Endocrinology and Biological Science: A Comprehensive Overview of Hormonal Mechanisms

Dr. Santiago López*

Institute of Environmental Sciences, National University of La Plata, La Plata, Argentina

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 produets'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, inelividual 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 harmone 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 harmone 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 speecffican 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 harmon they specific receptor it initial their actions. Eg. adreoecrteo 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 poratharmone 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 harmone 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 Dextramphetanine stimulates. GRF Releaxse by alpha adrenergie stimulation where as it is inhibited by betaddrenergic stimulation.
The hypothalamic harmonce are thought to be lamented as resdt of aminergic neuronal actvtg dopamine noradrenalin and serotonin.

Harmones and vitamins harmones and vitamins are inter-related to each other due to imbalance of harmoness and vitamins deficiencies may be occur on restricted diets malobsorption syndromes or in states where the body need increases eg. During body growth pregnancy and lactation.

Endocrine glands and harmones

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 hypothalamic thus, the secretion of the tropic harmones from the anterior pituitary gland is controlled in two ways.

By the hypothalamic and by feedback of harmones from the endocrine target cells
Fig.
The negative feedback control of theonteniov pituitary secretion environmental orendognal stimuli act upon the hypothalamic. Which secretes specific releasing factors converged to the anterior pituitary.

Feedback control:- Over all connotations of harmones producing and secreting activity of the anterior pituitary is also inflected by the harmones of the resection glands. Thus plasma levels of harmones of the adrenal thyroid and gonads fall the hypothalamic is stimulated to secreting the appropriate releasing harmones.

Now production of corticotrophin thyrotrophic and gonad trophy may be occurs. On other sides the blood clevis of the target glands harmones are high, the release of the hypothalamic releasing harmone is inhibited thus, such a negative feedback mechanism is responsible for the maintenance of normal target gland harmones blood levels eg. Contraceptives, adverse effect like adrenal insufficient and failure resetting from administration of aileron corticosteroids in high does which depress the production of endogenous corticosteroids.

Homeostatic of glucose :_ The concentration of glucose in blood is maintained at a constant dent through many factors such as food intake rate of excretion exercise, reproductive state and psychdeyied condition influence is level decrees in the level of blood glucose offer muscular exercise in recognized by alpha cells in the body of langerhans. Which release harmonce glucose into glucose and these the blood glucose level brought to the normal level after meal the beta cell release day pancreas release a hormone. Induces captale of glucose by liverless to convert into glucose. This reduces the blood glucose level and bring it book to the normal level. Vitamin D is ineffective cases or renal rickets and hypoptataemic rickets the vitamin D_3 analogue, al facalcides (1-u-hyclroy chotecaloipck Vs under evolution for the treatment of renal steadies trophy osteamalasive – responds to favourably to vitamin D therapy. It is also used to raise and maintain serum calcium level in hypothalamic titan the treatment of hypothalamic D consists of with drawl of the vitamins low calcium died and ad minis traction of hydrocortisone. And vitamin eg is isolated from what germ oil and name alpha –tocopherol. In m uscle weakness increased oxidation of polyunsaturated fatty acids, vitamin E motions the germinal epithelium treatment is done for infertility in women, habitual abortion progressive muscular dystrophy, peripheral vascular disease refectory anaemia's and haemolytic anaemia's they behaves as catalytic surfers.

Functional classification of harmones

Three major classes of endocrine mentioned effects can be recognized.

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

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

Steroids

Derivatives of tyrosine's
These harmons show a great range of molecular weight from tripeptid like thyrotrophic releasing (TRH) to growth harmons (GH) with 190 amino acid residues and large glycoprotein harmones such as TSH.

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

Storied not stared in cell like peptides hormones. They form when the time of requirement steroids comprises 3-b carbon rings and a five-carbon ring faced to gather.

All the steroids are synthesized from acetate cholesterol is converted into pregnenolone in the mitochonelrice catalyzed by enzyme cholesterol dismutase and they to progesterone or 17-hydrog pregnenotore in the smooth endoplasmic reticuteen. Cortical is formed from

Pregnenalone by 17 hydroxylation and atdosterone, by successive hydroxylation and dehydrogenation. The side chain of 17 hydroxylation pvegnenalone is cleaved to form Andros lection. Tyrosine derivations are the monoamines adrenaline, nor adenine and dopamine and the thyroid harmones thyroxin and trio thyroxin eg. Dopamine is formed form tyrosine. Now noradrenalin and adrenaline formed by the action of phenyl ethanolamine N-Methyl transfixes. Thyroid haromans are formed from two molecules of iodinated tyrosine liked throeghan oxygen molecule.

Hormonal Effects :-
It exerts their inpuence on almost all types of cells in the body.

It inpuences 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 sells.

It Effects the integunet. Mucus production Peeling, Plumage, pigmentation and lolar change production and secretion of sweat sebum and milk is also controlled by harmones.

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

Histology of endocrine glands:-
It's ho was great ration in their histological architecture some enetocrme glands are defined from a single grin layer during their development while other arise from more than grin layer most of the endocrine organs are defined form the endodermis of the entry. These include the thyroid, parathyroid and glands associated with the gastro intestinal tract such as pancreas. The pituitary glad is derived from the ectoderm. The advanced macular 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 melodrama the entryo. The pineal gland is nervous in nature and is therefore deride from the neural ectoderm. The thyroid and testes are tubal or structures with central space. All the endocrine cells have well developed endoplasmic reticulum and Golgi complex required for the synthesis and packaging of the harmones. The his technical characters toes of the cytoplasm of the endocrine cells also reffects the function carried upon the by the endocrine cells. Cells of refracted granules in the cytoplasm in the adrenal cortex.

Thyroid gland :- It is dumb bell shaped, bibbed gland donated 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 106e measures above 5 x 2 x 2 cm. The two lokes are connected to each other by a narrow strip of tissue called is thmus or middle lobe which crosses the 2-4^{th} tracheal rings the right lobe is bigger than the left lobe. A pyramidal lobe raring in size extends from the is thmus opened in the neck. Accessory thyroid bodies are located beneath the main thyroid gland.

The weight of thyroid gland rabies up to 20 to 25 gm is influenced by diet age, sex and reproductive state of the individual. Thyroid gland is kingly vascular blood s supplied by the paired superior and inferior thyroid or terries and directly from the aorta venous blood collected by internal jugular and in nominate veins. Blood haws ensure adequate supply of inorganic iodine of the gland it is defined form the superior, middle and inferior cervical ganglia and para sympathetic fibbers derived from the superior and inferior large ngeal bvanhers of the rogues 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 outo pushing from the middle of the neck infront of the thyroid cartilage. It is derived form the fourth pharyngeal pouch, which gins to the lateral dokes of the gland. During in tra uterine development thyroid gland bonte roughed the follicular structure of gland is evident by 12-14th weak of the foetus.

Histology:-
The biosynthesis of thyroid harmons is carried out in the thyroid foll cular cells of humorous aelni about zoou in diameter large follicles are found near the periphery of the gland while smaller follicles are arranged at the lentos. Each follicle is made up of a cubical follicles epithellivn the resting condition, the epithellion is low but the height is dependent upon the extent of stimulation of the gland thyroid stimulating harmons the low cubical epithelium becomes converted into tall columnar epithelium.

Thyroid follicles are measure about 20-150 um in diameter. A single lages of cubical follicular epithelial cells lines each follicular. It is surrounded bya 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 strome containing lymph channels and nerve endings. The follicular lumen is filled with a colloid material, the thyro globulin It consists of 75% of the colloid material is the main storage form of thyoid harmones thyro globulin constitules about 75% of the colloid material.

Granular cytoplasm containing large number of mitochondria and distinct Golgi cpparaty follicular cells facing the called dal material is thrown into a number of microvilli. Nuclevs is situated the follicular cells and the cytoplasm is filled with the well developed rough endoplasmic reticulum and Golgi complex cythoplasmic vesicles filled with the colloidal material are also found in the cytoplasm these on the basis of stoning are of three types Eason phallic, acidophilic and basophilic and mixed two types of follicular cells have been distinguished on the basis of electron microscopic and his loch cal studies principal cells one contained small number of mitochondria and different proteases and oxidises required for the synthesis of thyroid harmones. Small numbers are scattered in large number of mitochondria and par follicular calls or c-cells-which secrets colcitonin.

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

The thymoglobulin with T_3 and T_4 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 thyroxin binding globulin (TBG) and T_3 is mainly bond to thyroxin- blending prealbumin (TBPA) Thyroid secretions ore increased in cold environment. Thyroid harmones have a rarity of effects on the cardio vas colas system it stimulates Na^+, K^+ ATP are directly and these by increase ATP turn ores and oxygen lonsumpiton these harmones are usd in the trot rent of my xodema in adults, cretinism and juvenile myxodena 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, teach cardiac, palpitation, arrhythmic angina pectoris, polyphasia and emaciation. It leads ot hypertension and gastrointestinal disturbances. Thyroidal preparations must be used with caution in patients with hypertension and lororarg artery disease.

Source. Sea fish, used in goitre belts, Treatment.
(i) Lugol's iodine
(ii) Iodized table salt.
Hypersensitivity reaction like ongioedena owelling of the larynx and multiple coetaneous haemorrhages my occur.

Radioactive iodine (l^{131}), Propranolol, Guanetnidine, thiocynates, Per chlorates.

Dosage- Propyl thiouracil (Propacil) 75-100 mg every 8 hourly
metylthiouracil (Methicil) 50 mg every to hourly.
Methimarde (tapazole) 5-10 mg every 8 hourly.

Therapeutic uses:-
To prepare hyperthyroid patients for surgery. It is administrated potassivm iodide 60 mg thrice doily is given for 14 days before oporition. Gland and becomes less vascular, reducing bleeding at the time of surgery combined therapy of carbimazole or propeyl thiouaction to suppress harmonic synthesis and aroid thyrotoxic crisis pump inhiboxas.

One prarale is a recently introduced gastric ontisecretary agent that inhibits the finaly common pathway in the selection of HCl i.g piotom pump or H^+K^+ ATPase pump.

It is also a effective anti secretary drug. l^+ produce anti secretary effect for a very long decoration normal secretary 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 turnkeys and (d) Bicarbonate section.

Constipation is condition in which defection is deluged and hard stool is formed for various reason. It may be due to consciously ignoring or preventing defecation or ageing , emotions a low bulk diet, atenic or spastic colon, chronic amacbiasis or drugs effects.

Irritant cathartics :-
These agents cause on irritation of gastrointestinal tract mucosa and there by increase reflex the peristalsis i.e. the motility to produce cathartic action.

Osmotic purgatives:- These agents acts by increasing the bulk of intestinal content it increasing by intestinal buk are administering the motenials which are not digested eg. Cellulose, gining the materials which absorbs water and swell eg. Agar

Giving the substances which prevent whater absorbtion in the gastrointestinal tract eg. Liquid paraffin employing the muter also which by their osmotic properties. Draw fluid in the tract. Eg. Saline

Soline purgatires are poorly absorbed from solutions retain water to increase in the bulk in the got they act quickly and not injured the mucosa. Food evokes secretion in the mouth rich in mules and enzyme ptyalin wares lubricants of the food when secretion is reduced some common drugs is used for maintaining secretion in a normal monnes. These drugs are called sialogogus and those inhabiting 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 protest gastro-intestinal mucous membrane from the irritants by coddling it mechanically. These agents might absorb ather anti-injective or ant cholinergic material.

Prostaglands 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 fatly 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 monument of intestinal rill. They are used in the treatment of severe diarrhoea only use of drugs like looranlde may be harmful if diarrhoea is due to bacterial or amoebic agents.eg. kalin pectin, Abdicated wood charcoal, Bismuth salts, coconut shells, zinch chloride etc.

III. REPRODUCTION

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

Reproduction is comluarg and a renewal source for the genetic material which appears to haveon inborn process of ageing. It is rast processes of increasing efficiency in the reproduction processes of vertebrates. So, it is a general tendency to words a reduction of the number of young and increasing parental care, so they are followes the stages f vertebrate evolution. They show the con urgent adaptation with birds and mammals.

Patterns of Reproduction:- Two process of reproduction may accus these are asexual and sexual. By asexually mode two special sexs are distinct called gametes, fusion to form cell-structure the zygote which in divides repeatedly to grow into a fully den loped 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 oven every month, which may unite with the mole sperm, to form a zygote, onus thus's woman's unite of life, with its genetic contribution. In moles, only one internal secretion is for the production of sex organs, secondary sex characters and anabolic stimulation this is controlled by Ganado tropic harmons of the pituitary as in women.

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

An organisms that produces both types of gamete is called hermaphrodite. In most hermaphrodite the two gamete to not mature to the some time, so that self-fertilization does not usually occurs , cross- fertilization is common sexual reproduction is of the biporental but may also be coniporental depending up on the species.

Parthenogenesis:- The development of on egg cell- into a new india dual with out the participation of sperm cells from the opposite sex is called the part homogenise is eg. Crustaceans, rotifers, insects. Not involve the fusion of gametes. Part homogenise is rare in the vertebrates. Eg. white two kegs

Gamogenesis and androgen sis:- Development of new individual takes place from the egg which is activated by sperm Tazaan but permeate zoon doet't contribute org genetic material to the egg. Resulting imtrgos carries only maternal chromos omes. Eg. Fish, poecilla, ptinus, a latro beetle.

Androgen sis:- Is a veneers condition of gynogenisis . Chromosome contribution in the developing egg comes exclusively from the male it is called androgen sis.

Sexual reproduction:- Mostly multi cellular animals is consist by the union of two dissimilar gametes, A egg nucleus with sperm nucleus to produce a single called diplopic 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 tastes, while which produces egg. Cells are called the ovaries sexual reproduction involves two moist fundamental events, meiosis and fertilization meiosis is the process by which gametes from the germinal epithellicon 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 oniporus major part of embryonic Development takes place outside the female body even though fertilization, has been internal but in viviparous reproduction.

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

Repvaduetion 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 yong 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 lags 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 mikes to find their original pawing ground. Crooking of the males frogs, enlarged belkeg of the females are two of the stimuli leads to mating accomplished by mole 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 ria the anterior part of the kidney and the wolfing ducts both sexes name a cloaea 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 adopted to life in water having respiratory and low matory systems as well as sensory adoptotias such as the lateral line. There are a good number of exceptions. It is adversely external facture of the reproductive system. Eg. Female moelfe 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 character stics of the reproduction mechanism of reptiles birds and mammals which are passed as amiates.

Amnion is an extra- embryonic membrane evolved in junction with shelled egg and it facilities the embargo to develop within a stable fluide embroilment. In conjunction with the onion a further extra-embrgonic membrane the Atlantis develops. It has role in expiratory changes and excretion there is yolk enclosed in a sac. Prowling raw material for the developing embargo. Albumen of eggs contains water and porow shell allows gaseous exchange, so the level of reptiles a great deal of provislon is made for both the nutrition and protection of the developing off spring.

Eg. Snakes guard their eggs and turtles and crocodiks, among others burg eggs to provide them with an uniform and protected environment lizards and snakes have developed vivipority but there is no exchange of materials between Mather 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 generation tendency to reduce the number of eggs laid in the more advanced birds one but on the whale the number of eggs related to the number of eggs of offspring that the variation is due to species of nesting, late tube 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 homoeothermic. They maintain their at constant

temperature. Female is 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 in cubate which is xary strong and can be clearly seen in the behaviour of a 'broody hen after hatching the yongs are usually cared for both by parents the gap of the fledging s beak aeting as the releaser to the parents, fending responses. Hormel of feet is by the pituitary lactogen which causes the secretion of milk from the regain's crop.

Mammals :- The cerebral hemispheres and complex behaviour, Mammals owe their success to the efficacy of their reproduction system, now the closs 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 monodramas are quite large mammalian eggs have reduced yolk they the tissues oviducts are well prepared for specialized and muscular region uteri sis perforated in the developing embryos. Now the well of uterus establishes contact with the foetal membranes of the developing embargo placenta sernes as physiological function and forms by the extra-embrognic membrane allantoids grow out from the foetal endoderm and fusing with chorionic give rise to chorioallentoic placenta, inner wall of chorion and the enter lining of the allontois are lined with mesoderm and in this tld resells arise forming the umbilical artery and vein. Foetal or terg and between foetal and maternal circulations countess current exchange system may develop food, water and oxygen are passed from the maternal circulation and carbon-die-oxide metabolites are returned. Mammalian orders have a tendency to reduce the lagers 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 lagers. 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 ginl 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 breading period is followed by resting phase. Mostly animals may bred once. Twice or many times. Breading 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 embelded 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 pregnandial. Appease in the cerine sodium-pregnanediol glucvronate. Period duration of progesterone is a week before menstruation and ceases before the period storts.

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

Ovary:- The female sex-Sterols secreted from ovaries. The oestrogens (estradiol from ovaries) have 18 carbon atoms and progestram (from corpora lutes of the ovaries) having 21 carbon atoms. The ovaries lien the abdominal cavity on ethos side hanging from the broad ligament by a fold of peritoneum called the mesovartum.

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 lager of germinal epithelium stroma consisting of connective tissue developing the folides and the bundles of interstitial cells. It secretes a estrogens Harmon. Corpus lustrum developed from the ruptured follides often ovulation they produce progesterone.

Estrogens- are the harmones which producer oestrus in orari ectomined rats or mice. The are drined from supra-renal cortex, placenta and few leydig cell of the testis.

Classification of estrogens:-
Natural estrogens- eg estradial, estrone, estriol semi-synthetic estrogens eg. Ethingles trodid mestroral quinestrol.

Synthetic estngens eg. Diethglstibes troll. Chlorotrianisene, metallenoestril.

Non steroidal agents with estrogenic activitg eg. Dienestrol Benzes helestrol methestrol . Metallinoestrol chlorotrianisene.

The FSH timalates the metabolic actively of the sertoli cells in the somniferous tubules. And promotes spermatogenesis. The ICSH promotes the development of the internal cells of leydig which syntheses and secrete testosterone. The servomechanism leads hypothalamic- pituitary There is need of physiological levels. Development of accessory sex organs and the secondary sexual characters less potent is and rastendione and dehy droeplan drosterone. Are secreted by adrenal cortex and the ovary which are bio transform as in the lives and kidney to testosterone. Sexual maturation concerned androgens in malls. Eg. Facial hair, musculanity, boldness, texture of the skin. Lower pitchedraice

Function:-
Indies, se condary sex character of males (body hair deep voice penhlegrouoth, and body hair in females. Support spermatogenesis
Influence sexual and aggressive behaviours in males and females.
Regulate secretion of gondo trophies for muscle metabolism. Increased respiratory role and bronohdilotion stimulate respiratory exchange of gases. Spleen contracts and release erythrocyte rich blood into circulation.
Piloerectiongines ag resins appearance.
Control of Adrenal medulla sending
Adrenal medulla produces no harmones in resting condition verities of 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.

Opthalmic 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 theropy alone. Acute infectious diseases messier doses of steroids used in the antis 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 fatigue 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 symptons.

ACTH is released from the piteebtery 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 noradrenalin are known as emergency harmones released under conditions of "fright, fight or flight.

These are associated with the sympalhetic 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 meta bolic effect U-actions are due to inhibition of adenyl-cyclase while B actions involve activation of enzyme U-receptors are exicitory where as B receptors are inhibitory.

Heart and blood vascular system:- Adrenaline and nor-adrenaline increase heart rate by stimulation the sin-auriculars node myocardial contractility and excitability are increased as a result of which the force of contraction s increased contraction of bundle of his is also increased now the b-effects are increases cardiac-output. The action of nor-adrenaline increases the vasodilator on of the coronary blood vessels and vase constriction of the peripheral resells. Now the adrenalin modals B rasodiation of the skeletal blood vessels. The Blood pressure becomes increases and becomes quietly normal.

Adrenal Medulla
Morphology:- It is ectodermic in origin. It is desired from the precursor of theulls of sympathetic ganglion cells that separates from the neural crests. Cells these occurs in two directions some of them gene rise to sympathetic going loria cells are stained yellowish brown with phaeochrom cycles hatter are stained in yellows brown with chromic acid they are known as chromaffinells.

Metabolism of cate chalamines
Cate chomines are derimed form the amino-acid phenyl line. The amino acid in liner hydroxyloted to from amino acid tyrosine. At the time of blood circulation the adrenal medulla sceneaetes tyrosine. The adrenal medullaary cells. Tyrosine hydrogen lase converts dihydro xyphengloline and then to depomine by the action of aromatic h-amino acid decarlorg lase. From the adrenal medullar cells dopamine enters the dense care resides in which medullary cells cubs of cytop lass and concerted into noradrenalin by dopamine cells, noradrenalin passes into the cytoplasm under methylation catalyzed by the enzyme phenyloe than lone N-methyl transferees and noradrenalin undergo rapid degradation after the release. During course of circulation the two harmones are removed on the nor adrenergenic normal endings or other tissues or the metabolred into blood tissues by on enzyme cate chalomines or methyl transferees. The products formed are metaddrenaline or nor metadelrenalione.

Regulation of secretion :- Regulation and synthesis is done by glucocorticrds. Is regulated by the hypothermal - pituitary- adrenal axis circulated by A.C-TH and CRH.

Circadian Raytheon and plasma control.
The secretion of adrenal gland (cortical) and anterior pituitary (ACTH) hormone doesn't occur in steady rate It follows diurnal rhytham. Which is a 24 hour cycle human anterior pituitary in th usual sleep/week fullness cycle starte prodding larger amounts of ACTH after midnight. Peak 6.00AM to 9.00 AM. The blood steroid level is the lowest in the lote evenings.

Stress:- By the administration of riprap physiologic doses of gluco-corticoids.
Hens selye suggest the concept of stress is an agent which attempts to attars the internal environment. Eg. Physical injuring infection, high or low temperature, radiation injuring neurones clear fatigue, emotions, noses, environmental pollutants It generates two types of syndromes. Eg. Local adaptation syndrome. Or general adaptation syndrome. These diseases respond to gluoco-coxticoid therapy. Under severe stress the cortical secretion may be raised up to tan-gold 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 works are single functional unit and secrets cortical, corticoosterene and small quanta ties 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 ocoupted 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 embrogalogical 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 forim 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 radiolly 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 schizopimenia, 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 park insulins conimalelarind human insulin. (low anti genierty) is produced by E.coli by recom binast technique or by chemical technique of park insulin, replacement of lone amino acid is different from

human insulin. The normal pancreas contains about 200 antis 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 parelntarally, usually by subcutaneous injection. Insulin circulates in plasma in afree state and negligible fraction is boomed to the plasma globulins in liver and kindneys. The disulphide bridges are splitin the lever by the enzyme glutathione insulin transhydro-genose (insulin's). 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 facees. The plasma half life of in troinenously injected insulin is lass than I minutes in man.

Pancreas/ islets of longerhans:-
Morphology:- endocrine function are performed by the islets of langerhans. It is leaj like situated between stomach and duodenum. They are small or highly rascularized masses of cells spread over the pancreas, on entire organ.
Histology:- It maybe grouped on epithelial cells among exocrine pancreatic aeini. It is of four types of secretary cells.

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

The insulin-secreting beta cells armrest numerous (upto 70 to 80% of iset cells). Alpha cells comprises 20 % of cells D and F cells of 4 perecnt and class than 2 percent. The physic bgic role of glucagon and insulin in the regulation of intermediary metabolism is well established the diabetics mellitus is a chronic disorder resulting from insulin defacing, characterized by hyperglycemias, attered metabolism of carbohydrates, proteins and lipiels. Metabolic abnormalities leads to polyurices Polydipsva poly phagia and fatigue bhy term compllcation include, prohferatine retinopathy mycondial infarction polynuropoty and uraemia include gangrene.

Hypersensitivity may occur and leads to demineralization of bone and metastatic calclfication in the kidnegs (heparinocalemosis urithasivs) the development of anti bodies may cause into leronce and resistance.

Calcitonin or (Thyrocalcitanin) is a small polypeptide mol.wt 3600 with 32 amino acids synthesized by secretary cells. It produce hypo cal cemia by inhibiting bone resumption, and by promotion 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 calcitionin is intioly givenin a dose of 0.5 mgldas.

Dihydrotachsterol is used to correct hypocol cemia of hypoparathyridism and to treast acutes chronic and latent forms of parathyroid tetang. Etidrate (didronel) is a non hormonal substances (biphosphanote) that reduce the rate of bone turnovers. It is related to pyrophosphate which has a role n bone mineralization. It is used in treatment of Paget's disease, maligning, and reduction of heterotrophic bone ruction Due to spinal cord injury.

Hyper parathyriodism- hyper junction may be due to a diffuse hyperplasia of the glands adenomas, carcinoma and aberrant production of PTH. Symptouns include polycrea, polydipsia disordered cardiac rhythm, renal calculi and sub porosteal bone resumption, with hyper calcemia and hyper calciuria.
Structure of parathyroid gland:

Calcium metabolism in the body is mainly governed by two hormones parity harmonies from the parathfroils and calcitonin from the par follicular cells of the thyroid gland. The chief physrologe role of PTH is the maintenance of calcium haemostasis is required form noram body function. On remontny parathyroid gland requites in a progressive hypo cal calmio, tenancy, comulsida and teatb.

Action PTH increases the plasma Calchemion concentration and clawers the phasma phosphate level.

It effects exerted on the Ca++ transport, in the bone, Kidneys, and the intestines. It stimulates a deny cyclise activity in the bone and kidny cells.

Toxicity:- over dosage with PTH causes hypocalcaemia Overdosage with PTH courses hypocalcaemia manifested as weakness remitting, diarrhoea lack of mesek 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 6x6x3 cm. in size total weight is 23 to 500 mg. gland associated with connective tissue it consists of columns of epithelial cells which inters read with blood compallarles and nerve endings.

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

Histology:- There is the presence of masses or cdumns of epithelial cells with blood sinuses in between them. These epithelial cells comprises two types chief r 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 race dated chief cells commonly known as water ckar cells cytoplasm studies shows they are of two types light chief cells or dark chief cells. Few and rich in secretor granules containing glogcogen in cells in contrast ot chief cells, oxyphid cells are larger in size and few in new bar. Granules can be stained in acidic dyes. It contains fatly granules and globule. Adipose tissues inters read and sometime colloid vessels.

Regulation of digestive secretions and motley of gusto-intestinal tracts are controlled by nermous bio-chemical and mechanical factors nervous bio-chemical and mechanical factors increase in hyderchloica acid disturbances and needs symptomatic treatment.

Drugs used in peptic ulcers
(i) Gustier antacids
(ii) Anti- secretary druesgs
(iii) Miscellaneous agents including mucosal protective agents.

Anti secretary agent:- These are the drugs that suppress HCL secretion by blocking receptions (muscormic receptor blockers H_2- receptor blocking or postreceptor mchonisms like H^+, K^+ ATPase of proton pump. These enzyme is location on the cell membrane gos trin is released from antrol mucosa of by food alkaline P^H in the stomach and digested protein are powerful stimuli for gas trinrelease harmones gastrin provides a fecdbook contral on Hcl secretion. When P^H of stomach is elenaled by food gostrin is released and comersely release of gostrin is inhibited when stomach attains low P^H ant cholinergic action eg. Dryness of mouth, urine retention etc. furthers ant cholinergic agents dely because the food remains for longer time, in stomach.

Gastro-intestinal harmnes:-
The missal lining of stomach and intestine is the largest and most diverse gland of the body number of endocrine cells not in a copact grouped in endocrine tissue best 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 harmones are control the motility and secretary activity of the digestive system and produced in response to specific chemical substance in got content mostly they are polypeptides.

Gastrin:- gastrin occurs in two forms gastric 17 secreted by pyloric ontrum and gastrin 34 produced by upper small-inters time 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 lagers 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 pvevious 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 function. 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 raging that seems to receine 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 phyorcal difference lactween the opposite sexes. They serves sexes to gether for mating to provide for the proteetion 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 ineliriduals.

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 harmone.

Female sex harmones:-
Oestrogens and progesterone are mainly two female sex-organs. They produced the ovarian follicles under the influence of follicle stimulating harmonc. (FSH) of pituitary gland. Oestrogens established steroidal stimulate the development of the braes to external genital a public and auxiliary hairs and distribution of body fat. Both oestrogen and progesterone are regard to endemetriun for the implant totion of emtryo. These harmones are produced in the enmity and regulated by gonad tropic harmone.

Menstrual cycle:- the rhythm tic changes accurse during the 28 days, during this time reproductive life of woman from puberty to the menstrual cycle (L.mens monthly In the phase of the menstrual cycle blearing occurs , this is called means traction phase. The duration is 3-5 days. Ovulation occurs between midway period. i.e. somewhere communing between 13^{th} and 15^{th} day. Thus the average intervals 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 uterine induces a gradually hypertrophies. It prepares suitable bed for reception and suitable bed for reception and implantation of the fertilized ovum.

If pregnancy occurs the proliferated mucosa is concerted into placenta. During the block of pregnoneg hypertrophral mucosa breaks down and is discharged as maturation. 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 occurs during the menstrual cycle into the four stages (i) the resting phase (ii) proliferation phase, (iii) the premenstval phase (iv) menstrual phase. The first and second phase are called follialar phase. They

are due to graclvaly action of estrogens, secreted by the maturing follies. On the 14th day ovulation takes place and corpus lustrum formation begging in the follicular spas of oriy.

Ovulation:- burst of egg follicle least liberating the egg and ovulation it starts about 14 days before the begging of the of means tuition. Ovulation involves the development of primordial or primary collide. The flailed stimulating (FSH) harmone from the anterior pituitary initiates and with LH regulates ovulation an egg produced from a primary acolyte first become partly detached from surrounding epithelial cells beneath tunica albuginea. It begins to enlarge a and surrounding cells grow to form many lagers. A nomagens conering of muco-protein zone pelluda appears at the developing oocyte and fallide cells. These follicular cells croncla lager around the pellucid appears between the devdoping oocyte and follide cells and developing egg. Under the influence of primary pituitary gonadotrophir a follicular fluid is secreted by the surrounding follicular cells and cells immediately surrounding the egg become separated from the more remote cells (zona pellucid) and a large cavity, the tantrum is formed full developed follick, granulise, and the is called a griffin follda.

The graffian 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-prajections 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 fallers, which enlarge but not go in ovulation finally degenerate to form artistic folldes follicles which ovulates is concerted into blood filled cavity corpus hormone Hague. After release of egg blood comes form the injured resells. Soon after this doted blood is replaced by yellow bodies of lipids or lacteal cells prolix ferreted from groundless and the cells and thus corpus lustrum is formed under thing have of listening hormone formation and maintenance of corpus lustrum starts with the influence of anterior pituitary. If the ovum is not fertilized the corpus lustrum degenerates to become corpus albicans which appears as disorganized scattered globules.

Oocyte:- She of on human oocyte is about 0.1 mm/100 micrometer in diameter. It has ribosome's enzymes, amino acids and other cells 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 sit of fertilization takes place uterus is connected to vagina tlivagl Croix nlear the opening of raging through cervix the bourtherel gelds secrete a fhile. Section serve to lubricates and neutralize any acid mag present.

Vagina leads to exterior through vaginal orifice which is flunked by on interpair of moist folds. The labia mineral, enclosed with the fleshier hair covered outs labia majors. These structures enclose the darters 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 panic of the mole. It has gloms, prepuce and capable of engorgement, it series to reproductive function. The urethra of the female opens just anterior to vaginal orifice.

Fertilization:- The sperneatazaa which re stored in epidgdymis in males are actively mobile as coitus near completion and the climax organism of the acts occurs, contraction of the epididymis and yas a defertia propel the spermatozoon. Through the ejaculatory dutes into the urethras. At the some time, the seminal recycles 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 retinal musdes and of the striated muscles in peritoneum. The act of ejaculate on ejected the semen and the monuments which bring to constitute it is a reflex act of which sensorg nerreg 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 resides 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 post of the vagina during coitus propel themselves up word by los hang movements tube. Now fertilization takes place probably contractions of uterus during coitus draw the semen into the uterine cavity.