



HISTAMINE-2 (H₂) RECEPTOR ANTAGONISTS

NCLEX-RN Pharmacology Infographic | 2026 Test Plan

Drug Class: H₂ Receptor Antagonists • System: Gastrointestinal

1. DRUG OVERVIEW

Key Indications — WHY we give it

- **GERD:** Gastroesophageal reflux disease (GERD)
- **PUD:** Peptic ulcer disease (gastric + duodenal ulcers)
- **Stress ulcers:** Stress ulcer prophylaxis in ICU/critically ill patients
- **ZES:** Zollinger-Ellison syndrome (acid hypersecretion)
- **Heartburn:** Erosive esophagitis, heartburn, dyspepsia
- **Pre-op:** Prevention of aspiration pneumonitis pre-anesthesia

 **High-yield:** H₂ blockers ↓ acid but **DO NOT** neutralize existing acid (that's antacids). Slower onset than antacids (~1 hr) but **LONGER** duration (6–12 hrs).

2. MECHANISM OF ACTION

Block H₂ receptors on parietal cells of the stomach



↓ Histamine-stimulated acid secretion



↓ Hydrochloric acid (HCl) production in stomach



↑ Gastric pH (less acidic)



Ulcer healing + symptom relief

 **Blocks ONLY** histamine pathway — acetylcholine & gastrin pathways still active (why PPIs are stronger suppressors).

3. THERAPEUTIC EFFECTS

What to expect — signs it's working

- ↓ Epigastric pain / heartburn / burning sensation
- ↓ Acid reflux symptoms & regurgitation

- Ulcer healing visualized on endoscopy (duodenal 4–8 wks; gastric 6–8 wks)
- Stable or rising hemoglobin/hematocrit (if GI bleed resolving)
- Normalized gastric pH > 4
- ↓ Need for antacid rescue doses
- Improved sleep (less nocturnal reflux when dosed at bedtime)

4. SIDE EFFECTS & ADVERSE REACTIONS

● COMMON (usually mild)

- Headache (most common)
- Dizziness, drowsiness, fatigue
- Diarrhea OR constipation
- Nausea, abdominal discomfort
- Dry mouth

🚨 SERIOUS / LIFE-THREATENING

- 🧠 CNS confusion, agitation, hallucinations — especially ELDERLY & renal impairment
- 🩸 Thrombocytopenia, leukopenia, agranulocytosis (↑ bleeding/infection risk)
- ❤️ Bradycardia & hypotension — with RAPID IV push
- 🟡 Hepatotoxicity (↑ LFTs, jaundice)
- 🩺 Acute interstitial nephritis (↑ creatinine)
- 📌 Vitamin B₁₂ deficiency — long-term use (↓ acid = ↓ B₁₂ absorption)
- ⚠️ Masks symptoms of gastric cancer — rule out malignancy before long-term use

⚠️ CIMETIDINE-SPECIFIC (highest side effect profile)

- Gynecomastia (breast enlargement in men) — antiandrogen effect
- Impotence, ↓ libido
- Galactorrhea in women
- CYP450 inhibition → MANY drug interactions (see Section 5)

5. PRIORITY NURSING CONSIDERATIONS

🔍 ASSESS / MONITOR

- Baseline & ongoing: abdominal pain, bowel patterns, stool color (black/tarry = bleed)
- Vitals — especially HR & BP with IV administration (bradycardia risk)
- Mental status (elderly, renal impairment → confusion)
- CBC (platelets, WBC) & renal function (BUN/Cr)
- LFTs with long-term therapy
- Signs of GI bleed: melena, hematemesis (coffee-ground emesis), ↓ H&H

🛑 HOLD / NOTIFY PROVIDER IF:

- Platelets < 100,000 or sudden drop
- New confusion, agitation, or hallucinations (esp. elderly)
- HR < 60 or SBP < 90 (post-IV dose)
- ↑ Creatinine > 1.5× baseline or oliguria
- Black tarry stools / hematemesis → possible active bleed
- Jaundice or ↑ LFTs > 3× upper limit of normal

🚫 CONTRAINDICATIONS / CAUTION

- Hypersensitivity to H₂ blockers
- Severe renal impairment (reduce dose — usually by 50%)
- Hepatic impairment (especially cimetidine)
- Pregnancy Category B — use only if clearly needed
- Elderly — ↑ risk of delirium/confusion

💊 KEY DRUG INTERACTIONS (especially CIMETIDINE)

- Warfarin → ↑ bleeding risk (↑ INR)
- Phenytoin → phenytoin toxicity
- Theophylline → theophylline toxicity
- Lidocaine, metoprolol, propranolol → ↑ levels
- Antacids → ↓ absorption of H₂ blocker (SEPARATE by 1–2 hrs)
- Ketoconazole, itraconazole, atazanavir → ↓ absorption (need acid)
- Alcohol → ↑ serum ethanol levels (cimetidine)

6. LABS & DIAGNOSTICS

🔬 LABS TO MONITOR

- **CBC:** CBC with platelets — watch for thrombocytopenia/leukopenia
- **Renal function:** BUN 7–20 mg/dL; Creatinine 0.6–1.2 mg/dL — renal dosing required
- **LFTs:** AST/ALT — hepatotoxicity screen (long-term)
- **Critical platelet:** Platelets 150,000–400,000/mm³ — HOLD if < 100,000 or dropping rapidly
- **H&H:** Hemoglobin 12–17 g/dL; Hematocrit 36–51% — trend for GI bleed
- **B₁₂:** Vitamin B₁₂ 200–900 pg/mL — check with long-term use
- **Mg:** Magnesium 1.5–2.5 mEq/L — hypomagnesemia possible

🔬 DIAGNOSTICS

- Upper endoscopy (EGD) — confirm ulcer healing, rule out malignancy
- H. pylori testing (urea breath test, stool antigen) — treat if positive
- Gastric pH monitoring — goal > 4 for ulcer healing

7. ADMINISTRATION & SAFETY

💊 ROUTE + TIMING

- PO, IV push, IV intermittent infusion, IM
- Best time: at BEDTIME (controls nocturnal acid surge) OR 30 min before meals
- With or without food — food does not significantly affect absorption
- Separate from antacids by 1–2 hours (antacids ↓ H₂ blocker absorption)

⚠️ HIGH-ALERT IV PRECAUTIONS

- IV push: administer SLOWLY over AT LEAST 2 minutes (famotidine)
- Rapid IV push → bradycardia, hypotension, cardiac arrhythmias
- Prefer intermittent IV infusion over 15–30 min when possible
- Check compatibility — do not mix with incompatible IV solutions



DOSE ADJUSTMENTS

- Renal impairment (CrCl < 50): reduce dose by ~50% or extend interval
- Hepatic impairment: reduce cimetidine dose; famotidine preferred
- Elderly: start low, go slow — higher confusion risk



SAFETY PEARLS

- Not a PRN rescue drug — onset ~1 hour (antacids for immediate relief)
- Tolerance can develop after 2 weeks of daily use
- Do NOT stop abruptly if on chronic therapy → rebound acid hypersecretion



8. PATIENT EDUCATION



MUST-TEACH POINTS

- Take exactly as prescribed — even when feeling better
- Take at BEDTIME for best overnight acid control
- Full effect may take several days — not immediate like antacids
- If using an antacid for breakthrough, SPACE 1–2 hours apart
- AVOID: alcohol, smoking, NSAIDs, aspirin, caffeine, spicy/fatty foods
- Smoking delays ulcer healing — biggest modifiable risk factor
- Report: confusion, mood changes, easy bruising, unusual bleeding
- Long-term use may require B₁₂ supplementation — ask provider



SEEK HELP IMMEDIATELY IF:

- Black tarry stools (melena) or bright red blood in stool
- Vomiting blood or coffee-ground-looking emesis
- Severe abdominal pain, fainting, dizziness
- Yellow skin/eyes (jaundice), dark urine
- Signs of infection — fever, sore throat (agranulocytosis)
- Persistent symptoms > 2 weeks despite therapy — rule out cancer



9. NCLEX TEST TRAPS

CLASSIC NCLEX TRAPS

- ❌ "-TIDINE" = H₂ blocker; "-PRAZOLE" = PPI — don't mix them up!
- ⌚ H₂ blocker ≠ immediate relief — if patient wants FAST relief, give an ANTACID
- 🚫 RANITIDINE (Zantac) was WITHDRAWN in 2020 (NDMA contamination) — never pick it as a current med
- ⌚ Antacids + H₂ blocker at SAME time = wrong — must separate by 1–2 hrs
- 🧠 Confusion in elderly is THE HALLMARK adverse effect — not "normal aging"
- 🩸 Cimetidine + warfarin = BLEEDING risk (classic priority question)
- li>• ♂ Gynecomastia is cimetidine, NOT famotidine
- 📌 Rapid IV push = bradycardia & hypotension — always give SLOWLY
- 🚑 GI bleed symptoms = PRIORITY assessment (ABCs/circulation)
- 🔄 Don't stop abruptly → rebound hyperacidity
- 💊 H₂ blockers ↓ absorption of drugs needing acid (ketoconazole, atazanavir)
- 📉 Long-term use → B₁₂ deficiency, fractures, C. diff risk

10. MEMORY BOOSTERS

MNEMONICS

"The 4 C's of CIMETIDINE" (why it's the 'bad boy' H₂ blocker):

- Confusion (elderly)
- CYP450 inhibition (drug interactions)
- Cardiac effects (bradycardia with IV)
- Cosmetic — gynecomastia, impotence

"TIDINE = TIDE the acid away"

- Famo-TIDINE, Cime-TIDINE, Nizati-TIDINE → all block H₂

"H-A-P-P-Y stomach"

- H — Heartburn relief
- A — Acid reduction
- P — Peptic ulcer healing
- P — Prophylaxis for stress ulcers
- Y — Yields higher gastric pH

"BEST at BEDtime"

- H₂ blockers suppress nocturnal acid surge best — dose at bedtime

CLASS PATTERN — know the 3 big GI acid drug classes:

- Antacids (-aluminum/magnesium/calcium): neutralize acid — FASTEST, shortest
- H₂ blockers (-tidine): ↓ acid production — MODERATE speed, 6–12 hrs
- PPIs (-prazole): irreversibly block proton pump — STRONGEST, 24+ hrs

MOST-TESTED DRUGS IN THIS CLASS

Generic (Brand)	Key Pearl	Watch Out For	NCLEX Status
Famotidine (Pepcid)	PREFERRED — fewest interactions, safest profile	Headache, rare confusion in renal impairment	★ Most commonly tested current H ₂ blocker
Cimetidine (Tagamet)	Oldest; weakest acid suppression; many interactions	Gynecomastia, impotence, CYP450 inhibition, confusion	⚠ High-yield for side effects & interaction questions
Nizatidine (Axid)	Similar to famotidine; 100% oral bioavailability	Headache, dizziness; rare hepatotoxicity	Less tested; know it exists
Ranitidine (Zantac)	WITHDRAWN from U.S. market April 2020	NDMA (probable carcinogen) contamination	🚫 Do NOT select as current med on NCLEX

CLINICAL JUDGMENT SNAPSHOT

CLINICAL JUDGMENT SNAPSHOT (NCJMM)

? What is the #1 priority risk with H₂ antagonists?

- GI bleeding (from underlying ulcer/GERD) — ALWAYS assess for melena, hematemesis, ↓ H&H, hemodynamic instability first.
- In elderly or renal impairment: acute confusion/delirium is a life-safety concern (falls, aspiration).

? What will harm the patient FIRST?

- RAPID IV PUSH → bradycardia, hypotension, cardiac arrhythmia within minutes.
- Missed GI bleed → hypovolemic shock.
- Drug interaction with warfarin/phenytoin (cimetidine) → toxicity or hemorrhage.

? What is the FIRST nursing action in a priority scenario?

- GI bleed suspected → ASSESS ABCs, VS, H&H; establish large-bore IV access; notify provider.
- Post-IV bradycardia/hypotension → STOP the infusion, place patient supine, assess VS, notify provider.
- New confusion in elderly on cimetidine → HOLD the drug, assess neuro status, safety/fall precautions, notify provider, request switch to famotidine.
- Coffee-ground emesis → NPO, suction setup, IV access, type & crossmatch, notify provider STAT.

🔑 **REMEMBER: Assess → Recognize cues → Prioritize → Act → Evaluate**

— End of NCLEX-RN Pharmacology Infographic —
 2026 NCLEX-RN Test Plan • NGN + NCJMM aligned