PATHOPHYSIOLOGY

UNIT 3 NOTES

DISORDERS RELATED TO

- HAEMATOLOGICAL DISEASES
- ENDOCRINE SYSTEM
- NERVOUS SYSTEM
- GASTROINTESTINAL SYSTEM

IMPERFECT PHARMACY

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ANAEMIA

- Anaemia is a medical condition that can be defined as deficiency in the number or quality of Red Blood Cells (RBCs) in human body.
- It can also be defined as reduced haemoglobin concentration or Hematocrit (PCV) below normal range.
- In Anaemia, oxygen carrying capacity of blood is reduced.
- Normal Haemoglobin ranges are :
  - Male : 13 g/dl
  - Female : 11 - 12 g/dl

TYPES OF ANAEMIA

There are many different types of anaemia, but in our syllabus we have to particularly study about these following types :

① Iron Deficiency Anaemia
② Megaloblastic Anaemia
③ Sickle Cell Anaemia
④ Thalasemia
⑤ Hereditary Acquired Anaemia

Iron Deficiency Anaemia

- Iron deficiency anaemia is a type of anaemia in which there is lack of iron in the body
- Bone marrow needs iron to make / synthesize Haemoglobin without it body can't make enough haemoglobin leading to decrease in oxygen carrying capacity of blood.
- It is the most common type of Anaemia.
- It is also known as Microcytic, Hypochromic Anaemia

Causes

- Blood Loss :
  - Menstrual Periods
  - Gastrointestinal Bleeding
  - Trauma or Injury
- Low Iron Diet : Less consumption of Foods such as Green leafy vegetables, bean, Pumpkin Seeds, Tofu, Meat etc.
- Increased Requirment :
  - Pregnancy
  - Lactation
  - Childhood (Growth)
- Poor Absorbtion :
  - Inflammatory Bowel Disease
  - Celiac Disease
  - Gastric Surgery

PATHOGENESIS

- The pathogenesis of iron deficiency anaemia involved several stages that affects body's iron stores & having subsequent impact on Red Blood Cells production.
- There are mainly 3 steps of Iron Deficiency Anaemia :

① Iron Depletion
② Iron Deficiency Erythropoiesis
③ Iron Deficiency Anaemia

① Iron Depletion

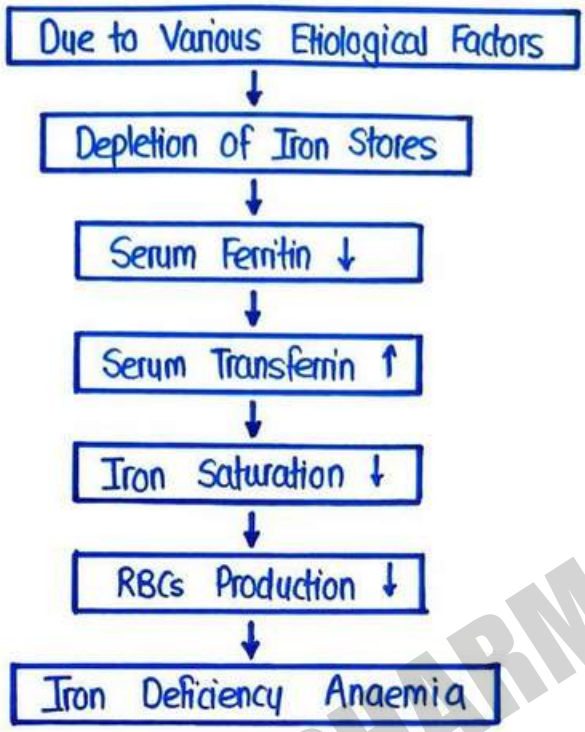
- Initially body uses its iron stores i.e., liver, spleen, bone marrow.
- This stage is often detectable through a decrease in serum ferritin level (a protein that stores iron).

② Iron Deficiency Erythropoiesis

- As in first stage iron stores become exhausted there's insufficient iron available for incorporation into Haemoglobin in developing RBCs in bone marrow.
- Serum Ferritin Level ↓ , Transferrin Level ↑ .

③ Iron Deficiency Anaemia

- It is the final stage in which RBCs becomes smaller (Microcytic) & Paler (Hypochromic) than normal due to reduced Haemoglobin conc..
- Hb levels falls below normal, leads to reducing in the ability of RBCs to carry oxygen.



Symptoms

- Fatigue
- Weakness
- Pale Skin
- Shortness of Breath
- Cold Hands & Feet
- Inflammation
- Poor Apetite

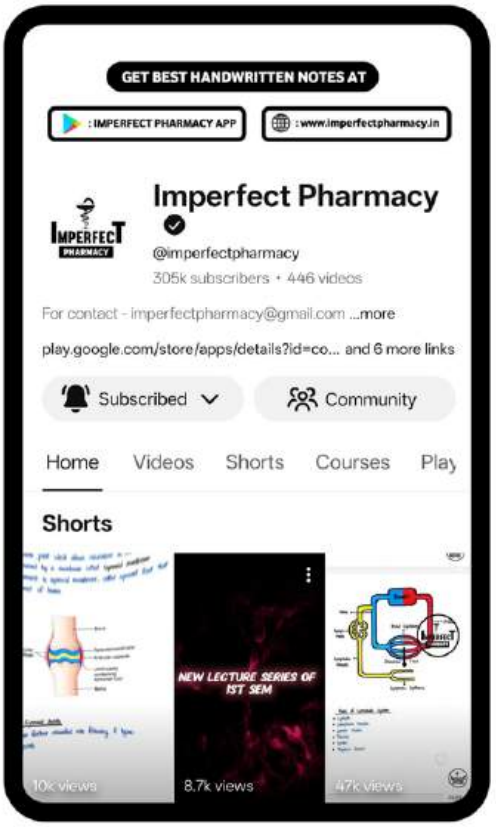
Complications

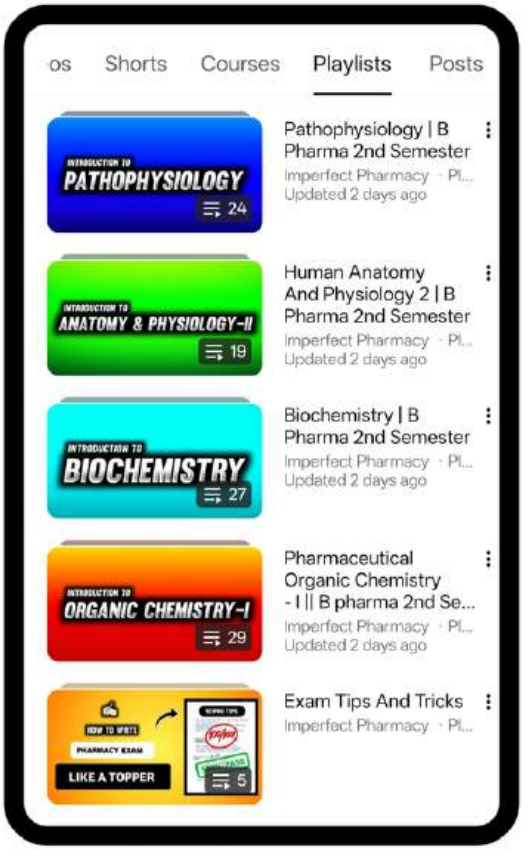
- Heart Problems
- Pregnancy Complications
- Depression
- Growth Problems
- Increased Risk of Infections

Management

- Increased Dietary Intake
- Iron Supplementation
- Vitamin C rich diet
- Iron Infusion

FOR LECTURE VIDEOS VISIT OUR CHANNEL





FOR MORE CONTENT : VISIT OUR APP

MEGALOBLASTIC ANAEMIA

- Megaloblastic Anaemia is a type of Anaemia characterized by presence of unusually large, abnormal RBCs called **Megaloblast**.
- It generally occurs due to deficiency of vitamin B12 (Cobalamin) or folic Acid (Folate, vitamin B9).
- There is nuclear defect in Megaloblastic Anaemia
- The deficiency of vitamin B12 & folic Acid results into impaired DNA synthesis.
- It is also known as Macrocytic Normochromic Anaemia.

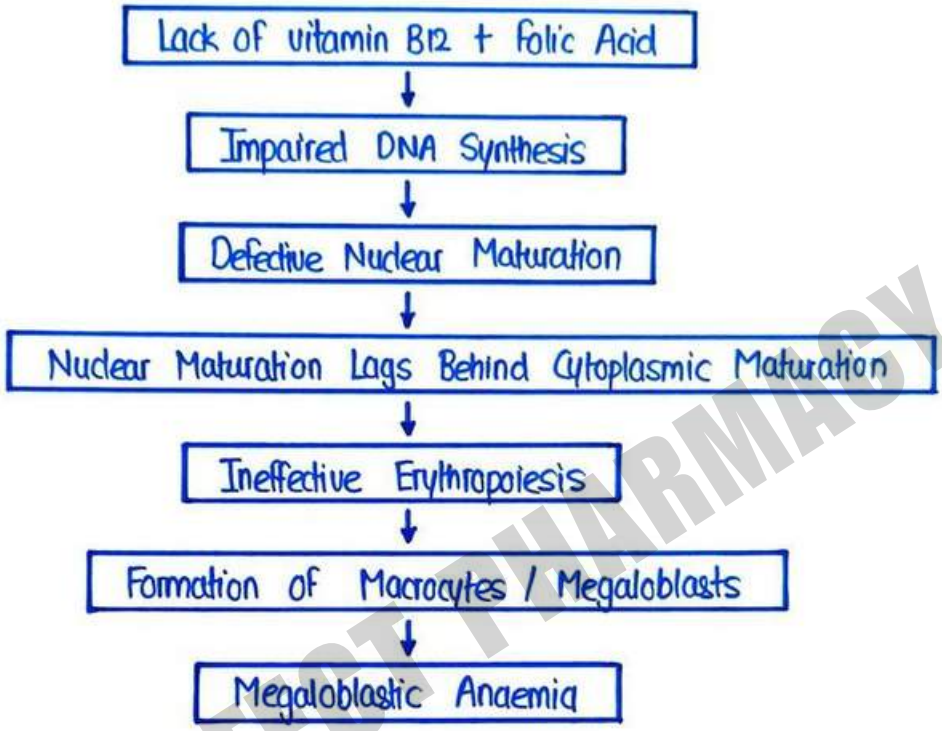
CAUSES

There can be various causes of Megaloblastic Anaemia as follows :

- **Decreased Intake** : Inadequate intake of vitamin B12 (Animal Products) & folic acid (Green leafy vegetables, Nuts, Seeds) leads to Megaloblastic Anaemia.
- **Increased Demand** :
  - Pregnancy
  - Lactation
  - Growth
  - Diabetes
- **Malabsorbtion** :
  - IBD
  - Celiac Disease
  - Crohn's Disease
  - Certain Medications

PATHOGENESIS

The pathogenesis of Megaloblastic Anaemia can be explained as follows :



SYMPTOMS

- Weakness
- Shortness of Breath
- Pale Skin
- Rapid Heatbeat
- Headache
- Glossitis

Complications

- Congestive Heart Failure
- Vision Problems
- Memory Loss
- Infertility
- Pernicious Anaemia
- Neurological Disorders

Treatment / Management

- Vitamin B12 & Folic Acid rich diet
- Supplementation
- Drugs
- Intravenous Injections

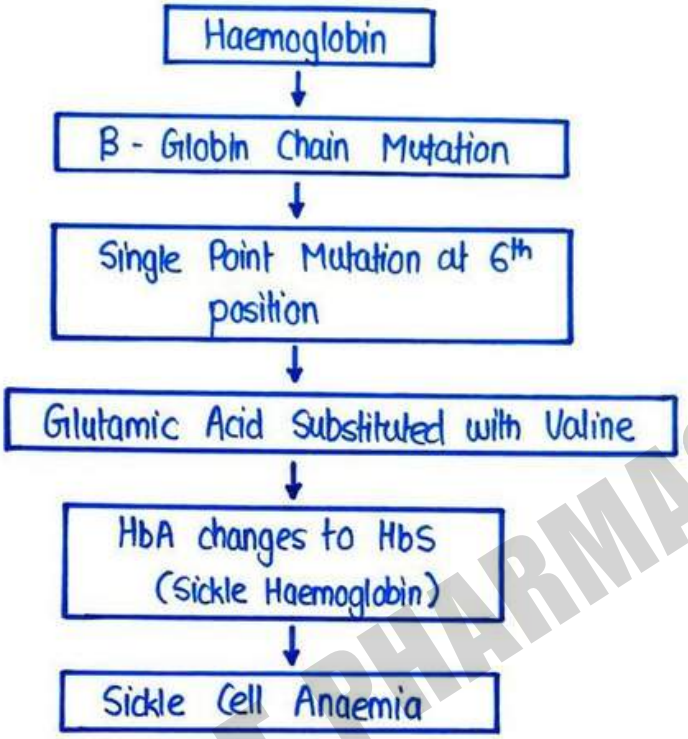
SICKLE CELL ANAEMIA

- Sickle Cell Anaemia is an inherited / genetic disorder characterized by sickle shaped RBCs.
- It occurs due to production of abnormal Haemoglobin i.e., Hbs.
- It is an Autosomal Recessive Disorder.
- It is an qualitative disorder in which quality of haemoglobin produced get affected.
- In sickle cell anaemia RBCs becomes rigid, sticky & less flexible.
- Hbs is very sensitive to low amount of O_2
- There is premature death of RBCs in Sickle Cell Anaemia. (10-20 days of lifespan).

ETIOLOGY

- Sickle Cell Anaemia is an inherited disease caused by defect in Gene.
- It occurs due to mutation in β chains of Haemoglobin
- In this affected individual inherited two copies of mutated gene, one from each parents.
- The parents are in the condition of sickle cell trait.

Pathogenesis



Symptoms

- Fatigue
- Jaundice
- Swelling
- Pain
- Frequent Infections
- Delayed Growth
- Stroke
- Organ Damage

COMPLICATIONS

- Brain Stroke
- Hypertension
- Erectile Dysfunction
- Vision Loss
- Organ Failure

MANAGEMENT

- Medications : Antibiotics / Pain Relevers
- Vaccinations
- Blood Transfusion
- Bone Marrow Transplant

THALASSEMIA

- Thalassemia is an inherited blood disorder characterized by abnormal production of Haemoglobin.
- It is caused by mutation in the genes that controls production of Haemoglobin.
- Thalassemia results in decreased production of one or more globin chains that make up Haemoglobin.
- It is a quantitative disorder of Haemoglobin.

TYPES OF THALASSEMIA

There are mainly two types of Thalassemia.

① α - Thalassemia
② β - Thalassemia

α Thalassemia

- It is characterized by decrease in synthesis of α - Globin chains
- There are 4 α chain located on chromosome 16 for synthesis of α chains.
- On the basis of deletion of 1 or more gene, it can be divided into 4 types :

① 1α chain deletion
② 2α chain deletion
③ 3α chain deletion
④ 4α chain deletion

β - Thalassemia

- It is characterized by decrease in synthesis of β Globin chains :
- There are two β genes located on chromosome 11 for synthesis of β chains.
- It can be further classified into two types :

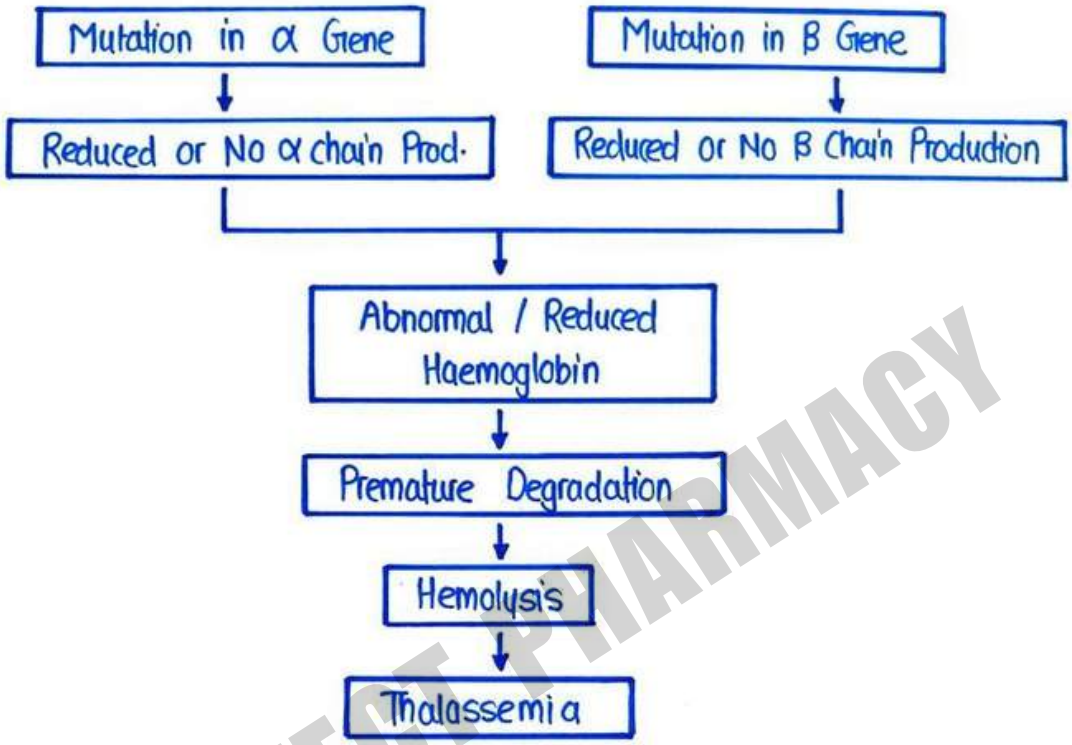
① $\beta\beta^{+}$: Minor
② $\beta^{+}\beta^{+}$: Intermediate
③ $\beta^{+}\beta^{0}$
④ $\beta^{0}\beta^{0}$: Major

CAUSES

- Thalassemia is primarily caused by Genetic Mutation in cell making Haemoglobin.
- These mutation result in reduced production of Haemoglobin.
- These mutations passed from parents to children.
- Thalassemia is inherited in Autosomal Recessive Manner.
- Mutation in α chain leads to α Thalassemia.
- Mutation in β chain leads to β Thalassemia.

PATHOGENESIS

The pathogenesis of Thalassemia can be explained as follows :



SYMPTOMS

- Fatigue
- Weakness
- Pale Skin
- Delayed Growth
- Shortness of Breath
- Iron Overload
- Heart Problems

Complications

- Iron Overload
- Enlarge Spleen
- Heart Problems
- Bone Abnormalities
- Stroke

Management

- Blood Transfusions
- Bone Marrow Transplantation.
- Medications (Antibiotics)
- Folic Acid

HAEMOPHILIA

- Haemophilia is an inherited bleeding disorder in which a person lacks or has low level of clotting factors leads to reducing body's ability to make Blood Clot.
- In Haemophilia Blood does not clot properly that leads to excessive bleeding.
- It is an Coagulation / Bleeding Disorder.
- It most commonly occurs in Males.

TYPES OF HAEMOPHILIA

Haemophilia can be mainly classified into two types :

① Haemophilia A
② Haemophilia B

Haemophilia A

- It is also known as Classical Haemophilia.
- It occurs due to abnormality / deficiency in clotting factor VIII.
- It is most common Haemophilia (80%)

Haemophilia B

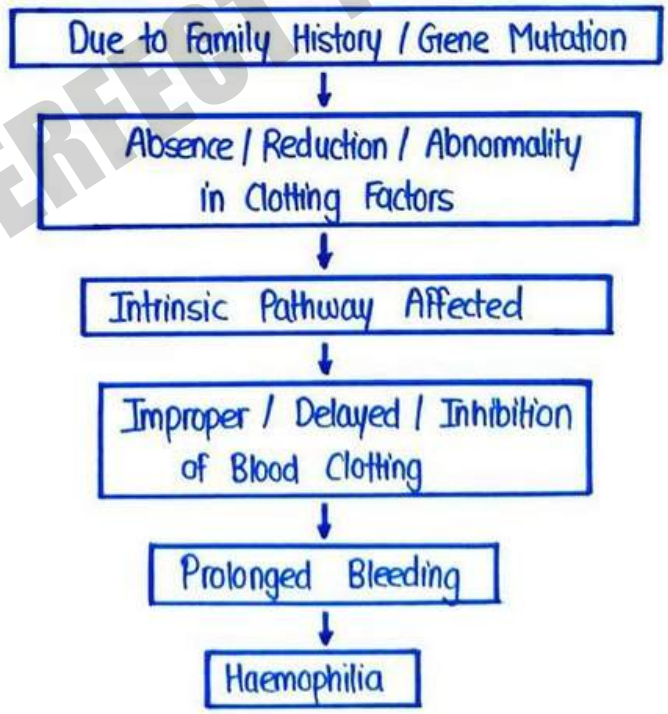
- It is also known as Christmas Disease
- It occurs due to abnormality / deficiency in clotting factor IX
- It is second most common Haemophilia (20%)

CAUSES / ETIOLOGY

- Haemophilia is primarily caused by Genetic Mutation in the Genes that provides instruction for making Clotting factors.
- These genes are located on Chromosome X
- Males are generally affected more with the disease compare to females as they only have 1 copy of most of the Genes on X chromosome whereas female have 2.
- This change / mutation either completely prevent / reduce the production or make abnormal factors.

PATHOGENESIS

The pathogenesis of Haemophilia can be explained as follows:



SYMPTOMS

- Prolonged Bleeding After Injury
- Spontaneous Bleeding
- Nosebleed
- Blood in Urine/ Stool
- Pain/ Swelling in Joints.

COMPLICATIONS

- Internal Bleeding
- Joint Damage
- Muscle & Tissue Damage
- Infection
- Anaemia

TREATMENT

- Prevention of Bleeding Episodes
- Replacement Therapy
- Gene Therapy
- Desmopressin Therapy

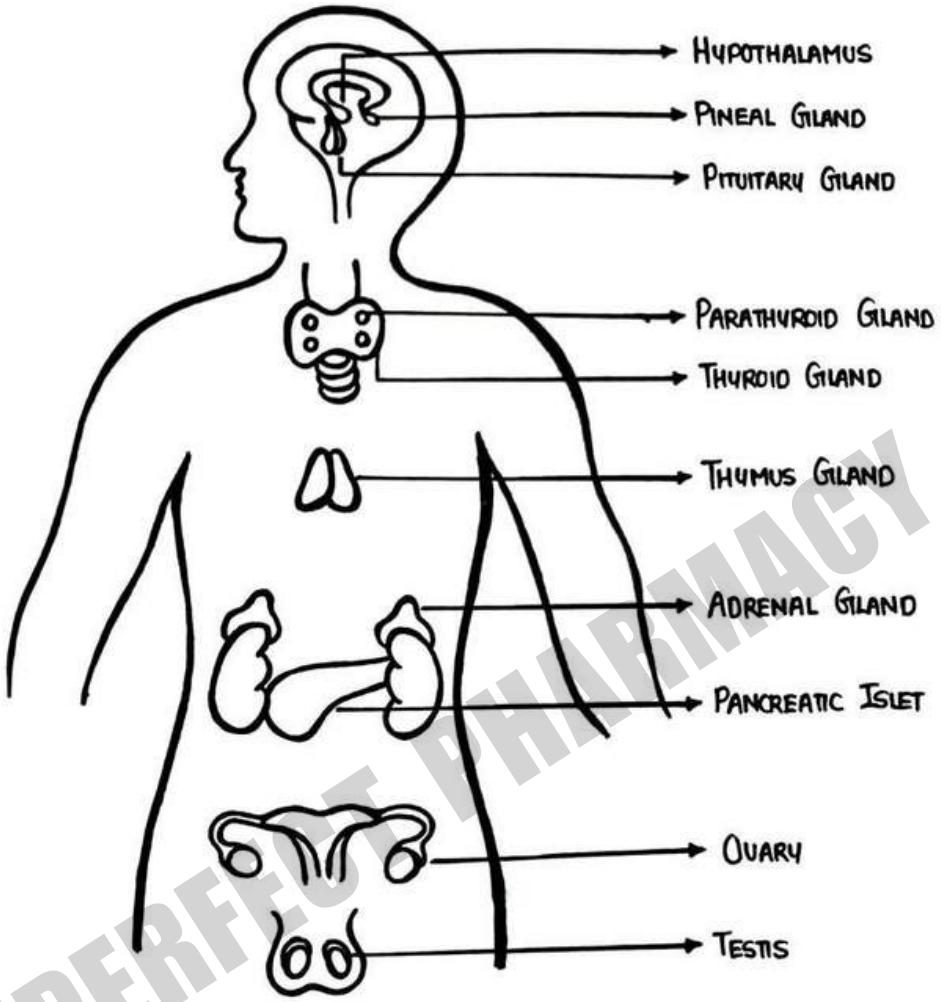
ENDOCRINE SYSTEM

- The Human Endocrine System is consist of group of ductless glands (Endocrine Glands) that regulates the body processes by secreting chemical substances (chemical messengers) known as **Hormones**.
- Endocrine Glands are Ductless.
- They secretes hormones directly into the Bloodstream.
- The Nervous System & Endocrine System together controls & coordinates all the functions of our body.
- The branch of science deals with the study of Endocrine system is known as **Endocrinology**.

ENDOCRINE GLANDS

- Endocrine Glands are ductless glands that secretes hormones into the extracellular spaces that further diffused into blood capillaries & carried throughout the body by circulatory system.
- The Endocrine system consist of number of endocrine glands as follows :

① Pituitary Gland
② Pineal Gland
③ Thyroid Gland
④ Parathyroid Gland
⑤ Thymus Gland
⑥ Adrenal Gland
⑦ Pancreatic Islets
⑧ Ovaries (Females)
⑨ Testes (Males)



ENDOCRINE SYSTEM

HORMONES

- Hormones are nothing but type of chemical messengers primarily produced by Endocrine Glands.
- Hormones regulates & controls a wide range of Physiological Functions.
- They are responsible for various cellular activities specially Growth & Metabolism.

Endocrine Disorders

- The diseases or disorders related with disturbance in physiology of Endocrine Glands are simply known as Endocrine Disorders.
- In our syllabus, we have to mainly study about following diseases :

① Diabetes
② Thyroid Diseases
③ Disorders of Sex Hormones

Causes Of Endocrine Disorders

Endocrine disorders mainly occurs due to any one of following reasons:

① Hyposecretion
② Hypersecretion
③ Tumour

DIABETES MELLITUS

- Diabetes Mellitus is a chronic metabolic disorder characterized by high levels of Glucose in Blood.
- It occurs either due to inadequate production of Insulin by Pancreas or body's inability to effectively use Insulin.
- Insulin is a Hormone produced by Pancreas that helps to regulate Blood Sugar Level by facilitating absorbtion of Glucose into cells to be used for Energy.

TYPES OF DIABETES MELLITUS

Diabetes Mellitus can be mainly classified into 3 types

① Type 1 Diabetes Mellitus
② Type 2 Diabetes Mellitus
③ Gestational Diabetes

TYPE 1 DM

- Earlier it was known as Insulin Dependent Diabetes Mellitus.
- It constitutes about 10% cases of Diabetes Mellitus.
- It occurs because of destruction of β cells of pancreas due to Autoimmune Disorders.
- It leads to deficiency of Insulin that leads to increase in Blood Glucose Level.
- Type 1 Diabetes often develops during Childhood or Adult Age.

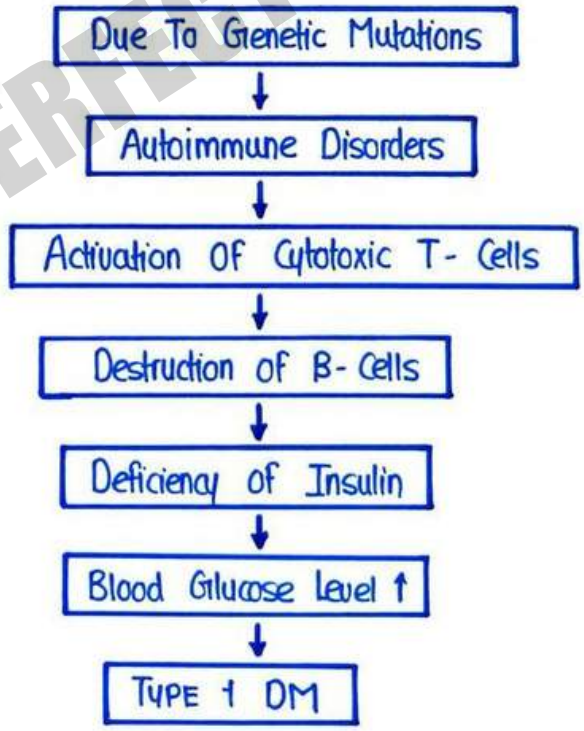
CAUSES

- Type 1 Diabetes Mellitus primarily occurs due to an Autoimmune Disorder, where body's immune system mistakenly attacks & destroys insulin producing β cells in pancreas.
- The exact cause of this autoimmune response is not fully understood, it is beleived to involve a combination of Genetic & Environmental factors.
- There are following factors that can be responsible for this AIR.

① Genetic Mutations
② Viral Infections
③ Early Childhood Exposures
④ Geographical & Seasonal Patterns

PATHOGENESIS

The pathogenesis of Type 1 Diabetes can be explained as follows :



Symptoms

- Increased Thirst
- Frequent Urination
- Extreme Hunger
- Weight Loss
- Fatigue
- Weakness

Complications

- Diabetic ketoacidosis
- Diabetic Neuropathy
- Diabetic Nephropathy
- Diabetic Retinopathy
- Depression & Anxiety

Treatment & Management

- Insulin Therapy
- Blood Sugar Monitoring
- Physical Activity
- Management of Other Health Conditions
- Carbohydrate Counting

TYPE 2 DM

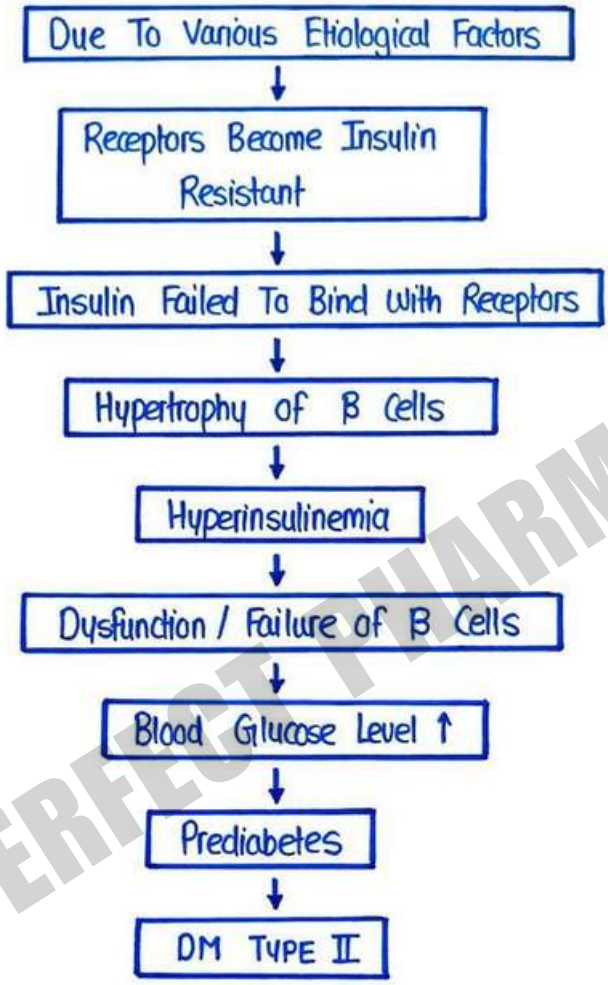
- Earlier it was known as Non Insulin Dependent Diabetes Mellitus.
- It constitutes about 90% cases of Diabetes.
- It generally occurs when cell doesn't respond to properly.
- In Type 2 Diabetes receptor on cells becomes Insulin Resistance.
- Type 2 DM, if maintained for a long period of time can also leads to Insulin Deficiency
- It generally occurs later (mostly after 30) due to physical inactivity, obesity & poor dietary habits.

CAUSES

Type 2 diabetes is mainly a lifestyle disorder in which body becomes resistant to the effect of Insulin. Several factors contribute to the development of Type 2 DM as follows:

- Genetic Factors
- Obesity
- Physical Inactivity
- Unhealthy Diet
- Age
- Gestational Diabetes
- Polycystic Ovary Syndrome (PCOS)

Pathogenesis



Symptoms

- Excessive Thirst
- Frequent Urination
- Increased Hunger
- Weight Loss
- Fatigue
- Slow Healing

Complications

- Diabetic Neuropathy
- Diabetic Nephropathy
- Diabetic Retinopathy
- Cardiovascular Diseases
- Depression / Anxiety

Treatment / Management

- Healthy Diet
- Regular Exercise
- Weight Management
- Certain Medications :
  - Sufonyl Urea
  - Metformin
- Blood Sugar Monitoring

THYROID DISEASES

- Thyroid Gland is a small butterfly shaped Endocrine Gland present in front region of trachea, lower to larynx.
- It produced mainly 3 hormones

① Triiodothyronine
② Thyroxine
③ Calcitonine

- Thyroxine & Triiodothyronine regulates body's metabolism.
- Now disturbances in these thyroid hormones leads to Thyroid Disorders.
- There are mainly two types of Thyroid Diseases :

① Hyperthyroidism
② Hypothyroidism

HYPERTHYROIDISM

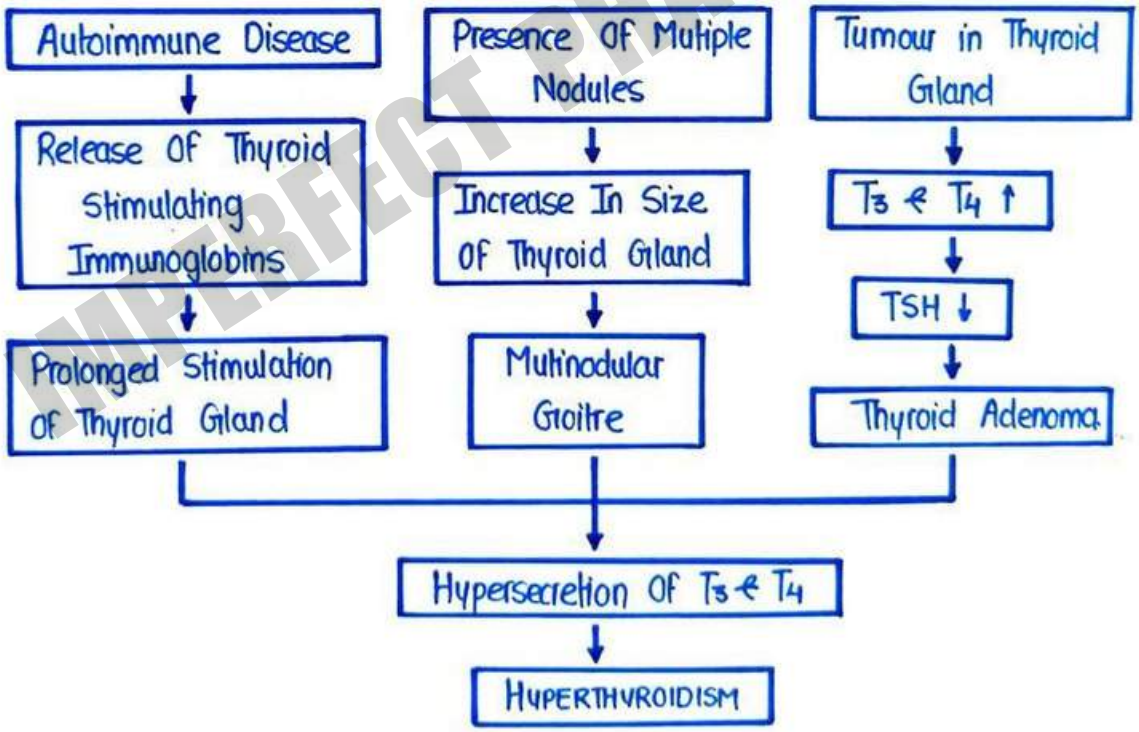
- It is also known as 'Thyrotoxicosis'.
- Hyperthyroidism is defined as Production of too much thyroid hormones from an overactive thyroid gland.
- One of the most common cause of hyperthyroidism is Grave's Disease.
- Overproduction of thyroid hormones leads to various abnormal metabolic functions.

CAUSES

- Graue's Disease
- Toxic Multinodular Goitre
- Toxic Adenoma
- Hypersecretion of TSH
- Hypersecretion of TRH
- Thyroiditis
- Excessive Iodine Intake

PATHOGENESIS

The pathogenesis of hyperthyroidism can be explained as follows :



Symptoms

- Increased Apetite
- Weight Loss
- Heat Intolerance
- High Excitibility
- Diarrhoea
- Fatigue & Muscle Weakness
- Increased Sweating
- Menstrual Irregularities
- Sleep Disturbances
- Exophthalmos

Complications

- Heart Problems
- Eye Problems
- Osteoporosis
- Gastrointestinal Issues
- Reproductive & Menstrual Periods

Treatment

- Anti-Thyroid Drugs
- Radioactive Iodine Therapy
- Thyroid Surgery
- Beta Blockers

HYROTHYROIDISM

- Hypothyroidism is defined as production of insufficient thyroid hormones by an underactive thyroid gland .
- One of the most common cause of Hypothyroidism is Hashimoto's Thyroiditis .
- Women are more likely to develope Hypothyroidism than Men.
- Underproduction of Thyroid Hormones leads to various abnormal metabolic functions .

CAUSES

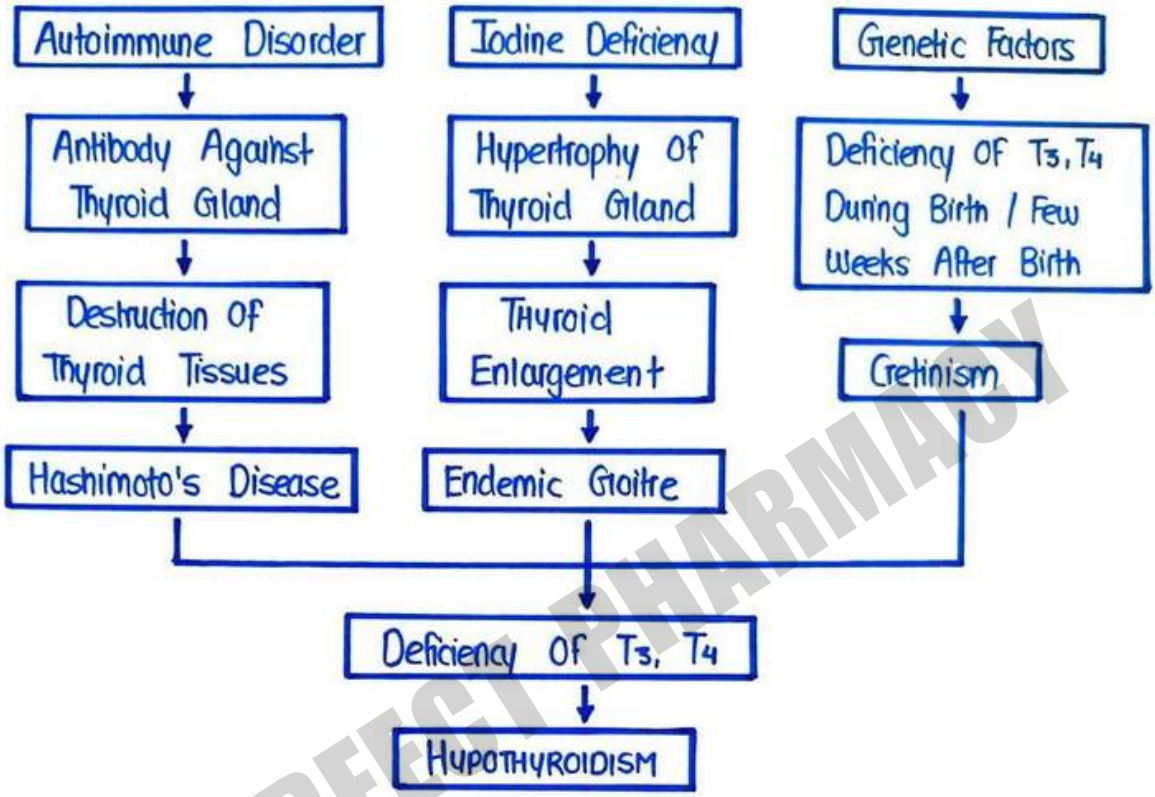
- Hashimoto's Thyroiditis
- Cretinism
- Endemic Goitre
- Iodine Deficiency
- Certain Medications & Surgery

SYMPTOMS

- Decreased Apetite
- Weight Gain
- Feeling Cold
- Inactiveness
- Constipation
- Decreased Sweating
- Prolonged Excessive Menstrual Bleeding
- Increased Sleep
- Myoxedema

PATHOGENESIS

The pathogenesis of Hypothyroidism can be explained as follows :



COMPLICATIONS

- Cardiovascular Issues
- Myoxedema
- Infertility
- Menstrual Irregularities
- Skin, Hair Issues

TREATMENT

- Iodine Supplements
- Thyroxine Tablets (levothyroxine)
- Balance Diet

Disorders Of Sex Hormones

- Sex Hormones are group of hormones released by Gonads (Testes in Males & Ovaries in Females) in our body.
- They are responsible for controlling Puberty, Reproduction, Birth & Lactation.
- Sex Hormones that includes **Testosterone** in males & **Estrogen** in females are required in most of the body functions, but mainly in sexual & reproductive functions.
- Both Testosterone & Estrogen present in Males & Females but the level differs according to sex.
- Males have higher Testosterone level & Females have higher Estrogen Levels.
- Sex hormone disorders disrupt the normal production of hormones which results in reduced sex drive (libido), vaginal dryness, infertility, excessive body hair, hair loss & long term effect on metabolic, cardiovascular & bone health.

Classification Of Sex Disorders

For Males & Females, it can be classified as follows:

① Females
- Polycystic Ovary Syndrome (PCOS)
- Amenorrhea
- Hirsutism

② Males
- Erectile Dysfunction
- Gynecomastia
- Hypogonadism

ERECTILE DYSFUNCTION

- It is defined as a condition in which males are unable to achieve or maintain an Erection, enough for sexual intercourse.
- It is also known as Impotence.
- It can affect, Men of all ages, but more common in older age but not a natural part of aging.

CAUSES

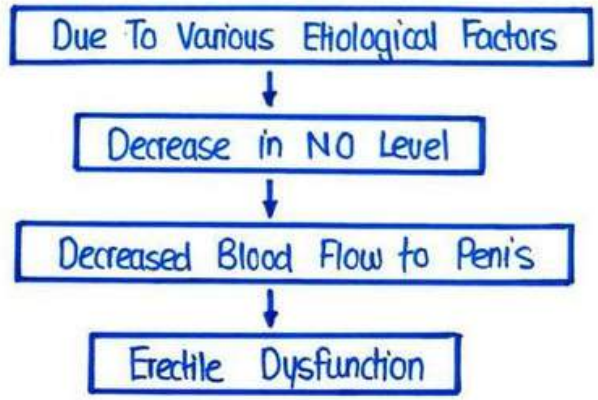
- Cardiovascular Diseases
- Diabetes
- Obesity
- Neurological Disorders
- Hormonal Imbalance
- Smoking / Alcohol
- Certain Medications
- Stress / Anxiety / Relationship Issues
- Poor Sleep
- Poor Diet
- Performance Anxiety
- Age

SYMPTOMS

- Difficulty in Achieve Erection
- Trouble in maintainining erection
- Reduced Sexual Desires.

PATHOGENESIS

The pathogenesis of Erectile Dysfunction can be explained as follows :



COMPLICATIONS

- Unsatisfactory Sexual Life
- Stress / Anxiety
- Embarassement / Low Self Esteem
- Marital / Relationship Problem

TREATMENT

- Phosphodiesterase Inhibitors
  - Sildenafil
  - Tadalafil
  - Verdenafil
- Healthy Diet
- Exercise
- Smoking & Alcohol Restriction
- Testosterone Replacement

GYNECOMASTIA

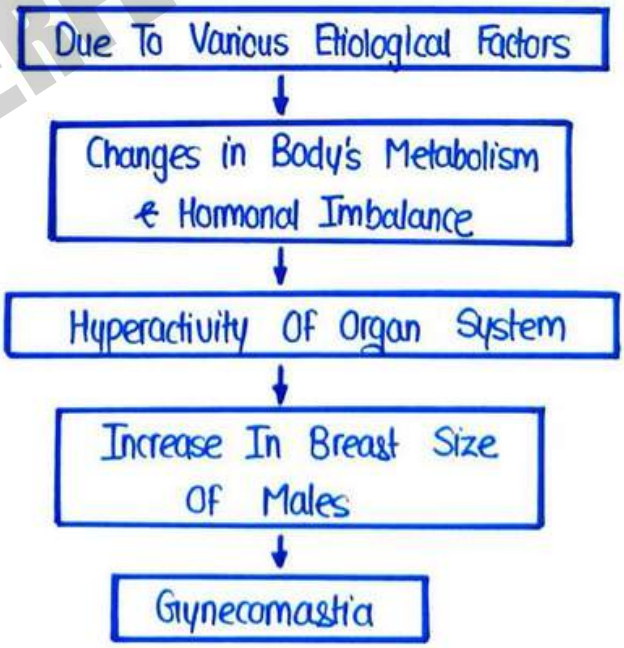
- Gynecomastia refers to enlargement of Male Breast Tissues.
- It can occur at any age but most prevalent during Infancy, Puberty & Older Age.

CAUSES

- Hormonal Imbalance
- Certain Medications
- Medical Conditions

PATHOGENESIS

Pathogenesis of Gynecomastia can be explained as follows :



SYMPTOMS

- Enlargement of 1 or both breast
- Swollen Breast Tissues.

TREATMENT

- Observation
- Medications
- Surgery
- Weight Management

HYPOGONADISM

- Hypogonadism in males refer to a condition in which testes produces insufficient amount of testosterone (Primary Male Sex Hormone).
- It can be further subdivided into two types :

① Primary Hypogonadism
② Secondary Hypogonadism

CAUSES

- Genetic Conditions
- Testicular Injury
- Testicular Infections
- Pituitary Tumour
- Nutritional Deficiency
- Certain Medications
- Aging

PATHOGENESIS

Due To Various Etiological Factors
↓
Decrease In Testosterone Level
↓
HYPOGONADISM

Symptoms

- Reduced Libido
- Erectile Dysfunction
- Fatigue
- Decreased Muscle Mass
- Less Body Hair
- Gynecomastia
- Mood Swings
- Sleep Disturbances
- Decreased Testicle Size

Treatment

- Testosterone Replacement
- Exercise
- Weight Management
- Treatment Of Underlying Causes
- Meditation

PCOS

- PCOS is ~~also~~ known as Polycystic Ovary Syndrome.
- It is an hormonal disorder that mainly affects the women of reproductive age.
- It is often characterised by irregular / prolonged or absence of Menstrual Periods or excess male hormone levels (Androgen ↑)
- In PCOS Women's sex hormones are out of balance that leads to development of ovarian cyst.

Causes

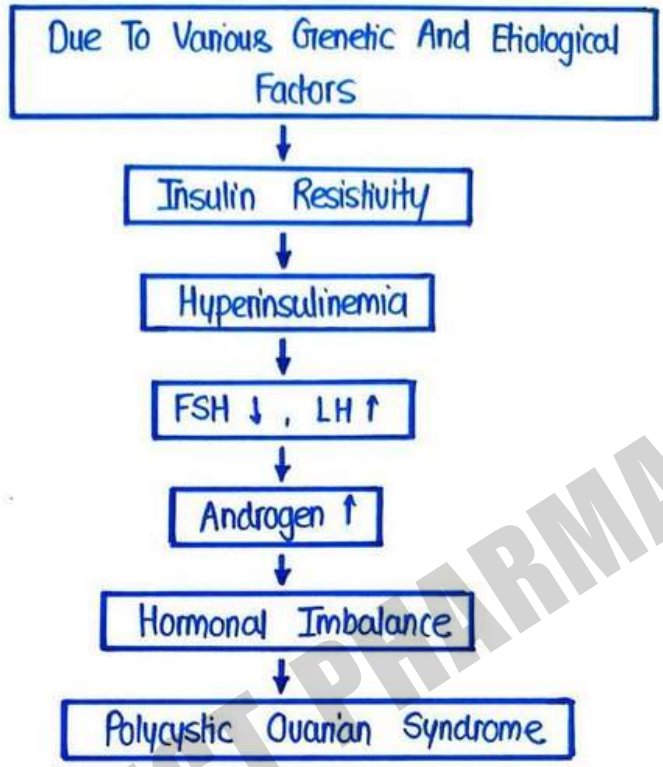
The exact causes of PCOS are not fully understood but several factors can contribute to its development as follows :

- Genetic Factors
- Androgen Level ↑
- Insulin Resistance
- Irregular Periods
- Obesity
- Imbalance b/w FSH & LH

Symptoms

- Irregular Periods
- Excessive Facial Hairs
- Infertility / Hirsutism
- Insulin Resistance
- Anxiety
- Weight Gain / Darkening of Skin

PATHOGENESIS



COMPLICATIONS

- Infertility
- Amenorrhea
- Gestational Diabetes
- Depression
- Hirsutism

TREATMENT

- Exercise
- Good Diet
- Anti Androgen Medications
- Metformin
- Birth Control Pills
- Surgery

AMENORRHEA

- Amenorrhea is a medical condition refers to absence of menstrual periods in women of reproductive age.
- It can be categorized into two major types :

① Primary Amenorrhea (Women who never developed menstrual period)

② Secondary Amenorrhea (Absence of Menstrual Period in a woman who was previously menstruating)

CAUSES

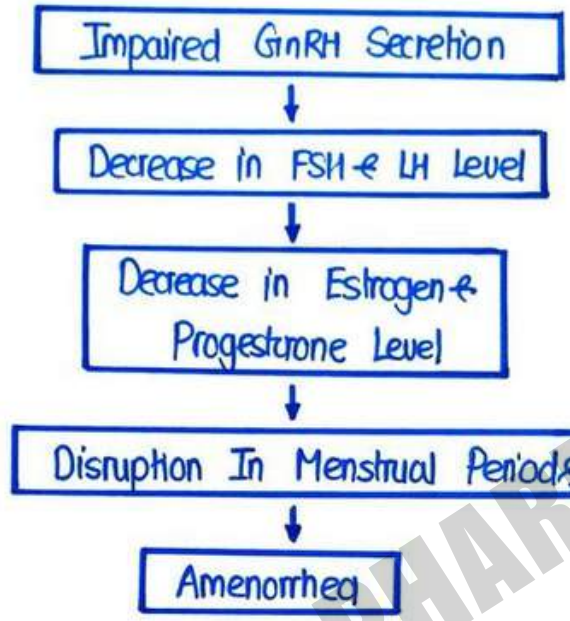
- Genetic Factors
- Hormonal Imbalance
- Pregnancy
- Stress
- PCOS
- Thyroid Disorders

SYMPTOMS

- No Menstrual Period
- Delayed Puberty

PATHOGENESIS

Pathogenesis can be explained as follows:



TREATMENT

- Hormonal Therapy
- Weight Management
- Birth Control Pills
- Stress Reduction
- Treatment Of Underlying Causes

HIRSUTISM

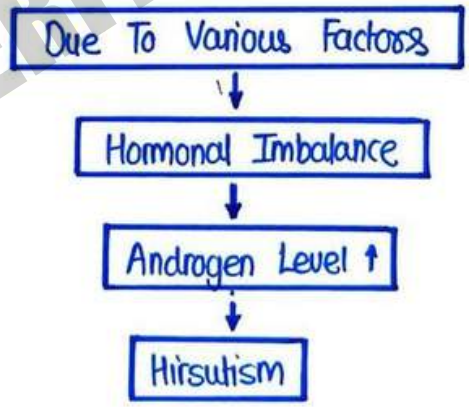
- It is a condition characterised by excessive hair growth in females in male pattern areas (Face, Back & Chest).
- It often results from excess male hormones called Androgens.

CAUSES

- PCOS
- Hormonal Imbalance
- Certain Medications
- Genetic Factors

PATHOGENESIS

It can be explained as follows :



SYMPTOMS

- Excessive Hair Growth
- Dark & Rough Hairs
- Male Pattern Hair Growth
- Deepening Of Voice

TREATMENT

- Oral Contraceptive Pills
- Anti Androgens
- Topical Creams
- Hair Removal
- Lifestyle Changes

Nervous System

- The Nervous system is the most complex system of Human Body containing millions of nerve cell network.
- It is the major controlling & coordinating system of Human Body.
- It is the body's command centre.
- It mainly consist of 3 components :

① Brain
② Spinal Cord
③ Cranial & Spinal Nerves

Neurological Disorders

- Neurological Disorders are diseases or conditions that primarily affect the Nervous System, which includes, Brain, Spinal Cord & Nerves throughout the body.
- Some of the most common neurological disorders are discussed below :

① Epilepsy
② Parkinson's Disease
③ Stroke
④ Alzheimer's Disease
⑤ Psychiatric Disorders
- Depression
- Schizophrenia

EPILEPSY

- Epilepsy is one of the most common chronic neurological disorder characterised by recurrent & unpredictable seizures due to disorder of brain cells.
- Seizures occurs due to sudden, uncontrolled electrical disturbances in brain that can cause changes in behaviour, movement, sensation & loss of consciousness.
- It is an Paroxysmal Disorder.
- It often occurs due to too much excitation or too low inhibation.

TYPES OF EPILEPSY

It is of mainly two types :

① Generalised Epilepsy
② Focal Epilepsy

GENERALISED EPILEPSY

- A Generalised Epilepsy is a type of seizure that involves abnormal electrical activity throughout the entire brain.
- It affects both Hemispheres.
- It is further subdivided as follows :

① Tonic Clonic Seizure
② Absence Seizure
③ Tonic Seizure
④ Clonic Seizure
⑤ Atonic Seizure
⑥ Myoclonic Seizure

① **Tonic - Clonic** :
- It is also known as Grand-Mal Seizure.
- It is characterised by loss of consciousness, stiffening of muscles (Tonic Phase) & Jerking movements (Clonic Phase)
- It leads to Post Seizure Depression.

② **Absence** :
- It is also known as Petit-Mal Seizures.
- It is characterised by sudden loss of consciousness (For 30-60 seconds) in middle of an activity.
- In this patient shows absent minded behaviour & typically occurs in children

③ **Tonic** :
- Tonic seizure involves sustained muscle stiffness/rigidity.
- It usually affects muscles in back, arms & legs.

④ **Clonic** :
- It is characterised by repeated jerking movement of muscles.
- It usually affects neck, face & arms.

⑤ **Atonic** :
- It involves sudden loss of muscle control, leading to collapse or fall.

⑥ **Myoclonic** :
- These seizure involves sudden brief muscle contraction.
- It can occur in specific muscle group or involve in entire body

Focal Epilepsy

- It is also known as Partial Epilepsy.
- In this only a single / specific part of brain is affected
- It is further subclassified into two types

① Simple Partial Seizure
② Complex Partial Seizure

① **Simple Partial** :
- These seizures do not cause loss of consciousness.
- They may cause localised symptoms such as tingling, changes in emotion, sensation & perception.

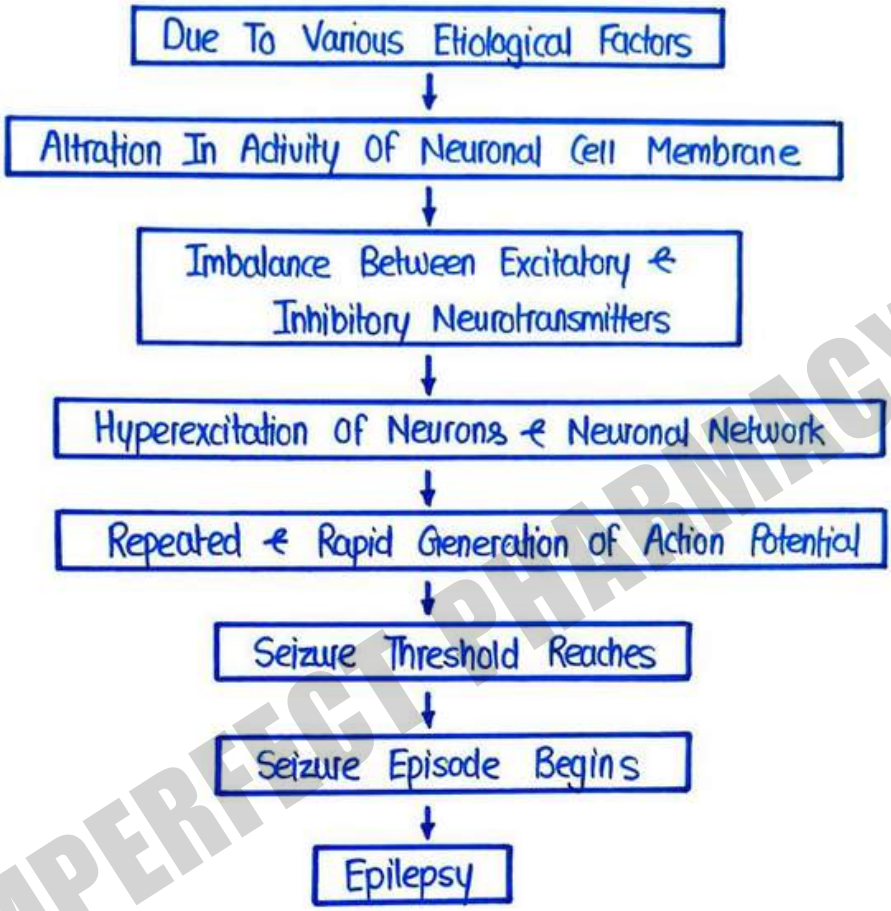
② **Complex Partial** :
- These seizures involves loss of consciousness accompanied by unusual behaviour or automatism.
- The person may not remember seizure afterwards.

Causes / Etiology

- Genetic Factors
- Head Injury
- Brain Tumour
- Meningitis
- Alzheimer's Disease
- Stroke
- Hypoglycemia
- Idiopathic Reasons
- Certain Medications

PATHOGENESIS

The pathogenesis of Epilepsy can be explained as follows :



SYMPTOMS

- Temporary Confusion
- Muscle Contraction
- Muscle Stiffening
- Loss Of Consciousness
- Uncontrolled Jerking
- Sudden rapid eye movement
- Sudden Mood Changes

COMPLICATIONS

- Injury & Accidents
- Depression / Anxiety
- Memory Loss
- Social Isolation
- Stigma
- Sudden & Unexpected Death

TREATMENT

- Antiepileptic Drugs
  - Carbamazepine
  - Phenytoin
  - Valproate
  - Clonazepam
  - Phenobarbitone
- Surgical Treatments
- ketogenic Diet
- Stress Management
- Counselling Therapy

PARKINSON'S DISEASE

- Parkinson's Disease (PD) is a neurodegenerative disorder in which Dopamine producing neurons in a brain structure called **Substantia Nigra** are damaged & die over time leading to a number of motor problems & mental disabilities.
- It is named on a British Physician Dr. James Parkinson, who first discovered it.
- Parkinson's Disease result from an insufficiency of Dopamine in the brain & thus categorised as movement disorder.
- It is one of the most common progressive movement neurological disorder.
- Symptoms of Parkinson's Disease appears when approxiamately 70% of dopamine producing cells are damaged.

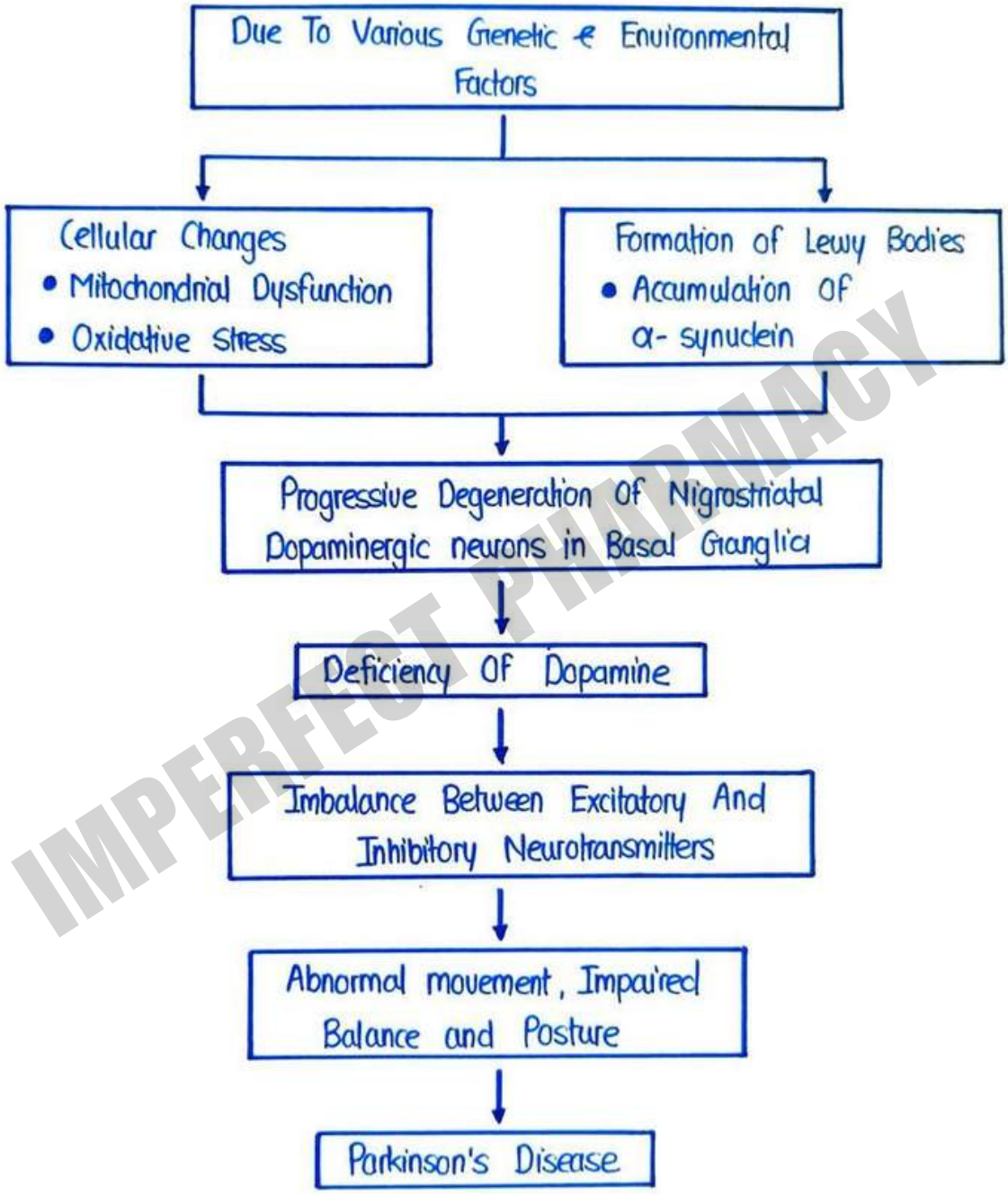
CAUSES / ETIOLOGY

- The major cause of PD is degeneration of neuronal cells in the area called Substantia Nigra lies in Basal Gianglia.
- These neurons produce Dopamine, a neurotransmitter involved in regulating movement & coordination.
- The exact cause of this neuron loss is not fully understood but both Genetic & Environmental Factors are beleived to play a role.

- Genetic Factors
- Mitochondrial Dysfunction
- Neuroinflammation
- Certain Medications
- Head Injury

PATHOGENESIS

The pathogenesis of Parkinson's Disease can be explained as follows :



Symptoms

- Rigidity
- Akinesia
- Tremors
- Posture Instability
- Bradykinesia
- Reduced Facial Expression
- Speech Disorder

Complications

- Depression / Anxiety
- Social Isolation
- Sleep Disturbances
- Mobility Issues
- Sexual Dysfunction

Treatment

There is no permanent cure for Parkinson's Disease, Treatment is mainly focuses on managing symptoms & improving quality of life.

- Levodopa
- Carbidopa
- Anticholinergic Drugs
- Lifestyle Modifications
- Psychological Support

STROKE

- Stroke can be simply defined as 'Brain Attack'.
- A Stroke occurs when blood supply to certain part of Brain is reduced or obstructed.
- Without oxygen & nutrients from the blood, Brain cell cannot function properly & eventually die.
- Stroke is also known as Cerebrovascular Accident.
- It is chronic medical emergency condition.

TYPES OF STROKE

Stroke can be classified into two types :

① Ischemic Stroke
② Haemorrhagic Stroke

① ISCHEMIC STROKE

- This is most common type of stroke, accounting for about 85% cases of stroke.
- It occurs when Blood Flow to the brain is reduced or blocked due to formation of clot or plaque in artery supplying blood to Brain

② HAEMORRHAGIC STROKE

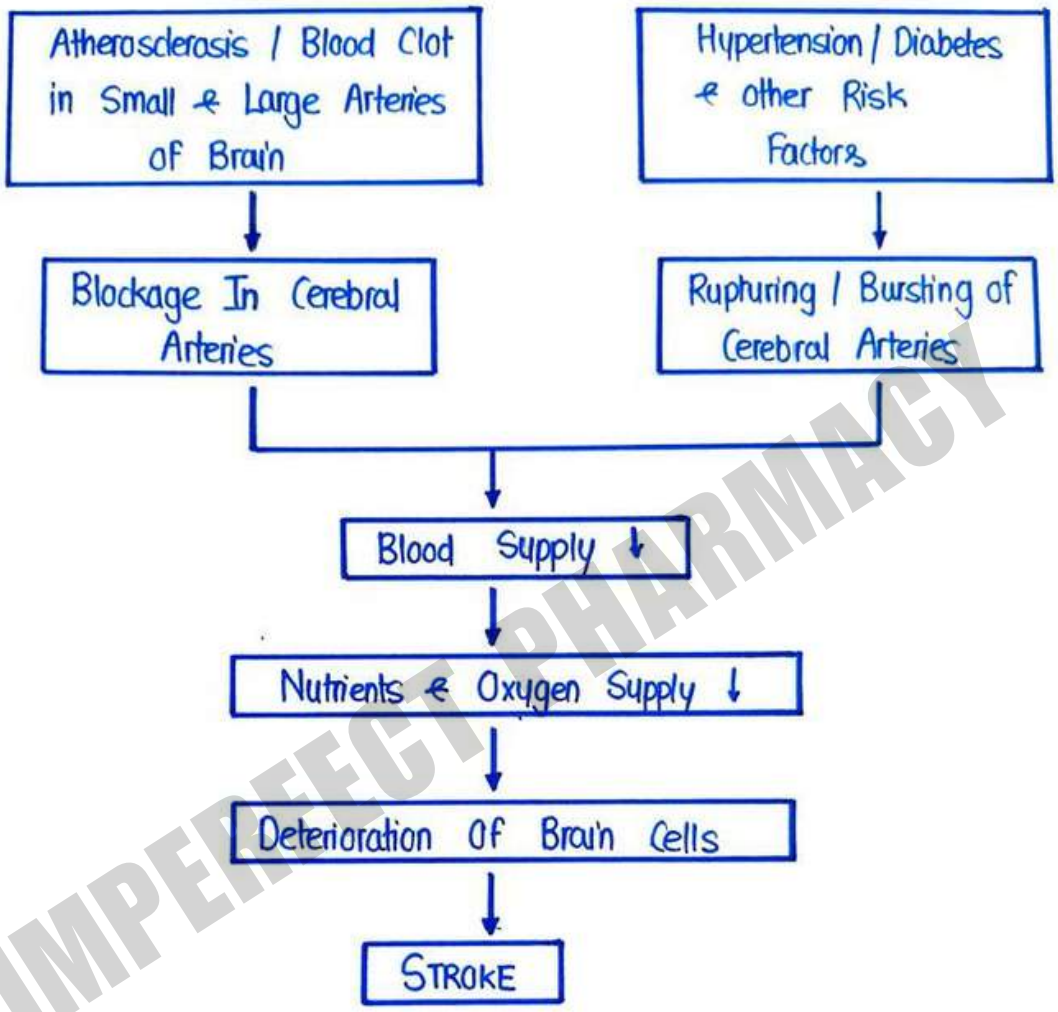
- This type of stroke occurs when a blood vessel in the brain ruptured / bursts leading to bleeding into or around the brain tissues.
- It makes up about 13 - 15 % cases of all stroke.
- It can be either Intracerebral or Subarachnoid.

CAUSES

- Thrombus
- Embolus
- Inflammation of Blood Vessels
- Hypertension
- Brain Trauma
- Arteriovenous Malformation
- Brain Tumour
- Diabetes
- High Cholesterol
- Smoking / Alcohol
- Obesity
- Age
- Family History

PATHOGENESIS

Pathogenesis of Stroke can be explained as follows :



SYMPTOMS

- Sudden Numbness / Weakness in Face
- Sudden Confusion
- Slurring in Speech
- Sudden Weakness In Arm
- Difficulty in Walking
- Sudden Severe Headache

Complications

- Paralysis
- Physical Disabilities
- Cognitive Impairment
- Memory loss

Treatment

If requires emergency treatment

- Anticoagulants
- Antiplatelets
- Antihypertensive Drugs
- Surgery
- Clot Blusters

ALZHIEMER'S DISEASE

- Alzheimer's Disease is an irreversible, progressive neurodegenerative disease in which there is a loss of intellectual functions & memory of the patient.
- It is the most common cause of Dementia.
- It was first introduced by Alois Alzheimer in 1907.
- It commonly occurs in older age.
- Alzheimer's Disease typically worsen over time, patient slowly lose his memory, thinking ability & eventually interfares with person's ability to carry out simple tasks.

CAUSES

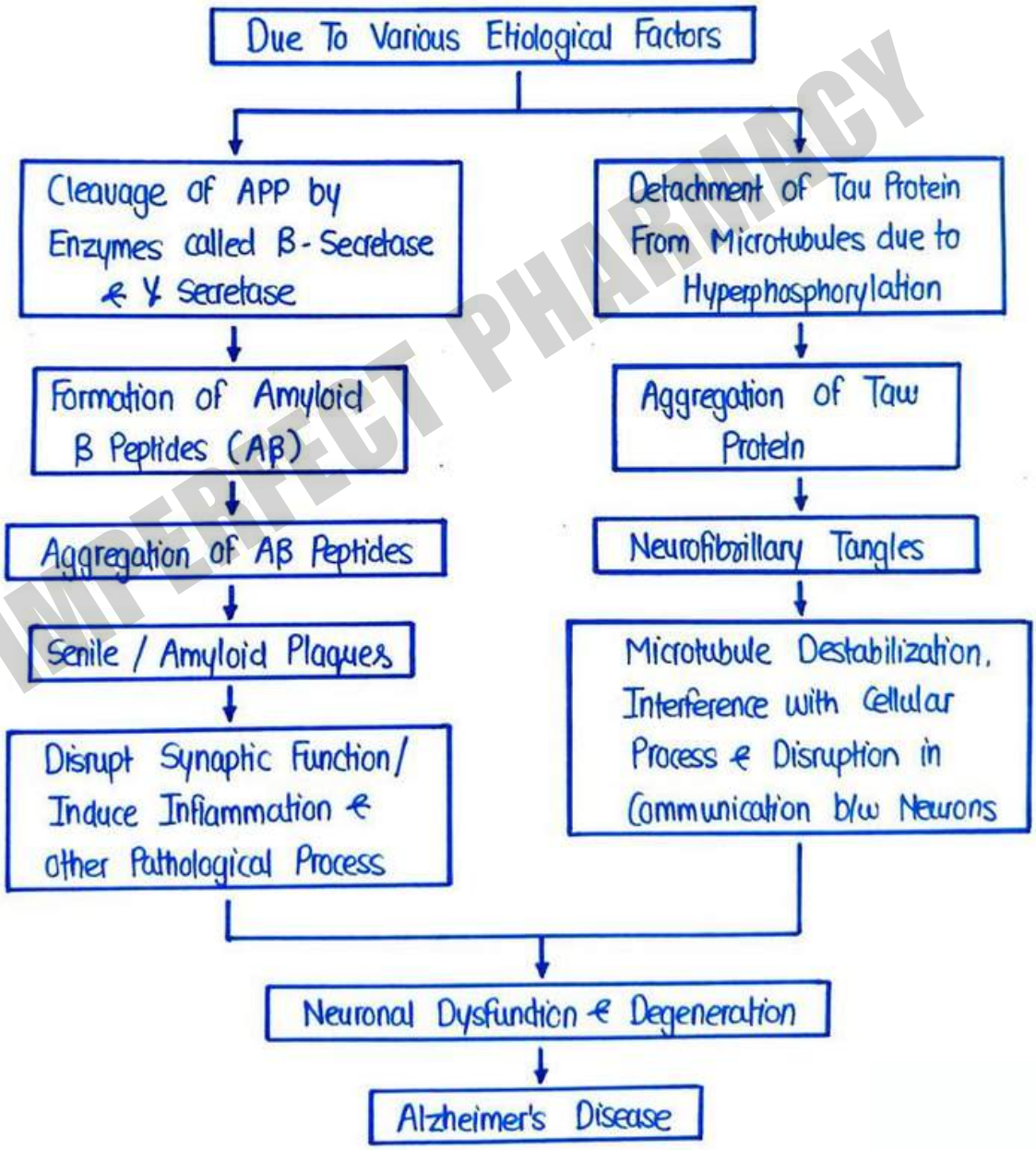
The exact causes of Alzheimer's Disease are not fully understood but several factors are believed to contribute to its development as follows:

- Genetic Factors
- Downsyndrome
- Family History
- Age
- Brain Trauma
- Viral Infections
- Myocardial Infarction
- Hypertension
- Smoking
- Obesity
- Diabetes

PATHOGENESIS

There are two major pathogenic changes are seen in Alzheimer's Patient through which we can explain its pathogenesis, although its not fully understood how they cause Neurodegeneration.

① Senile Plaque : Accumulation of β-Amyloid Protein
② Neurofibrillary Tangles : Tangles of Tau Protein



Symptoms

- Loss of Memory Function
- Poor Judgement
- Confusion
- Changes in Mood / Behaviour
- Depression / Anxiety

Complications

- Inability to Perform Daily Task
- Loss of Mobility
- Malnutrition / Dehydration
- Pneumonia
- Death

Treatment

There is no permanent cure for this disease, treatment is mainly focuses on managing symptoms & slowing down progression.

- Cholinesterase Inhibitors
- Memantine (NMDA receptor agonist)
- Counselling Therapy
- Lifestyle Medications

DEPRESSION

- Depression is defined as Mood Disorder that causes a persistent feeling of sadness & loss of interest.
- It is a very common but serious mental illness.
- It is a significant risk for suicide.
- It affect how you think, feel & handle daily activities, often resulting in emotional & physical problem.

TYPES OF DEPRESSION

There are several types of depression recognized by mental health professionals as follows:

① Major Depressive Disorder
② Persistent Depressive Disorder
③ Bipolar Disorder
④ Seasonal Affective Disorder
⑤ Psychotic Depression
⑥ Postpartum Depression
⑦ Premenstrual Depression

① MAJOR DEPRESSIVE DISORDER

- It is a serious & most common type of depression.
- It is characterized by persistent feeling of sadness, hopelessness & loss of interest in daily activities.

② Persistent Depressive Disorder

- It is a chronic form of depression lasting for at least 2 years.
- Symptoms of PDD is a milder compare to MDD but persistent over a longer period.

③ Bipolar Depression

- It is also known as Maniac Depressive Illness.
- It involves periods of extreme mood swings that includes Emotional Highs (Mania) & Lows (Depression).

④ Seasonal Depression

- It typically occurs during winter months when natural sunlight is reduced.
- It typically gets away with spring & summer.

⑤ Psychotic Depression

- It includes severe depressive symptoms along with psychotic features such as Hallucination (seeing or hearing things that aren't there) or Delusions (strongly held false beliefs).

⑥ Postpartum Depression

- It is experienced by some women after giving birth.
- It can occur during pregnancy & upto 1 year after having a baby.

⑦ Premenstrual Depression

- It causes emotional & physical symptoms similar to depression, occurs in the week or before menstruation, it improves after menstruation.

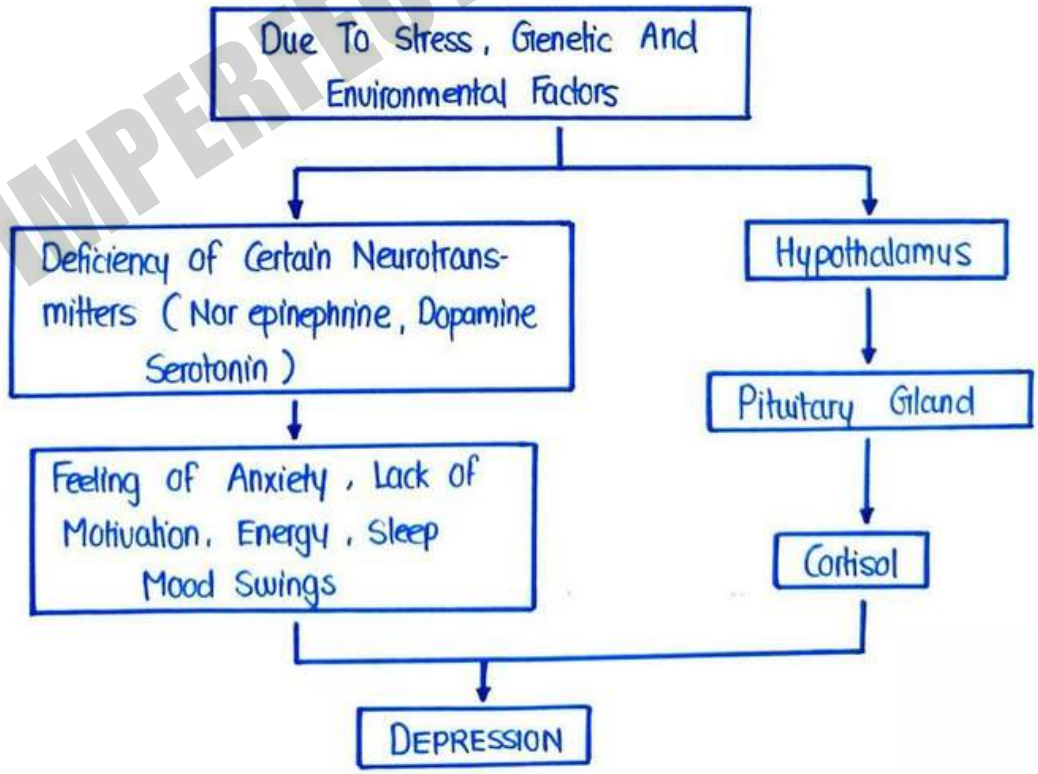
CAUSES

- Genetic Factors
- Imbalance of Neurotransmitters
- Environmental Factors
- Medical Conditions
- Certain Medications
- Social Isolation
- Childhood Trauma

PATHOGENESIS

There are 2 major Hypothesis available to explain pathogenesis of depression

① Monoamine Hypothesis
② Neuroendocrine Hypothesis



Sign & Symptoms

- Persistent Sadness
- Hopelessness
- Lack of Interest
- Feeling of Guilt / Worthlessness
- Sleep Disturbances / Oversleep
- Lack of Confidence
- Low Self Esteem
- Lack of Concentration
- Forgetfullness
- Irritability
- Lack of Energy
- Suicidal Thoughts

Complications

- Suicide
- Social Isolation
- Relationship Issues
- Premature Death

Treatment

- Counselling Therapy
- Antidepressants
- Exercise / Healthy Diet
- Mindfullness
- Social Connections

SCHIZOPHRENIA

- Schizophrenia is defined as Splitting of Mind.
- It is a serious psychotic disorder characterised by loss of contact with reality.
- It is a serious mental illness that has an effect on how a person feels, behaves & thinks
- Hallucination & Delusion are major characteristics of Schizophrenia.
- It is more common in men than women.

CAUSES

The exact causes of schizophrenia are not fully understood, but it is believed that many genetic, environmental & biological factors plays a key role in its development :

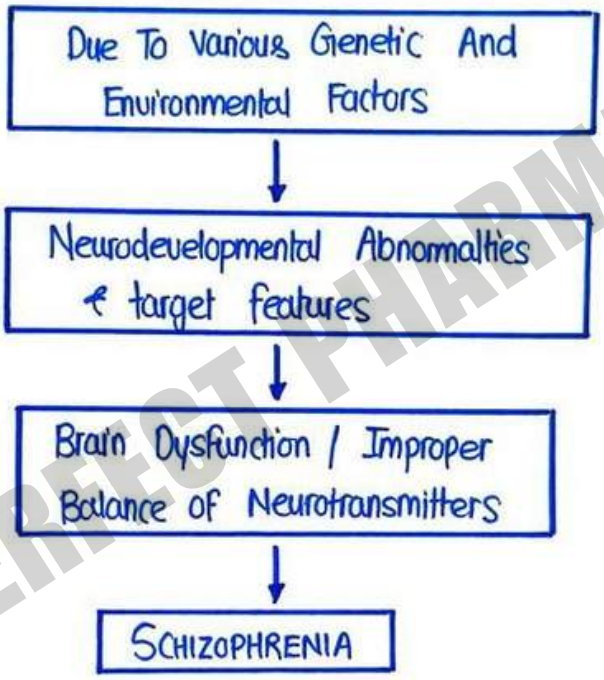
- Prenatal Factors
- Family History
- Social Factors
- Neurotransmitters Imbalance

SYMPTOMS

- Positive Symptoms
  - Hallucinations
  - Delusions
  - Disorganized Speech Behaviour
- Negative Symptoms
  - Emotional Unstableness, Loss of Interest / Motivation

PATHOGENESIS

- The pathogenesis of schezophrenia is not fully understood.
- It involves combination of genetic, neurobiological & environmental factors:
- The Dopamine Hypothesis is one of the most well known theories for the pathogenesis of Schizophrenia.
- According to schizophrenia is associated with Hyperactivity of Dopamine in certain pathway due to increased D_2 receptor sensitivity.



TREATMENT

- Pschychotherapy
- Antipsychotic Drugs
- Antidepressants
- Lifestyle Changes.

PEPTIC ULCER

- A Peptic Ulcer can be defined as a sore or hole that forms in the lining of the stomach or the first part of small intestine (duodenum).
- It mainly occurs when stomach acid damages the lining of these organs.
- Peptic Ulcer often results from imbalance of Protective Factors and Damaging Factors

TYPES OF PEPTIC ULCER

There are mainly two types of Peptic Ulcer:

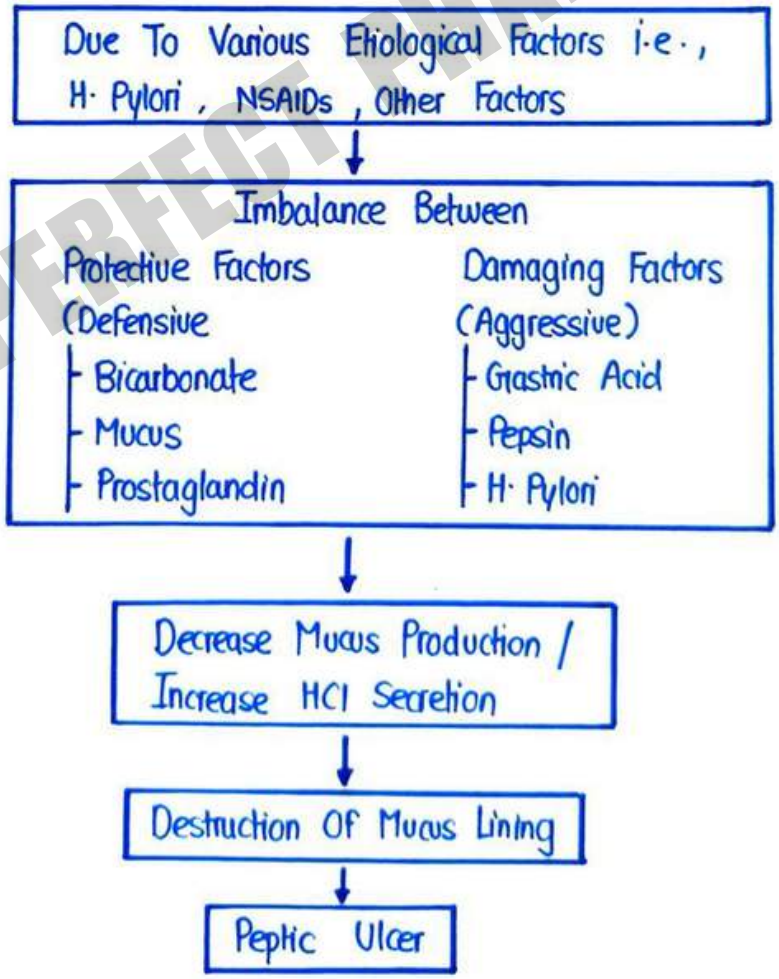
① Gastric Ulcer
② Duodenal Ulcer

GASTRIC ULCER	DUODENAL ULCER
• It occurs in the stomach • Often occurs due to reduced defensive factors • Less Common (15-25%) • Epigastric Pain 1-2 hour after eating • Weight Loss • Haemorrhage is common • Equal in both sexes	• It occurs in the duodenum. • Often occurs due to enhanced secretion of acid. • More Common (70-80%) • Epigastric Pain 2-5 hour after eating • Weight Gain • Haemorrhage is Less common. • More common in Males.

CAUSES / ETIOLOGY

- Helicobacter Pylori (H. Pylori) Infection
- Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)
- Genetic Factors
- Age
- Stress
- Smoking
- Alcohol
- Spicy Foods

PATHOGENESIS



Sign & Symptoms

- Abdominal Pain
- Heartburn
- Nausea & Vomitting
- Unintended Weight Loss
- Bloating
- Dark Blood in Stools
- Apetite Changes
- Indigestion

Complications

- Internal Bleeding
- Obstruction
- Gastric Cancer
- Perforation

Treatment

- Antibiotics
- Proton Pump Inhibitors
- Antacids
- Avoidance of NSAIDs
- Lifestyle Modifications
- Avoid Spicy Food / Exercise
- No smoking / Alcohol

THANK YOU

FOR CHOOSING IMPERFECT PHARMACY AS YOUR STUDY PARTNER

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