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Nervous system

Presented By;-

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Specialization:- Pharmaceutical Chemistry

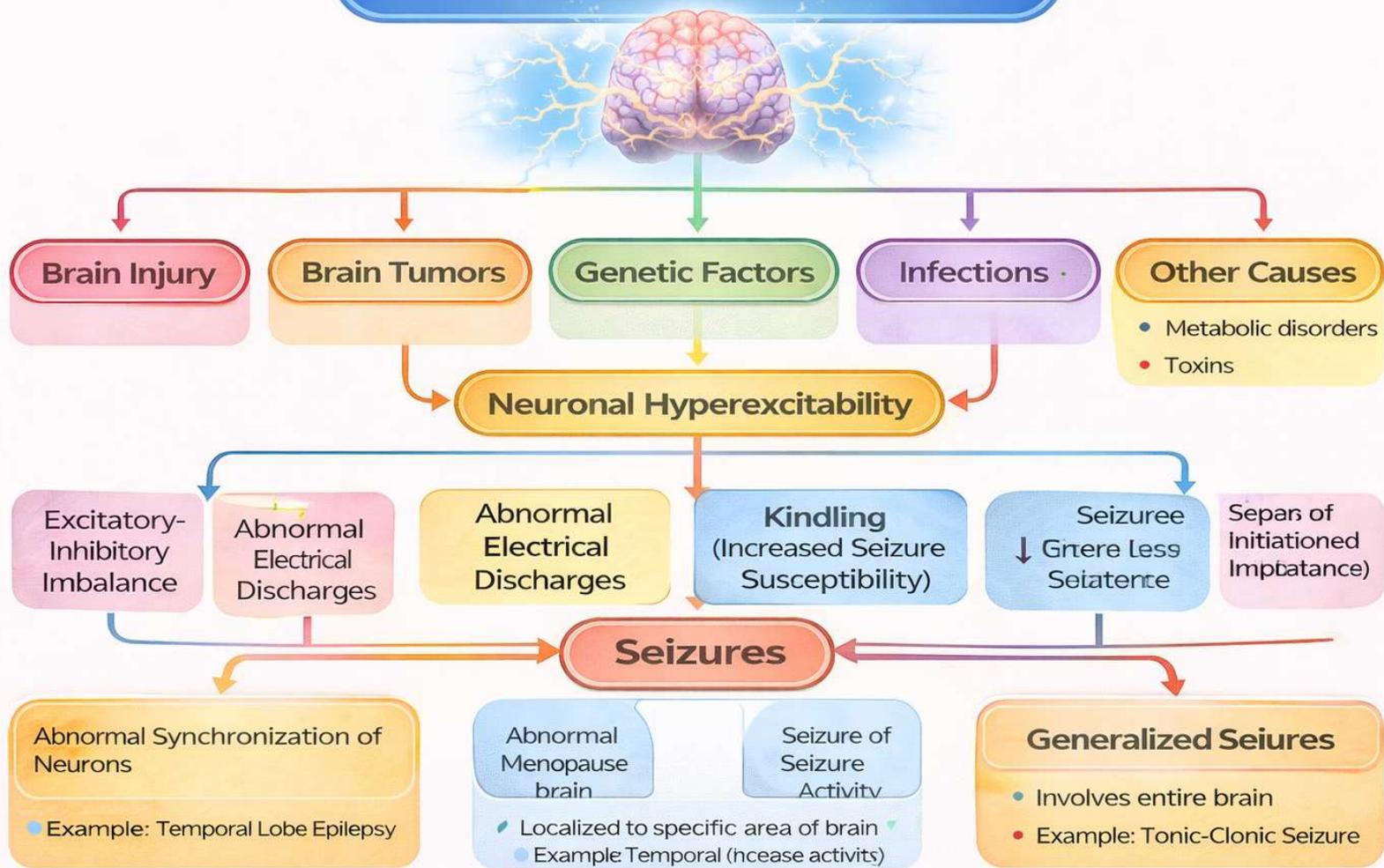
1. Epilepsy

S.No	Aspect	Description
1	Definition	Epilepsy is a chronic neurological disorder characterized by recurrent, unprovoked seizures due to abnormal electrical activity in the brain
2	Nature	Non-communicable, chronic condition
3	Age group	Can occur at any age
4	Key feature	Repeated seizures with or without loss of consciousness
5	Cause	May be idiopathic or secondary to brain pathology

I. Etiology of Epilepsy

S.No	Category	Causes
1	Genetic	Inherited seizure disorders
2	Structural	Brain tumors, head injury, stroke
3	Infectious	Meningitis, encephalitis, neurocysticercosis
4	Metabolic	Hypoglycemia, electrolyte imbalance
5	Perinatal	Birth trauma, hypoxic injury
6	Idiopathic	No identifiable cause

Pathogenesis of Epilepsy



II. Diagnostic Tests for Epilepsy

S.No	Test	Purpose
1	Electroencephalogram (EEG)	Detects abnormal electrical brain activity
2	MRI Brain	Identifies structural abnormalities
3	CT Scan	Detects tumors, hemorrhage
4	Blood tests	Rule out metabolic causes
5	Video-EEG monitoring	Confirms seizure type
6	Clinical history	Most important diagnostic tool

III. Treatment of Epilepsy

S.No	Method	Details
1	Antiepileptic drugs (AEDs)	Phenytoin, Valproate, Carbamazepine, Levetiracetam
2	Monotherapy	Preferred initial approach
3	Polytherapy	Used if seizures are uncontrolled
4	Surgery	For refractory epilepsy
5	Ketogenic diet	Especially in children
6	Lifestyle management	Adequate sleep, avoid triggers
7	Patient education	Drug compliance, safety precautions

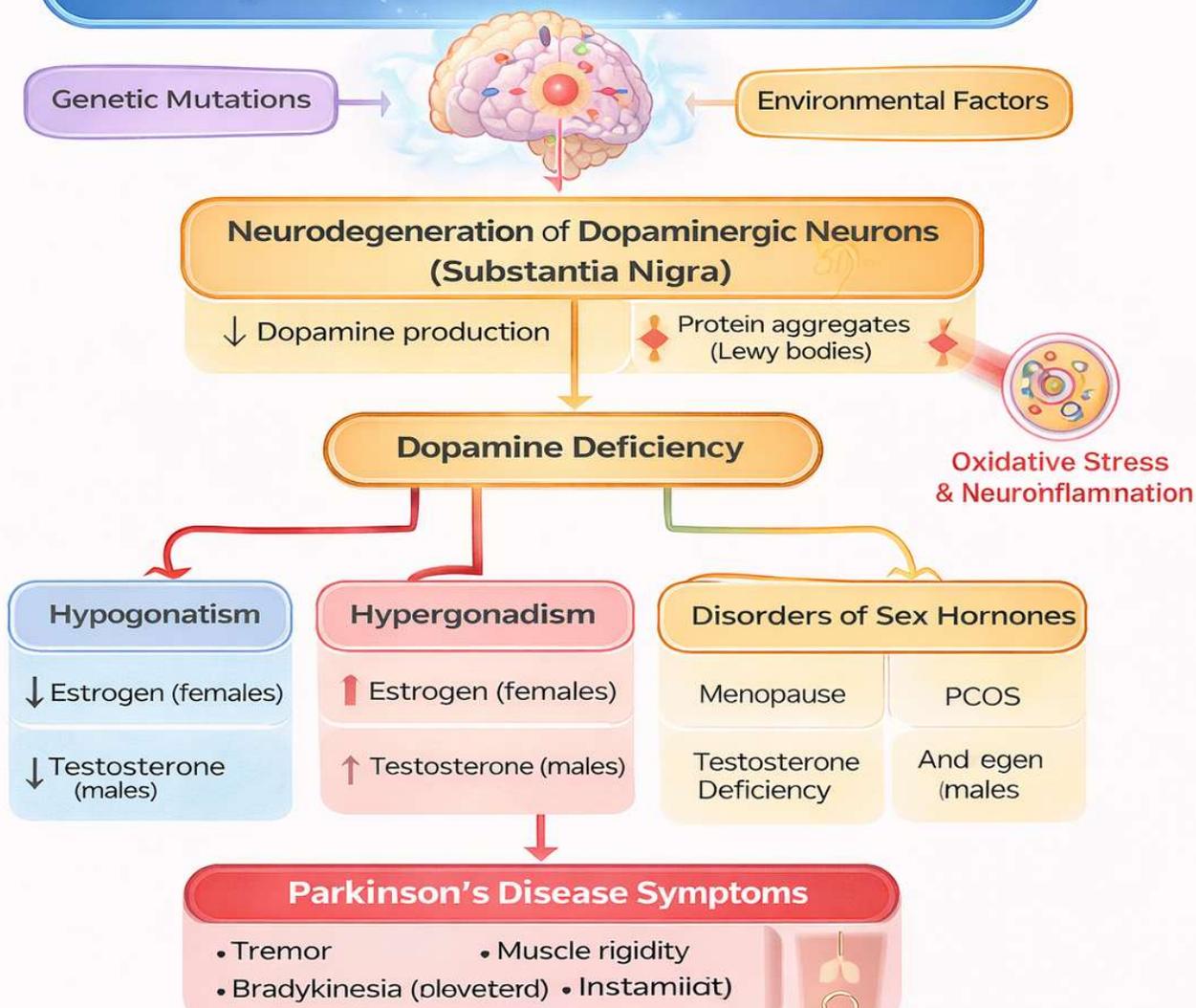
2. Parkinson's disease

S.No	Aspect	Description
1	Definition	A chronic, progressive neurodegenerative disorder affecting movement
2	Pathology	Degeneration of dopaminergic neurons in substantia nigra pars compacta
3	Neurochemical change	↓ Dopamine in nigrostriatal pathway
4	Age group	Common after 60 years
5	Nature	Slowly progressive, irreversible

I. Etiology of Parkinson's Disease

S.No	Category	Causes
1	Genetic factors	Mutations in SNCA, LRRK2, PARK genes
2	Environmental toxins	Pesticides, herbicides, MPTP
3	Aging	Natural neuronal degeneration
4	Drug-induced	Antipsychotics, antiemetics
5	Oxidative stress	Free radical-mediated neuronal damage
6	Mitochondrial dysfunction	Impaired energy metabolism

Pathogenesis of Parkinson's Disease



II. Diagnostic Tests for Parkinson's Disease

S.No	Test	Purpose
1	Clinical examination	Diagnosis based on motor symptoms
2	Response to Levodopa	Improvement supports diagnosis
3	MRI / CT scan	Exclude other brain pathologies
4	DAT scan	Shows reduced dopamine transporter activity
5	PET scan	Assesses dopaminergic function (research use)
6	Blood tests	Rule out secondary causes

III. Treatment of Parkinson's Disease

S.No	Treatment	Examples / Purpose
1	Dopamine precursor	Levodopa + Carbidopa (gold standard)
2	Dopamine agonists	Pramipexole, Ropinirole
3	MAO-B inhibitors	Selegiline, Rasagiline
4	COMT inhibitors	Entacapone
5	Anticholinergics	Trihexyphenidyl (for tremor)
6	Amantadine	Reduces dyskinesia
7	Surgical therapy	Deep Brain Stimulation (DBS)
7	Supportive care	Physiotherapy, speech therapy

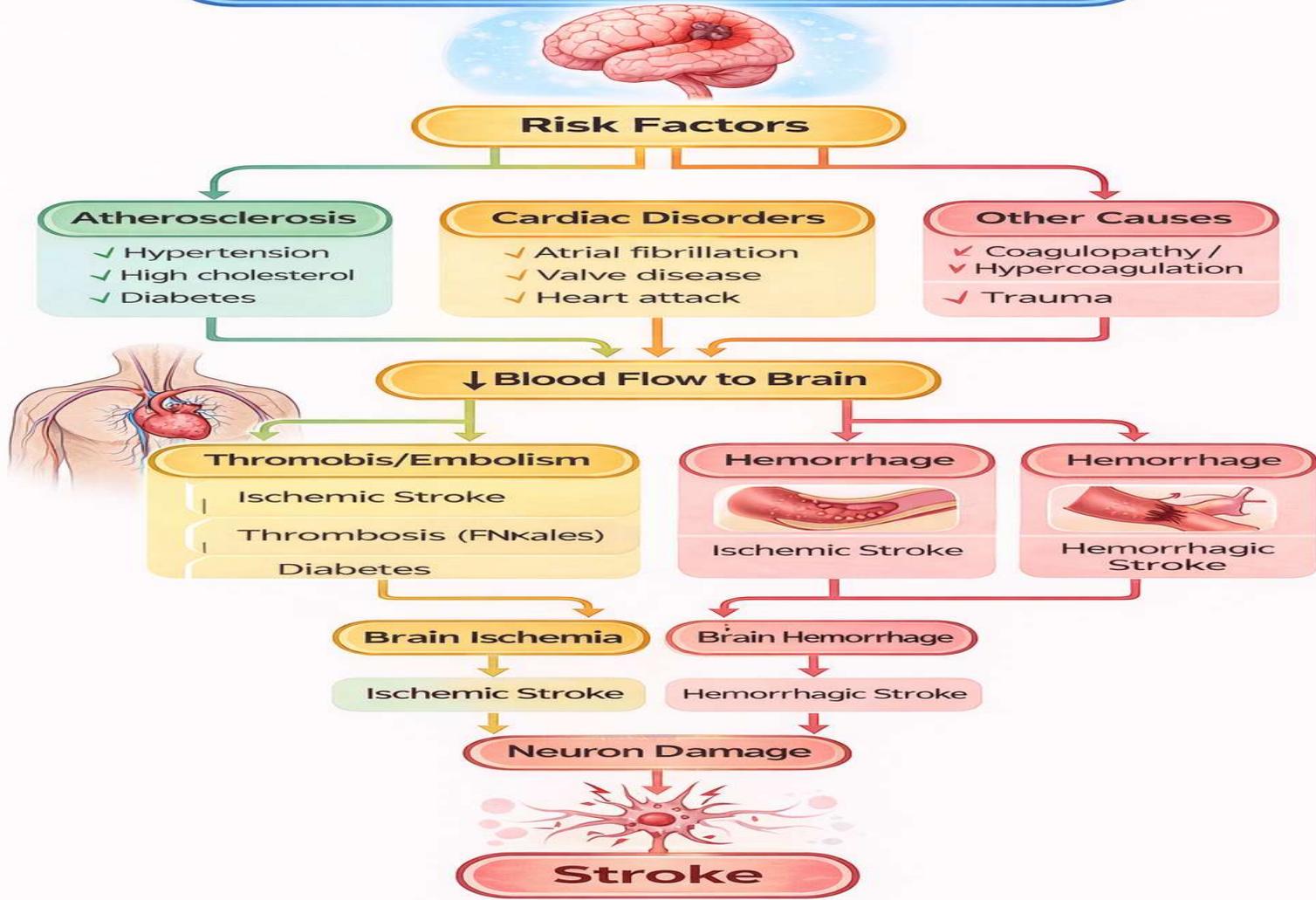
3. Stroke

S.No	Aspect	Description
1	Definition	Stroke is a sudden neurological deficit due to interruption of blood supply to the brain.
2	Nature	Medical emergency
3	Cause	Either ischemia (blocked vessel) or hemorrhage (ruptured vessel)
4	Outcome	Leads to brain tissue damage, disability, or death
5	Key Feature	Rapid onset of symptoms (paralysis, speech disturbance, loss of consciousness)

I. Etiology of Stroke

S.No	Category	Causes
1	Vascular	Atherosclerosis, hypertension
2	Cardiac	Atrial fibrillation, valvular disease
3	Metabolic	Diabetes mellitus, hyperlipidemia
4	Lifestyle	Smoking, alcohol, obesity
5	Hematological	Polycythemia, clotting disorders
6	Others	Trauma, aneurysm, vasculitis

Pathogenesis of Stroke



II. Diagnostic Tests for Stroke

S.No	Test	Purpose
1	CT Scan (Non-contrast)	Differentiates ischemic vs hemorrhagic stroke
2	MRI Brain	Detects early ischemic changes
3	CT Angiography	Identifies vascular occlusion
4	Carotid Doppler	Assesses carotid artery stenosis
5	ECG	Detects cardiac arrhythmias
6	Blood Tests	Glucose, lipid profile, coagulation studies

III. Treatment of Stroke

S.No	Type	Treatment
1	Ischemic Stroke	Thrombolytics (tPA), antiplatelets, anticoagulants
2	Hemorrhagic Stroke	BP control, surgical intervention
3	Acute Management	Oxygen, IV fluids, glucose control
4	Secondary Prevention	Antihypertensives, statins
5	Rehabilitation	Physiotherapy, speech therapy
6	Lifestyle Modification	Smoking cessation, diet, exercise

Psychiatric Disorders

Psychiatric disorders are **health conditions** affecting your **thinking, mood, and behavior**, causing significant **distress or problems** with **daily life**, **work**, and **relationships**, going beyond normal reactions to stress, and often **needing** professional help like **therapy or medication** to manage.

Etiology

Factor	Examples
Biological	Neurotransmitter imbalance, genetics
Psychological	Stress, trauma, personality
Social	Poverty, abuse, isolation
Environmental	Substance abuse, infections
Developmental	Childhood neglect

Disorder

1	Depression
2	Schizophrenia
3	Alzheimer's disease

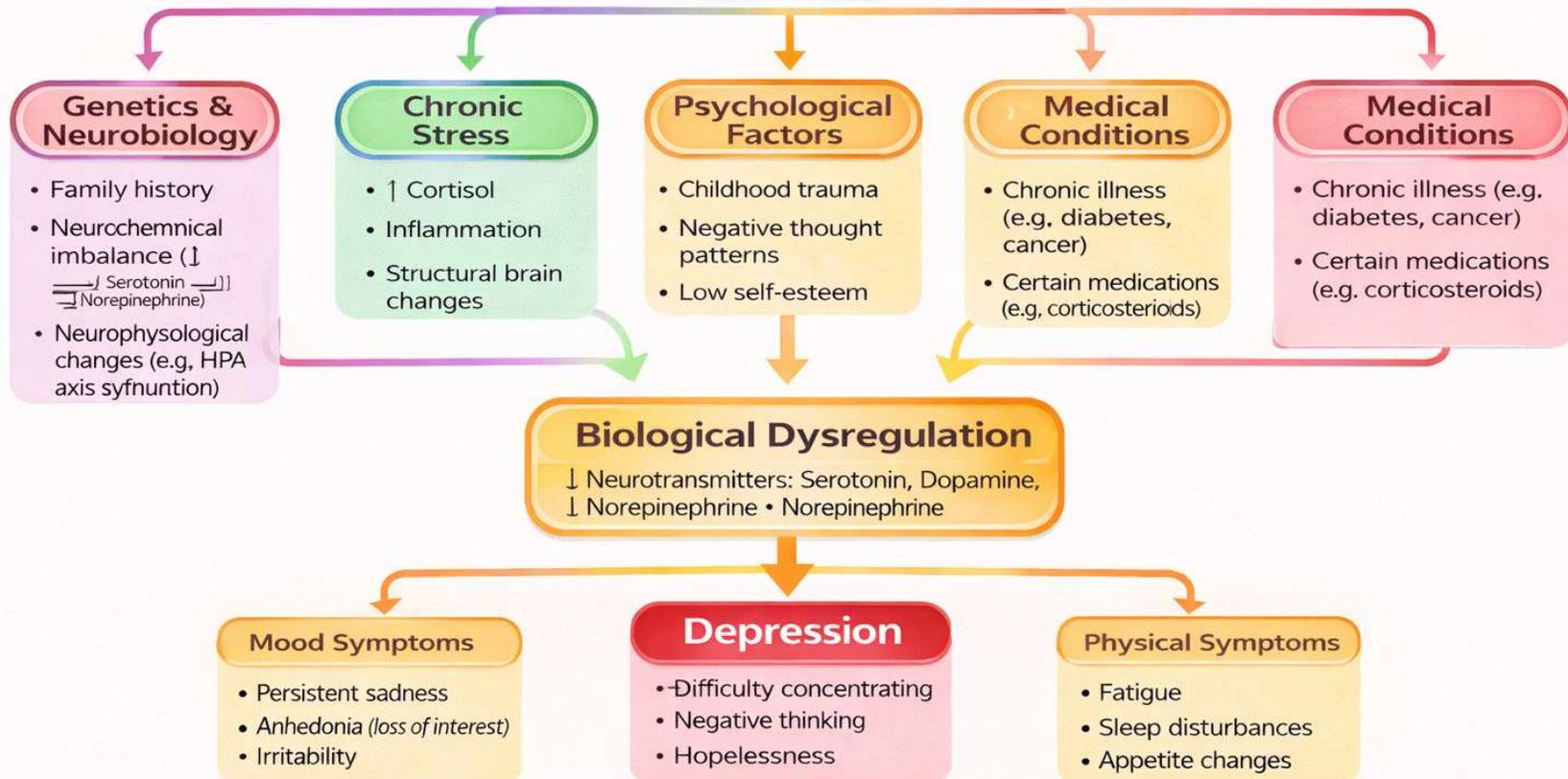
4. Depression

S.No	Aspect	Description
1	Definition	Depression is a common mental disorder characterized by persistent sadness, loss of interest or pleasure, and reduced ability to function.
2	Nature	Affective (mood) disorder
3	Duration	Symptoms last ≥ 2 weeks
4	Impact	Affects thoughts, behavior, emotions, and physical health
5	Global burden	One of the leading causes of disability worldwide

I. Etiology of Depression

S.No	Category	Causes
1	Biological factors	Neurotransmitter imbalance (\downarrow serotonin, norepinephrine, dopamine)
2	Genetic factors	Family history of depression
3	Psychological factors	Low self-esteem, negative thinking, trauma
4	Social factors	Stress, loss, loneliness, financial problems
5	Medical conditions	Chronic illness, hormonal disorders
6	Drug-induced	Alcohol, corticosteroids, sedatives

Pathogenesis of Depression



II. Diagnostic Tests for Depression

S.No	Diagnostic Method	Purpose / Use
1	Clinical Interview (DSM-5 criteria)	Primary method for diagnosis.
2	PHQ-9 Scale	Measures severity of depression.
3	Hamilton Depression Rating Scale (HDRS)	Assesses symptom severity.
4	Beck Depression Inventory (BDI)	Self-reported depression scale.
5	Blood Tests	Rule out medical causes (thyroid, anemia).
6	Psychiatric Evaluation	Assess suicide risk and comorbidities.

III. Treatment of Depression

S.No	Category	Treatment Options
1	Psychotherapy	Cognitive Behavioral Therapy (CBT), interpersonal therapy.
2	Antidepressants	SSRIs (Fluoxetine), SNRIs (Venlafaxine), TCAs, MAOIs.
3	Mood Stabilizers	Lithium (for bipolar depression).
4	Atypical Antidepressants	Bupropion, Mirtazapine.
5	Electroconvulsive Therapy (ECT)	Severe or treatment-resistant depression.
6	Lifestyle Measures	Exercise, sleep hygiene, stress management, social support.
7	Combination Therapy	Drugs + psychotherapy (most effective).

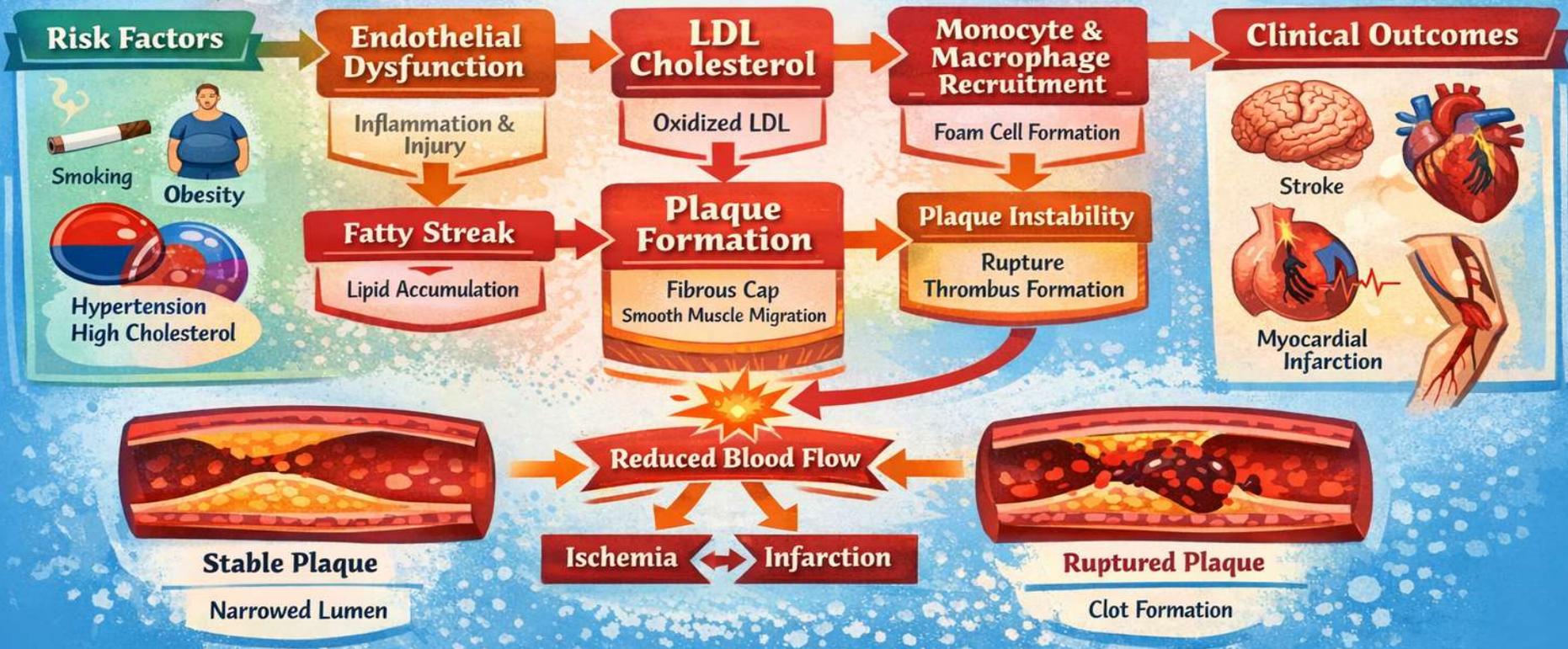
5. Atherosclerosis

S.No	Heading	Details
1	Definition	A chronic inflammatory disease of large and medium-sized arteries characterized by atheromatous plaque formation.
2	Primary Feature	Deposition of lipids (cholesterol), fibrous tissue, and inflammatory cells in arterial walls.
3	Common Sites	Coronary arteries, carotid arteries, aorta, cerebral arteries, peripheral arteries.
4	Disease Nature	Progressive and often asymptomatic until significant arterial narrowing occurs.
5	Clinical Importance	Major underlying cause of ischemic heart disease, stroke, and peripheral vascular disease.

I. Etiology of Atherosclerosis

S.No	Category	Causes / Risk Factors
1	Lipid Factors	High LDL cholesterol, low HDL cholesterol, hyperlipidemia.
2	Lifestyle Factors	Smoking, sedentary lifestyle, high-fat diet, obesity.
3	Medical Conditions	Hypertension, diabetes mellitus, metabolic syndrome.
4	Genetic Factors	Family history, inherited lipid disorders.
5	Age & Gender	Increasing age; more common in males.
6	Inflammatory Factors	Chronic inflammation, oxidative stress.

Pathophysiology of Atherosclerosis



II. Diagnostic Tests for Atherosclerosis

S.No	Diagnostic Test	Purpose / Findings
1	Lipid Profile	Elevated LDL, triglycerides; low HDL.
2	ECG	Detects ischemia or previous myocardial infarction.
3	Echocardiography	Assesses heart function and wall motion abnormalities.
4	Doppler Ultrasound	Detects arterial narrowing and blood flow reduction.
5	CT Angiography	Visualizes plaque and arterial stenosis.
6	Coronary Angiography	Gold standard for coronary artery disease.
7	Ankle–Brachial Index (ABI)	Diagnoses peripheral arterial disease.

III. Treatment of Atherosclerosis

S.No	Category	Management / Drugs
1	Lifestyle Modification	Smoking cessation, exercise, weight reduction, low-fat diet.
2	Lipid-Lowering Drugs	Statins (Atorvastatin), fibrates, ezetimibe.
3	Antiplatelet Drugs	Aspirin, clopidogrel (prevent thrombosis).
4	Antihypertensives	ACE inhibitors, beta-blockers, CCBs.
5	Antidiabetic Therapy	Glycemic control in diabetic patients.
6	Interventional Procedures	Angioplasty with stent (PCI).
7	Surgical Treatment	Coronary artery bypass grafting (CABG), endarterectomy.

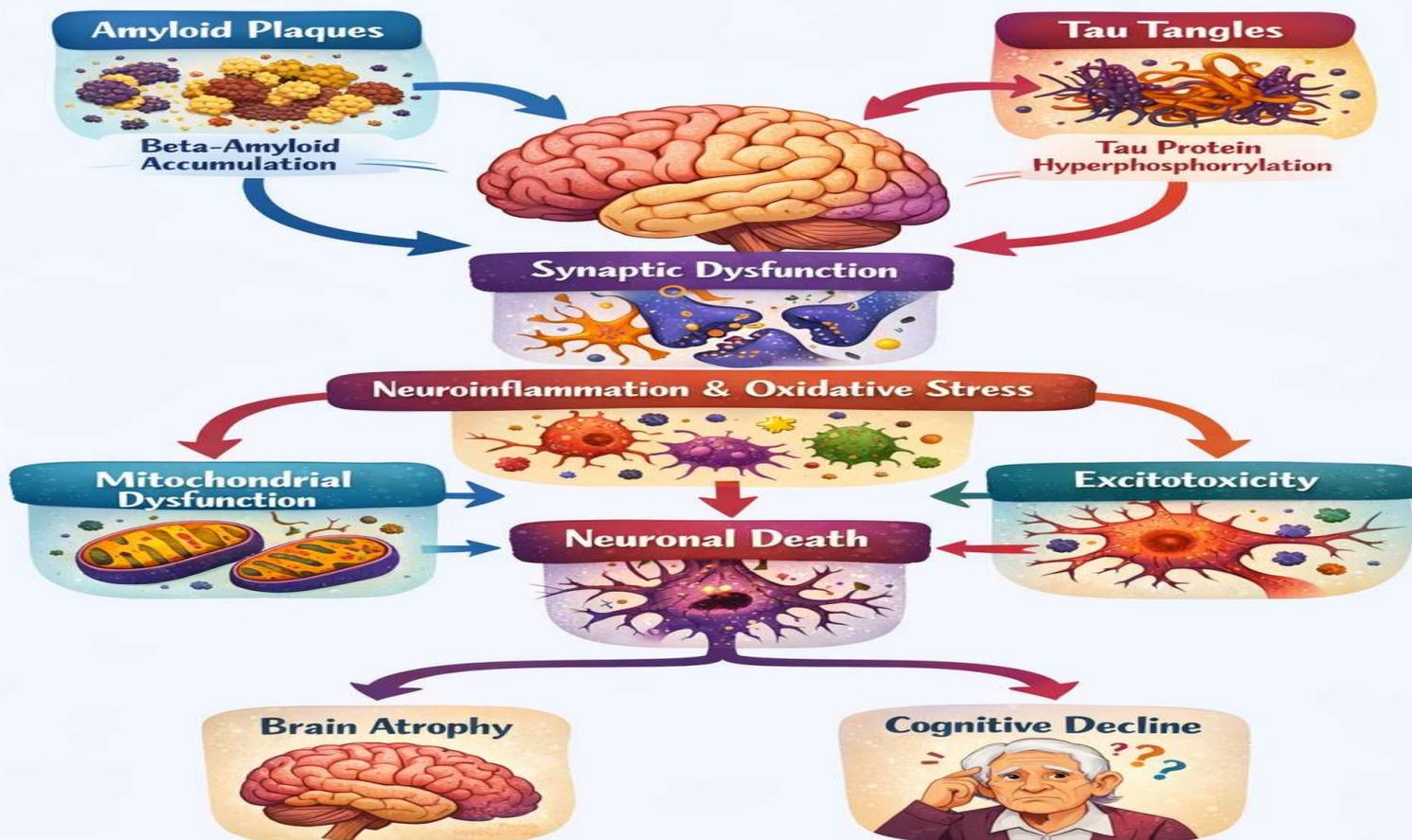
6. Alzheimer's Disease

S.No	Heading	Details
1	Definition	Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by gradual loss of memory, cognition, and functional ability.
2	Nature of Disease	Chronic, irreversible, and progressive dementia.
3	Age Group	Commonly affects elderly (>65 years); early-onset may occur <65 years.
4	Primary Affected Area	Cerebral cortex and hippocampus.
5	Key Features	Memory loss, confusion, language impairment, personality changes.

I. Etiology of Alzheimer's Disease

S.No	Category	Etiological Factors
1	Genetic Factors	Mutations in APP, PSEN1, PSEN2 genes; APOE-ε4 allele.
2	Amyloid Hypothesis	Accumulation of β-amyloid plaques in brain.
3	Tau Protein Abnormality	Formation of neurofibrillary tangles due to hyperphosphorylated tau.
4	Neurochemical Changes	Deficiency of acetylcholine in brain.
5	Ageing	Major risk factor.
6	Environmental / Lifestyle	Head injury, low education, cardiovascular disease, diabetes.

Pathophysiology of Alzheimer's Disease



II. Diagnostic Tests for Alzheimer's Disease

S.No	Diagnostic Test	Purpose / Findings
1	Clinical Assessment	Memory, language, behavior evaluation.
2	Mini-Mental State Examination (MMSE)	Assesses cognitive impairment.
3	Neuropsychological Tests	Memory, attention, problem-solving ability.
4	MRI Brain	Cerebral and hippocampal atrophy.
5	CT Scan	Excludes tumors, stroke, hydrocephalus.
6	PET Scan	Reduced glucose metabolism in affected brain areas.
7	CSF Analysis	↓ β -amyloid, ↑ tau protein.
8	Blood Tests	Rule out other causes (thyroid, B12 deficiency).

III. Treatment of Alzheimer's Disease

S.No	Category	Treatment / Drugs
1	Cholinesterase Inhibitors	Donepezil, Rivastigmine, Galantamine – improve cognition.
2	NMDA Receptor Antagonist	Memantine – reduces glutamate-induced neurotoxicity.
3	Combination Therapy	Donepezil + Memantine (moderate to severe AD).
4	Behavioral Symptoms	Antidepressants, antipsychotics (with caution).
5	Non-Pharmacological	Cognitive therapy, memory training, social engagement.
6	Supportive Care	Caregiver support, structured routine, safety measures.
7	Disease Status	Treatment is symptomatic only; no cure available.



Thank You

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