

HIGH-YIELD DRUG CLASS REVIEW

Beta *Blockers*

β-Adrenergic Antagonists — the “-olol” family. Cardiac workload reducers, rhythm tamers, and the #1 drug class tested for hold parameters and rebound emergencies.

SUFFIX: -OLOL

SYSTEM: CARDIOVASCULAR

CLASS: B-ADRENERGIC ANTAGONISTS

HIGH-ALERT FOR BRADYCARDIA + REBOUND MI

01 Drug Overview

WHY WE GIVE IT

- **Hypertension** — chronic BP control
- **Stable angina** — ↓O₂ demand
- **Post-MI cardioprotection** — ↓mortality
- **Chronic HFrEF** — *only* carvedilol, metoprolol succinate, bisoprolol
- **Arrhythmias** — A-fib rate control, SVT
- **Migraine prophylaxis** — propranolol
- **Thyroid storm** — propranolol (blocks T₄→T₃ + sympathetic surge)
- **Essential tremor & performance anxiety** — propranolol
- **Glaucoma** — timolol eye drops
- **Pheochromocytoma** — *only AFTER* α-blockade

02 Mechanism of Action

HOW IT CHANGES PHYSIOLOGY

β_1 block → ↓HR · ↓contractility · ↓renin → ↓BP · ↓myocardial O_2 demand

β_2 block → bronchoconstriction · ↓insulin release · ↓glycogenolysis → *risk of bronchospasm & masked hypoglycemia*

SELECTIVITY MATTERS (NCLEX PATTERN)

GROUP	DRUGS	KEY RULE
β_1 selective "A BEAM"	Atenolol · Bisoprolol · Esmolol · Acebutolol · Metoprolol	Safer in asthma/DM — but selectivity <i>lost at high doses</i>
Non-selective	Propranolol · Nadolol · Timolol · Pindolol	Contraindicated in asthma
$\alpha + \beta$ combo	Carvedilol · Labetalol	HF gold standard · Labetalol = pregnancy-HTN & HTN emergency

03 Therapeutic Effects

SIGNS IT'S WORKING

- ↓HR toward goal (often 55–70)
- ↓BP to target range
- ↓frequency & severity of **angina**
- ↑exercise tolerance
- ↓mortality post-MI and in chronic HF
- Controlled ventricular rate in A-fib
- ↓migraine frequency (propranolol)

04 Side Effects & Adverse Reactions

COMMON VS LIFE-THREATENING

COMMON

- **Bradycardia** · hypotension
- Fatigue · dizziness
- Cold extremities (peripheral vasoconstriction)
- Erectile dysfunction · ↓libido
- **Depression** · nightmares (*propranolol crosses BBB*)
- Masked hypoglycemia (*sweating preserved*)
- ↑LDL · ↑triglycerides

🚨 SERIOUS / LIFE-THREATENING

- **Heart block** (2°/3° AV block)
- **Severe bradycardia** → cardiogenic shock
- **Bronchospasm** (non-selective in asthma) — can be fatal
- **Acute HF decompensation** if started during crisis
- **REBOUND HTN / MI / angina** if abruptly stopped
- **Masked hypoglycemia** → unrecognized coma in diabetics

05 Priority Nursing Considerations

ASSESS · MONITOR · HOLD · NOTIFY

HOLD THE DOSE & NOTIFY HCP IF:

- ✗ HR < 60 bpm
- ✗ SBP < 90–100 mmHg
- ✗ New or worsening **heart block** on ECG
- ✗ Acute decompensated HF (new SOB, weight ↑, crackles)
- ✗ Active **bronchospasm / wheezing**

ASSESS / MONITOR

- **HR + BP** *before every dose*
- Apical pulse × 60 sec
- ECG — rhythm, PR interval
- Lung sounds (esp. non-selective)
- Daily weight, edema, SOB
- Blood glucose in diabetics
- Mood / depression screening

CONTRAINDICATIONS

- 2°/3° AV block (no pacer)
- Cardiogenic shock
- Severe bradycardia · sick sinus
- Acute decompensated HF
- **Asthma** (non-selective)

KEY INTERACTIONS

- **CCBs** (verapamil, diltiazem) → severe brady / block
- Digoxin → additive bradycardia
- Insulin / sulfonylureas → masked hypoglycemia
- Clonidine → rebound HTN if co-discontinued

06 Labs & Diagnostics

WHAT TO WATCH, WHAT IT MEANS

- **Blood glucose** — hypoglycemia may be silent; check scheduled, not PRN, in diabetics
- **BUN / Creatinine** — atenolol is renally excreted; dose-adjust in CKD
- **Potassium** — β-blockers can ↑ K⁺ (blunt cellular uptake)
- **Lipid panel** — may ↑ LDL, ↑ TG
- **LFTs** — metoprolol & labetalol hepatically metabolized
- **ECG** — watch PR interval > 0.20 sec → first signal of AV block
- **BNP / echo** — trending HF response

07 Administration & Safety

ROUTE • TIMING • HIGH-ALERT RULES

- PO — take at **same time daily**, with food (improves absorption of metoprolol)
- **Metoprolol tartrate** = IR, BID • **Metoprolol succinate (XL)** = ER, once daily — *the HF form*
- **Do NOT crush** ER / XL tablets
- **Esmolol IV** — ultra-short half-life (~9 min); titrate for intraop HTN, SVT, aortic dissection
- **Labetalol IV** — HTN emergency & preeclampsia
- **Timolol eye drops** — press inner canthus 1 min to ↓ systemic absorption (can still cause bradycardia / bronchospasm)
- **NEVER abruptly discontinue** — taper over 1–2 weeks to prevent rebound MI/HTN
- In chronic HF: **start LOW, go SLOW** — initiate only when euvolemic & stable

08 Patient Education

WHAT THEY MUST KNOW

- **Check pulse before each dose** — hold & call if <60
- **Never stop abruptly** — taper with provider; rebound MI/HTN is real
- Rise slowly from sitting / lying — orthostatic hypotension
- Report: SOB, swelling, weight gain >2 lb/day or >5 lb/week
- Diabetics: **tachycardia & tremor are hidden**; rely on sweating + glucose checks
- Avoid alcohol, OTC decongestants (pseudoephedrine)
- Report new depression, nightmares, ED, cold extremities
- Carry medical ID stating β-blocker use

09 NCLEX Test Traps ⚠️

WHERE STUDENTS GET PICKED OFF

- **Abrupt d/c** → rebound HTN, angina, MI. **TAPER.**
- Masks hypoglycemia — *except sweating*. Diaphoresis is preserved.
- Non-selective β-blockers are **contraindicated in asthma**, not just cautioned.
- **Carvedilol & metoprolol succinate** are for *stable chronic* HF — **NOT acute decompensation.**
- Check **HR and BP** before every dose — not BP alone.
- **Thyroid storm** answer = *propranolol* (blocks sympathetic + T4→T3 conversion).
- **Pheochromocytoma** → α-blocker *first*, then β. Reverse order = HTN crisis.
- **Timolol eye drops** cause systemic bradycardia & bronchospasm — assess lungs!
- β1 selectivity is **dose-dependent** — lost at high doses.
- Holding parameter: HR < **60**, SBP < **90–100** (know your facility's cutoff).

10 Memory Boosters

MNEMONICS & PATTERN RECOGNITION

A BEAM → β_1 selective: *Atenolol, Bisoprolol, Esmolol, Acebutolol, Metoprolol*

C & L → Combined $\alpha + \beta$:
Carvedilol, Labetalol

$\beta_1 = 1$ heart → *one heart, so β_1 is cardiac*

$\beta_2 = 2$ lungs → *two lungs, so β_2 is pulmonary*

“Block β , slow the heart, drop the pressure” → *core effect in one line*

HOLD 60 / 100 → *HR < 60 · SBP < 100 = stop and assess*

+ Most Tested Drugs in This Class

KNOW THESE COLD

DRUG	SELECTIVITY	#1 NCLEX USE	WATCH FOR
Metoprolol (tartrate / succinate)	β_1	HTN · post-MI · chronic HF (succinate only)	Tartrate BID vs succinate daily — don’t mix up
Propranolol	Non-selective	Migraine · essential tremor · thyroid storm · performance anxiety	Crosses BBB → depression, nightmares
Atenolol	β_1	HTN	Renal excretion → dose-adjust in CKD
Carvedilol	$\alpha + \beta$	Gold standard for chronic HFrEF	Must be stable/euvolemic before initiation
Labetalol	$\alpha + \beta$	HTN in pregnancy · HTN emergency IV	Can cause orthostatic hypotension quickly
Esmolol	β_1	IV — SVT, intraop HTN, aortic dissection	Ultra-short half-life (~9 min) — titrate closely
Bisoprolol	β_1	Chronic HF · HTN	Cleanest β_1 selectivity of the class
Timolol	Non-selective	Glaucoma (topical)	Systemic absorption → bradycardia, bronchospasm



NCJMM · RECOGNIZE → ANALYZE → PRIORITIZE → ACT

Clinical Judgment Snapshot

#1 PRIORITY RISK

Severe bradycardia & AV block leading to hemodynamic collapse — the drug’s core pharmacology becomes its lethal endpoint.

WHAT HARMS THE PATIENT FIRST

In order of speed:
1. **Bronchospasm** in an asthmatic (minutes)
2. **Rebound MI / HTN** after abrupt d/c (hours–days)
3. **Masked hypoglycemia**

FIRST NURSING ACTION

Assess apical HR & BP before administering. If HR < 60 or SBP < 100 → **hold the dose, reassess, and notify the provider.** Never skip the pre-dose check.

in a diabetic — no warning tachycardia

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Generate a complete, high-yield, Canva-ready pharmacology infographic for the topic below, aligned with the 2026 NCLEX-RN Test Plan and the NCJMM clinical judgment framework.

Include ALL sections in this exact order:

-  TITLE (generic + brand, class, system)
-  1. DRUG OVERVIEW — indications, high-yield clinical use
-  2. MECHANISM OF ACTION — simplified with → arrows
-  3. THERAPEUTIC EFFECTS — what tells you it's working
-  4. SIDE EFFECTS — Common vs Serious  (toxicity + life-threatening)
-  5. PRIORITY NURSING CONSIDERATIONS — monitor, HOLD parameters, contraindications, interactions (assess/monitor/hold/notify)
-  6. LABS & DIAGNOSTICS — key labs, critical values, meaning
-  7. ADMINISTRATION & SAFETY — route, timing, high-alert precautions
-  8. PATIENT EDUCATION — must-know, when to seek help, safety
-  9. NCLEX TEST TRAPS  — common mistakes + priority vs non-priority
-  10. MEMORY BOOSTERS — mnemonics, class patterns, recall tricks
-  CLINICAL JUDGMENT SNAPSHOT — #1 priority risk · what harms FIRST · FIRST nursing action

If the topic is a drug CLASS, also include "MOST TESTED DRUGS IN THIS CLASS" with key differences.

Style: bullet points only, clean color-coded sections, <60-sec rapid review, exam success + real-life safety. Deliver as a Canva-ready HTML infographic.

TOPIC: [INSERT DRUG NAME, CLASS, OR TOPIC HERE]