💊 "Psychiatry for USMLE" 💊

Section 3: Pharmacology

🧠 Psychotherapy Approaches

Type	Mechanism / Use
Behavioral therapy	Change maladaptive behaviors (e.g., systematic desensitization)
Cognitive behavioral therapy (CBT)	Identify distorted thoughts, improve coping, emotional control (alcohol triggers, anxiety, depression)
Dialectical behavioral therapy (DBT)	Borderline personality disorder, emotion regulation
Interpersonal therapy	Improve interpersonal relationships and communication

Motivational interviewing	Resolve ambivalence, enhance intrinsic motivation (substance use, weight loss)
Supportive therapy	Provide empathy, maintain hope/optimism

⚡ CNS Stimulants

- Drugs: Methylphenidate, dextroamphetamine, methamphetamine, lisdexamfetamine
- Mechanism: ↑ catecholamines (dopamine, norepinephrine) in synaptic cleft
- Clinical Use: ADHD, narcolepsy, binge-eating disorder
- Adverse Effects: Nervousness, agitation, insomnia, anorexia, tachycardia, hypertension, tics, weight loss

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🧩 Antipsychotics

Classification & Mechanism

Class	Drugs	Mechanism	Notes
Typical (1st-gen)	Haloperidol, Pimozide, Trifluoperazine, Fluphenazine, Thioridazine, Chlorpromazine	D2 receptor blockade	Primarily treat positive symptoms of schizophrenia; high EPS risk; high-potency = more neurologic SEs; low-potency = more anti-HAM
Atypical (2nd-gen)	Clozapine, Olanzapine, Risperidone, Quetiapine, Aripiprazole, etc.	D2 + 5-HT2 blockade; Aripiprazole = D2 partial agonist	Treat positive & negative symptoms; clozapine for treatment-resistant cases or suicidality

Clinical Use

- Schizophrenia, bipolar disorder with psychosis, Tourette syndrome, OCD, Huntington disease
- Clozapine: treatment-resistant psychosis, persistent suicidality

Adverse Effects

- Anti-HAM: Sedation, dry mouth, constipation, orthostatic hypotension
- Metabolic: Weight gain, dyslipidemia, hyperglycemia (especially clozapine, olanzapine)
- Endocrine: Hyperprolactinemia → galactorrhea, oligomenorrhea, gynecomastia
- Cardiac: QT prolongation
- Neurologic: EPS (ADAPT), NMS
- Ophthalmologic: Corneal deposits (chlorpromazine), retinal deposits (thioridazine)
- Hematologic / Others: Clozapine → agranulocytosis, seizures, myocarditis

Extrapyramidal Symptoms (EPS) - ADAPT

Timeframe	Type	Treatment
Hours-days	Acute dystonia (spasms, oculogyric crisis)	Benztropine, diphenhydramine

Days–months	Akathisia (restlessness)	β-blockers, benztropine, benzodiazepines
Days–months	Parkinsonism (bradykinesia, rigidity)	Benztropine, amantadine
Months–years	Tardive dyskinesia (chorea, orofacial)	Benzos, botulinum toxin, valbenazine, deutetrabenazine

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💊 Lithium

- Mechanism: Modulates neurotransmission (↓ excitatory, ↑ inhibitory) and second messengers (G proteins).
- Clinical Use: Mood stabilizer for bipolar disorder (acute mania & relapse prevention).
- Adverse Effects (LiTHIUM mnemonic):
  - L → Low thyroid (hypothyroidism)

    - I → Insipidus (nephrogenic diabetes insipidus → polyuria)
    - T → Teratogenic (Ebstein anomaly)
    - H → Hypothyroidism (repeated for emphasis)
    - I → Increased calcium (mild hypercalcemia)
    - U → Unwanted movements (tremor)
- Notes:
    - Narrow therapeutic window → monitor serum levels
    - Mostly renal excretion; reabsorbed at PCT via Na^+ channels
    - Drugs increasing toxicity: thiazides, ACE inhibitors, NSAIDs

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🚌 Buspirone

- Mechanism: Partial 5-HT1A receptor agonist
- Clinical Use: Generalized anxiety disorder (non-sedating, non-addictive)

- Onset: 1–2 weeks
- Advantages: No alcohol interaction (vs benzodiazepines)

🧠 Antidepressants Overview

1. SSRIs (Selective Serotonin Reuptake Inhibitors)

- Drugs: Fluoxetine, Paroxetine, Sertraline, Fluvoxamine, Citalopram, Escitalopram
- Mechanism: Inhibit serotonin reuptake
- Clinical Use: Depression, GAD, panic disorder, OCD, bulimia, binge-eating, social anxiety, PTSD, premenstrual dysphoric disorder, premature ejaculation
- Adverse Effects: GI upset, sexual dysfunction, SIADH, serotonin syndrome, mania if bipolar

2. SNRIs (Serotonin–Norepinephrine Reuptake Inhibitors)

- Drugs: Venlafaxine, Desvenlafaxine, Duloxetine, Levomilnacipran, Milnacipran
- Mechanism: Inhibit 5-HT & NE reuptake
- Clinical Use: Depression, GAD, neuropathic pain (Duloxetine, Milnacipran → fibromyalgia), venlafaxine → social anxiety, panic, PTSD, OCD
- Adverse Effects: ↑ BP, insomnia, sedation, nausea, sexual dysfunction

3. Tricyclic Antidepressants (TCAs)

- Drugs: Amitriptyline, Nortriptyline, Imipramine, Desipramine, Clomipramine, Doxepin, Amoxapine
- Mechanism: Inhibit 5-HT & NE reuptake
- Clinical Use: MDD, neuropathic pain, migraine prophylaxis, OCD (clomipramine), nocturnal enuresis (imipramine)
- Adverse Effects: Sedation, α1-blocking effects → hypotension, anticholinergic → tachycardia, urinary retention, dry mouth; prolonged QT; 3° TCAs worse anticholinergic than 2°

- Toxicity (Tri-C's): Convulsions, Coma, Cardiotoxicity (Na^+ channel blockade); treatment: $NaHCO_3$

4. MAO Inhibitors

- Drugs: Tranylcypromine, Phenelzine, Isocarboxazid, Selegiline (MAO-B selective)
- Mechanism: Nonselective MAO inhibition $\rightarrow \uparrow$ NE, 5-HT, dopamine
- Clinical Use: Atypical depression, anxiety, Parkinson disease (selegiline)
- Adverse Effects: CNS stimulation, hypertensive crisis (tyramine-rich foods)
- Contraindications: SSRIs, TCAs, St. John's wort, meperidine, dextromethorphan, pseudoephedrine, linezolid
- Notes: Wait 2 weeks after stopping MAOIs before starting serotonergic drugs or resuming normal diet

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🟣 Atypical Antidepressants

Drug	Mechanism	Clinical Use	Key Adverse Effects / Notes
Bupropion	NE + DA reuptake inhibitor	MDD, smoking cessation	Stimulant effects: tachycardia, insomnia; seizures in bulimia/anorexia; ↓ sexual side effects & weight gain
Mirtazapine	α2-antagonist → ↑ NE & 5-HT; 5-HT2/3 antagonist; H1 antagonist	MDD (esp. with insomnia/underweight)	Sedation, ↑ appetite & weight, dry mouth
Trazodone	5-HT2, α1, H1 antagonist; weak 5-HT reuptake inhibitor	Insomnia (antidepressant at high doses)	Sedation, nausea, priapism, orthostatic hypotension
Vilazodone	5-HT reuptake inhibitor + 5-HT1A partial agonist	MDD	Headache, nausea, diarrhea, anticholinergic; serotonin syndrome risk if combined with other serotonergic drugs

Vortioxetine	5-HT reuptake inhibitor + 5-HT1A agonist + 5-HT3 antagonist	MDD	Nausea, sexual dysfunction, sleep disturbances, anticholinergic; serotonin syndrome risk if combined with other serotonergic drugs

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🚬 Pharmacotherapy for Smoking Cessation

Therapy	Mechanism	Key Points / Adverse Effects
Nicotine Replacement Therapy (patch, gum, lozenge)	Nicotinic ACh receptor agonist	Relieves withdrawal; long-acting patch + short-acting forms can be combined; headache, oral irritation
Varenicline	Nicotinic ACh receptor partial agonist	Reduces withdrawal & reward effect; adverse: GI discomfort, sleep disturbance

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💊 Medically Supervised Opioid Withdrawal / Relapse Prevention

Drug	Mechanism / Use	Key Points / Adverse Effects
Methadone	Long-acting oral opioid agonist	Used for supervised withdrawal or maintenance therapy
Buprenorphine	Partial opioid agonist (sublingual film)	Suppresses withdrawal & maintenance; can precipitate withdrawal if given too soon after full agonist
Naloxone	Short-acting opioid antagonist	IM, IV, or nasal spray; reverses acute opioid overdose (respiratory & CNS depression)
Naltrexone	Long-acting oral opioid antagonist	Prevents relapse after detox; also helps alcohol/nicotine cessation and weight loss ("naltrexone for the long trex back to sobriety")

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