calcium metabolism in the body is mainly governed by two hormones parathyroid hormone from the parathyroid glands and calcitonin from the parafollicular cells of the thyroid gland. The chief physiological role of PTH is the maintenance of calcium homeostasis is required for normal body function. On removal of parathyroid gland requires in a progressive hypocalcemia, tetany, convulsions and death.

Action PTH increases the plasma Calcitonin concentration and lowers the plasma phosphate level.

Its effects exerted on the Ca^{++} transport, in the bone, Kidneys, and the intestines. It stimulates a cyclic activity in the bone and kidney cells.

Toxicity:- over dosage with PTH causes hypocalcaemia. Overdosage with PTH causes hypocalcaemia manifested as weakness, vomiting, diarrhoea, lack of muscle tone.

Parathyroid gland :-

Morphology:- In the posterior surface of the thyroid gland it consists of two pairs of small bodies, oval in shape and ring embedded in the posterior surface it assume $6 \times 6 \times 3$ cm. in size total weight is 23 to 500 mg. gland associated with connective tissue it consists of columns of epithelial cells which intersperse with blood capillaries and nerve endings.

Development:- Two upper parathyroid glands are formed from the fourth branched pouches while the lower pair is formed from the third branched pouch.

Histology:- There is the presence of masses or columns of epithelial cells with blood sinuses in between them. These epithelial cells comprise two types chief or principal cells. It is small in size no granules, cytoplasm is clear but contains glycogen nucleus is large and vascular majority of the cells populate and sustain throughout life. These cells become enlarged cytoplasm becomes vacuolated chief cells commonly known as water clear cells cytoplasm studies shows they are of two types light chief cells or dark chief cells. Few and rich in secretory granules containing glycogen in cells in contrast to chief cells, oxyphilic cells are larger in size and few in number. Granules can be stained in acidic dyes. It contains fatty granules and globules. Adipose tissues intersperse and sometimes colloid vessels.

Regulation of digestive secretions and motility of gastro-intestinal tracts are controlled by nervous bio-chemical and mechanical factors nervous bio-chemical and mechanical factors increase in hydrochloric acid disturbances and needs symptomatic treatment.

Drugs used in peptic ulcers

- (i) Gastric antacids
- (ii) Anti-secretory drugs
- (iii) Miscellaneous agents including mucosal protective agents.

Anti-secretory agent:- These are the drugs that suppress HCL secretion by blocking receptors (muscarinic receptor blockers H_2 - receptor blocking or postreceptor mechanisms like H^+ , K^+ ATPase or proton pump. These enzyme is located on the cell membrane gastrin is released from antral mucosa of stomach by food alkaline P^H in the stomach and digested protein are powerful stimuli for gastrin release gastrin provides a feedback control on HCL secretion. When P^H of stomach is elevated by food gastrin is released and conversely release of gastrin is inhibited when stomach attains low P^H anticholinergic action eg. Dryness of mouth, urine retention etc. further anticholinergic agents delay because the food remains for longer time, in stomach.

Gastro-intestinal hormones:-

The mucosal lining of stomach and intestine is the largest and most diverse gland of the body number of endocrine cells not in a compact group in endocrine tissue but scattered over mucosal cells. These cells secrete specific cells by diffusion and not through circulation. Mostly gastro-intestinal hormones are also secreted by other areas. These hormones control the motility and secretory activity of the digestive system and produced in response to specific chemical substance in gut content mostly they are polypeptides.

Gastrin:- gastrin occurs in two forms gastrin 17 secreted by pyloric antrum and gastrin 34 produced by upper small-intestine gastrin 17 contains seventeen amino acids. While gastrin 34 contains in addition to the seventeen amino

acids where as gastrin 34 contains in addition to the 17 amino acids at c terminal end of gastrin 17 anethes 17- amino acids thus malcing a total of 34 its half life is six times mare than gastin 17 but its action is six times less effective.

From the pyloric ant run two gastrin have been isolated gastrin without sulphate anf gastrin II with ithered sulphate. These two gastrins contains seventeen omino acids there biological activity of first five amino acids and any nthetic product with all the physiological action of gastrin pentagastrin.

The gastric ulders maybe produced due to

- (i) Abnormality in gastric acid secretion
- (ii) Abnormal mucosal deference.

Estrous cycle:-

At the certain periods of the year female will receive the male now the mating seasons are the characters ties of animal breeders as heat and by physiological as oestrous. The sexual phases immediately preceding estrus are called postures. The changes of swelling and increases vascularity of the value and vagina. Uterus become larged glands hypertrophy. At this time bleeding occurs from the uterus and appears externally. These charge of posters are prop oratory in nature female organs being into a conelition suitable for reception of the mole and the fertilization of ovum.

The groffion follicles in the ovarg under go maturation estras is the period during which ovulation occurs and the female mate with male the changes during postestras are anticipatory to the in plan tation of the fertilized oven in the oteras the oterine mucosa hyper tropics and its glands show an increase in secretary activity. During postestrus the corpus luteeuin develops the oterin changes in postestrun resemble these taking place during psegnang which, indded are an extension or continuation of the form thus the changes at the different phases of estrus are as:- pro- estrus-A song wineeus fluid is serrated in uterus and vagina become congested. It is a tendency of estrogens secreted by maturing follicles vaginal smear shows large number of mediated cells broken off from the proliferating vaginal epithelium.

Estrus-(heatperiod)- During the period of heat, only female receives male. Congestion of the uterus becomes maximum. The virginal epithelium thickens furthes and the superficial layers are fully keratin in pregnation is possible. If fertilization takes place, placenta forms and pregnancy begins. If not, it passes on to the next pase vaginal smear shows large him of keratinised cells.

Postestras cheuteal phases:- changes in teated in the pprevious stage proceed still furthes due to the action of progress throng secreted by the newly formed corpora lutea in the absence of pregnancy corpora lutea degenerate and the subside generation forgone arise. Eg. Monosestrus animals (biteh). The phyertrophied mulosa breaks down and is discharged, vaginal smears show targe number of neutrophills.

Anoestrus:- The resting asexual period in monoesters animals last up to the next mating season and is known as anoestrus in polyesters animals the resting interval is short up to the next cycle which is called distrust. In rats last for 4-5 days regional smarts shows degenerating leucocytes and denuded epithelium.

Sexual reproduction is moles:-

The structure which enrolled in (sex characters) in reproduction include mainly as geneses .e. taste in the male and ovaries in the female. Gametes or sex cells all so secretes harmonics that are the functional sex accessories induce structures which involved in the transmission of gametes or the developing zygote from the site of its origin to exterior. In male the sex-accessories epiididymes away from the testes apiary of remind vesicles which provide essential nutrients, a single pro-state gland that serves to lubricate the passage way to the outside of the body through pennies, A pair of cowers glands which are also lubricating the passage in fjunction. And pennies may be erected by the circulation to facilitate placement in to the raging of the female for the ejaculation of sperm.

In female, the sex accessories include a pair of fallopian on tubes from the override at the proximal ends enter the oftenest, A single Uterus a raring that seems to receive sperms. One pair of mammary glands which produce milk, for the new born and but bourethral glands secrete a fluid similar to that of the gland, connected to the urethra of the male.

Secondary sex characteristics:-

These include more or lese external specialization which are phyorical difference lactween the opposite sexes. They serves sexes to gether for mating to provide for the protection or nutrition of the young the important secondary sex characters are the following.

- (i) Males have muscular body in aceordanic to female.
- (ii) Mammary gland are well developed in females and the rudimentary in males
- (iii) (the pitch of voice is high in males than females.
- (iv) Males have well defined organs as, hairs chest face, on their body. In females the hairs are present sparsely.

Female reproduction organs:-

Sperms are produced in the testes. Testes are two oval oldies and are suspend in a sac hanging from the lower wall of the abdomen, the scrota. Each testis is composed of coiled annatto massing somniferous tubs lined with epithelia cells and produce sperms cells. The interstitial cells of leg dig around the tables produce the mole sex hormones, testosterone, which promotes the development of accessory gland and contort. Mole secondary sex-characteristics. As, sperms are released into the interior of the tubules they are carried by ciliary action to the epididymis which lies on the outsides of and partially encircling the testis and epididymis together constitute testicle the sperms stored, so become motile in nature, epidydimls connects the as deferens. It is a muscular tube that leaves the scrotum by the inguinal canal and empts into the urethra. The duct leads from the bladder the terminal portion of each was deferens enlarges to form an ejaculatory duct capable of contraction and expulsion of the sperms which are stored there adulatory duct before connects to urethra a glandular seminal vesicle empties three. It also secretes a viscid fluid which is expelled along with the sperms. The mixture of the fluid and the sperms is known as semen.

Another pair of glands, cowpeas glands attached to the urethra below the pro-state gland. Their secretions are also al kaline and are we as lubricant for the same. The secretions of the prostate and coopers glands suspend the sperms motile and newish than and neutralize the normally acid environment of the urethra and of the female reproductive tract to a P^H more suitable for sperm survival. from the musculature urethra communicates with the extortion of the body, the penis. It consist of columns of spongy tissue, the corpora cavernous, surrounding the urethra, along a skin layer. Tip of the penis enlarges slightly to form glands which is covered by a fold of skin, the prepuce, function of penis is to deposit the semen in the genital tract of the female.

Erection of penis:- Associated with sexual stimulation. It is caused by dilution of the blood resells carrying blood to the spongy tissues resulting in the called of blood with in these spaces .as the tissues the testis close to the body epoxy dymis urethra faunally the muscles surrounding the bulb are stimulated. They contract and propel the semen out through the urethra and produce some of the sensations associated with organism.

Ejaculation:- Stimulation leads to can traction of muscle present in the scrotum, railing the testes. Close to the body epididymis and vas deferens. These contraction more the semen in urethra finally muscles surrounded the bulls are stimulated. It contract and propel the semen out through the urethra and produce some of the sanction associated with organism.

Semen:- At the time of insemination. It contains sperms cells and secretion of seminal rest cells prostate gland and cowpers gland and also discharged per ejaculation raris from 2.5 to 3.5 ml.

Spermatozoon:- The spermatozoon consts of two marl parts, head and tail. Tail divided into neck mid piece. It is about 0.05 mm is lefth .it is motile in nature and enzymes are responsible forints motility are located in the mid piece. Head of spermatozoon is a sperm -shaped Stratton bovnded by plasma- membrane at the other for end it has

a cup-like structure called acrosome made up of geology apparatus. It contains hydro zing enzymes and plugs on important role in the penetration of sperm in the ovum. Head contains a well condensed nucleus. And a very little cytoplasm. Head is followed by short neck. Neck consists of controlees a proximal contras. The two controlees lie at right angles to one another. The proximal controlled has no active function. But is a potential activist within the egg during the first deavage division of the fertilized. The distal contrail serves as basal body for tait neck followed by mid-piece composed exclusively of mitochondria. Aggregate at the based and forming a continuous spiral mitochondrial (A-Tapes) provides energy to the sperm tail for its motility mid-piece is followed the principal place (which ultimately ends in the and piece. Now principal place the end-place of the fibres system is reduced to the axial complex of the control fitters. Surrounded by the ring of nine peripheral fibres.

Numbers:- nearly 300 to 400 millions of sperms cells are present in the semen of each ejaculate of a normal young adult male. Only of these can fertilize the egg cell. In moles 35 millions sperms/ml. of semen are generally sterile. Female Reproductive organs:- Female reproductive organs include a pair of ovaries, air of avidest (fallow ion tubes) and the uterus or the vagina.

The ovaries are paired small almond live flattened belies lying the sides of vertebra of Colum behind the kidneys in the phonic cavity. Each ovary is attached to the and over ion ligament, it composed of stream of fibre connection tissue and is lined by a germinal epitheliums which proliferate the us ands of primordial follicles during the embvgonic life of individual.

Each ovary is rough hdifferentioled into on outs cortex and on inner medulla.

In mature ovary contains follichs corpora lutes in the various stages. It consist only large blood vessels of the organ one call of the mass of epithelium cells give rise to an immature ovum orooegte.

The remaining cells surrounded the ovum oroo-cyte as sac or follicle called follicular epithelium or granulose consist of primordial cells.

Now they become organized in a connective tissue lagers, the theca externa and the the interna.

Puberty:- graffial follicles reached on matting at the time of puberty in young girls. In is the beginning of youth, when onset of sexual maturity may functionally organize. At this time the various morphological, psychological and endocrine no logical changes take place in the individual. Secondary sexual characteristics marked during the growth as well as accessory sex organs maybe. These changes going an with gonodotropheas which stimulate the ovaries. Ovaries on stimuli privies the development and mantance of primary as well as accessory sex characters of the female inelividuals.

Sex-harmonics:-

Male sex Harmones:- Test sterna is a male sex hormones. It is secreted by the somniferous tubles in the testes associated by chemicals called androgens and realer masculine characters tics.

Effects of androgens:- They are produces in the male human foetus and play important role in the genitalia. It may causes the enlargement of the penis, testes and also the prostate and the seminal vesicles and other accessory organs. They also affect the growthay larynx muscle development stele tot size and distribution of body hairs. They stimulate the biosyntheses of proteins of muscle tissue and also the formation of red-blood deals they stimulate by the apocrine sweat gland whose secretion attracts bacteria. And so produces body odours, associated after puberty.

Regulation of androgen production:-

Production androgen is regulated by a gondo tropic-hormone (LH) secreted by the anterior pituitary. LH acts on the intestinal cells of leydig to release androgens. It effects on the male reproduction organs, androgen inhibits in turn the release of LH. During negative feedback when they reaches at a certain level profound effects on male

reproduction organs. It inhibits. In turn the release of LH. Sperms formation stopped when it discarded pituitary development of sperms cess proliferate the pituitary hormone the follicle stimulating hormone.

Female sex hormones:-

Oestrogens and progesterone are mainly two female sex-organs. They produced the ovarian follicles under the influence of follicle stimulating hormone. (FSH) of pituitary gland. Oestrogens established steroidal stimulate the development of the breasts to external genital a public and auxiliary hairs and distribution of body fat. Both oestrogen and progesterone are regard to endometrium for the implantation of embryo. These hormones are produced in the ovary and regulated by gonadotropic hormone.

Menstrual cycle:- the rhythmic changes occur during the 28 days, during this time reproductive life of woman from puberty to the menopause. In the phase of the menstrual cycle bleeding occurs, this is called menses. The duration is 3-5 days. Ovulation occurs between midway period. i.e. somewhere between 13th and 15th day. Thus the average interval of repeated 28 days earlier or the cyclic discharge of blood mucus and certain other substances from the females. The menstrual blood contains stripped of endometrial, mucus leucocytes and unfertilized ovum. The uterine lining undergoes a gradual hypertrophy. It prepares a suitable bed for reception and implantation of the fertilized ovum.

If pregnancy occurs the proliferated mucosa is converted into placenta. During the block of pregnancy hypertrophied mucosa breaks down and is discharged as menstruation. It is described as the funeral of the unfertilized ovum. The disappointed uterus weeps and the weeping is swept out as the menstrual flow.

The endometrial changes occur during the menstrual cycle into the four stages (i) the resting phase (ii) proliferation phase, (iii) the premenstrual phase (iv) menstrual phase. The first and second phase are called follicular phase. They are due to gradual action of estrogens, secreted by the maturing follicles. On the 14th day ovulation takes place and corpus luteum formation begins in the follicular space of ovary.

Ovulation:- burst of egg follicle liberating the egg and ovulation it starts about 14 days before the beginning of the menses. Ovulation involves the development of primordial or primary follicle. The follicle stimulating hormone (FSH) from the anterior pituitary initiates and with LH regulates ovulation an egg produced from a primary follicle first become partly detached from surrounding epithelial cells beneath tunica albuginea. It begins to enlarge and surrounding cells grow to form many layers. A zona containing of muco-protein zone pellucida appears at the developing oocyte and follicle cells. These follicular cells crowd around the pellucida. Between the developing oocyte and follicle cells and developing egg. Under the influence of primary pituitary gonadotrophin a follicular fluid is secreted by the surrounding follicular cells and cells immediately surrounding the egg become separated from the more remote cells (zona pellucida) and a large cavity, the antrum is formed full developed follicle, granulosa, and the is called a graafian follicle.

The graafian follicles during final stages of development moves to the surface which bursts releasing ovum into the abdominal cavity. Now the ovum is swept into one oviduct with the help of cilia present at the finger like projections of the oviduct opening. The oviduct the ovum is transplanted into uterus. In case the ovum is fertilized it liquefies and ovum is fertilized it liquefies and discarded through the vagina. The follicles, which enlarge but not go in ovulation finally degenerate to form atretic follicles which ovulates is converted into blood filled cavity corpus hemorrhagicum. After release of egg blood comes from the injured vessels. Soon after this dotted blood is replaced by yellow bodies of lipids or luteal cells proliferated from granulosa and the corpus luteum is formed under the influence of luteinizing hormone formation and maintenance of corpus luteum starts with the influence of anterior pituitary. If the ovum is not fertilized the corpus luteum degenerates to become corpus albicans which appears as disorganized scattered globules.

Oocyte:- Size of human oocyte is about 0.1 mm/100 micrometer in diameter. It has ribosomes, enzymes, amino acids and other organelles for rapid synthesis of embryonic cells. The eggs are shed in the body cavity form where the ostia of oviducts pick them up. Uterus wall is thick it leads through uterus and is the site of fertilization

takes place uterus is connected to vagina through the opening of vagina through cervix the Bartholin's glands secrete a fluid. Secretions serve to lubricate and neutralize any acid that may be present.

Vagina leads to exterior through vaginal orifice which is flanked by one pair of moist folds. The labia minora, enclosed with the fleshy hair covered outer labia majora. These structures enclose the clitoris which is a small mass of tissue just anterior to the urethral opening. Clitoris is a small mass of tissue just anterior to the urethral opening the clitoris is homologous to the penis of the male. It has glans, prepuce and capable of engorgement, it serves to reproductive function. The urethra of the female opens just anterior to vaginal orifice.

Fertilization:- The spermatozoa which are stored in epididymis in males are actively mobile as coitus near completion and the climax organism of the male occurs, contraction of the epididymis and vas deferens propel the spermatozoon. Through the ejaculatory ducts into the urethra. At the same time, the seminal vesicles contract and expel viscous secretion, the semen with its suspension of spermatozoa. Is ejected from the urethra with considerable force by the contraction of the bulbospongiosus and of the striated muscles in perineum. The act of ejaculate on ejected the semen and the movements which bring to constitute it is a reflex act of which sensory nerves in the penis are its afferent limb the sympathetic nerves its efferent limb. A thin secretion from the prostate gland are added to the semen in the urethra. The secretion of the seminal vesicles appears to be essential for maintaining life and motility of the spermatozoon. But the prostatic secretion and the secretions of the urethral glands are not of the importance in this respect. They probably serve as a lubricant.

Spermatozoa deposited in the upper part of the vagina during coitus propel themselves upward by the peristaltic movements of the tube. Now fertilization takes place probably contractions of uterus during coitus draw the semen into the uterine cavity.