

ALPHA BLOCKERS

Alpha blockers are drugs that inhibit the action of **norepinephrine and epinephrine** at **alpha-adrenergic receptors** (α_1 and α_2), thus causing **vasodilation**, reduced **blood pressure**, and altering **smooth muscle tone** in various tissues.

Classification of Alpha Blockers

Category	Subtype	Examples
Non-selective α blockers	Blocks α_1 and α_2	Phenoxybenzamine, Phentolamine
Selective α_1 blockers	Blocks α_1 only	Prazosin, Terazosin, Doxazosin
Selective α_2 blockers	Blocks α_2 only (rare)	Yohimbine

Mechanism of Action

- Alpha blockers **competitively** or **irreversibly** inhibit α -receptors:
 - α_1 blockers $\rightarrow$ inhibit vasoconstriction $\rightarrow$ **vasodilation** $\rightarrow$ $\downarrow$ BP
 - α_2 blockers $\rightarrow$ increase norepinephrine release $\rightarrow$ may increase BP
 - Non-selective α blockers** $\rightarrow$ affect both types $\rightarrow$ mixed effects
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Drugs and Their Features

1. Phenoxybenzamine

- Type:** Non-selective, **irreversible**
- Use:** **Pheochromocytoma** (pre-op to control BP)
- Adverse effects:** Postural hypotension, reflex tachycardia

2. Phentolamine

- Type:** Non-selective, **reversible**
- Use:** Diagnostic test for pheochromocytoma, extravasation of vasopressors
- Adverse effects:** Hypotension, arrhythmias

3. Prazosin

- **Type:** Selective α_1 blocker
- **Use:** Hypertension, Benign Prostatic Hyperplasia (BPH)
- **Note:** Less reflex tachycardia
- **Adverse effects:** First-dose hypotension

4. Terazosin, Doxazosin

- **Type:** Long-acting selective α_1 blockers
- **Use:** Hypertension, BPH
- **Duration:** Longer than prazosin

5. Tamsulosin, Alfuzosin, Silodosin

- **Type:** α_{1A} -selective blockers
- **Use:** BPH only (acts on prostate smooth muscle)
- **Advantage:** Minimal hypotension
- **Note:** Tamsulosin is most commonly used for BPH

6. Yohimbine

- **Type:** α_2 blocker
- **Use:** Erectile dysfunction (obsolete now)

Clinical Uses of Alpha Blockers

Condition	Preferred Drug(s)
Pheochromocytoma	Phenoxybenzamine, Phentolamine
Benign Prostatic Hyperplasia	Tamsulosin, Alfuzosin, Prazosin
Hypertension	Prazosin, Terazosin
Raynaud's Disease	Prazosin
Vasopressor Extravasation	Phentolamine

Adverse Effects

- **Postural hypotension** (especially prazosin)
- **Reflex tachycardia** (more with non-selective)
- Nasal congestion
- Dizziness
- Miosis
- Sexual dysfunction

Comparison: Non-Selective vs Selective α Blockers

Feature	Non-Selective α Blockers	Selective α_1 Blockers
Examples	Phentolamine, Phenoxybenzamine	Prazosin, Terazosin, Tamsulosin
Action	α_1 and α_2	α_1 only
Reflex tachycardia	More (due to α_2 block)	Less (α_2 intact)
BP effect	Variable	Predictable hypotension
Use in pheochromocytoma	Yes	No
BPH symptom relief	Moderate	Effective

Key Points

- First dose hypotension: Prazosin
- Pheochromocytoma drug of choice (DOC): Phenoxybenzamine
- BPH with minimal BP effect: Tamsulosin
- Non-selective reversible blocker: Phentolamine
- Irreversible α blocker: Phenoxybenzamine
- Erectile dysfunction (obsolete): Yohimbine