LEUKOTRIENE RECEPTOR ANTAGONISTS (LTRAs)

Montelukast (Singulair) • Zafirlukast (Accolate) • Zileuton (Zyflo)

Class: Leukotriene Modifiers | System: Respiratory / Pulmonary

NGN NCLEX-RN 2026 Test Plan • Clinical Judgment Focus

1. DRUG OVERVIEW

WHY WE GIVE IT — Key Indications:

- Long-term MAINTENANCE & prophylaxis of chronic asthma (NOT for acute attacks)
- Exercise-induced bronchoconstriction (EIB)
- Seasonal & perennial allergic rhinitis
- Aspirin/NSAID-exacerbated respiratory disease (AERD)
- Add-on therapy when inhaled corticosteroids (ICS) alone aren't enough

HIGH-YIELD CLINICAL USE:

- Alternative for patients who can't/won't use inhalers (children, elderly)
- Particularly helpful for nighttime asthma symptoms
- Step-up therapy in GINA/NAEPP asthma guidelines

2. MECHANISM OF ACTION (SIMPLIFIED)

Normally in asthma/allergy:

- Arachidonic acid → 5-lipoxygenase → Leukotrienes (LTC4, LTD4, LTE4)
- Leukotrienes bind CysLT1 receptors → bronchoconstriction + mucus + inflammation + eosinophils

LTRAs BLOCK the cascade:

- **Montelukast / Zafirlukast →** BLOCK CysLT1 receptors → ↓ bronchoconstriction, ↓ mucus, ↓ inflammation
- **Zileuton →** inhibits 5-LIPOXYGENASE enzyme → ↓ leukotriene SYNTHESIS (different target)

RESULT → Open airways + less inflammation + easier breathing

3. THERAPEUTIC EFFECTS

What tells you it's WORKING:

- ↓ Frequency & severity of asthma attacks
- ↑ FEV1 (improved lung function on pulmonary function tests)
- ↓ Use of rescue inhaler (SABA/albuterol)
- Fewer nighttime awakenings from asthma

- ↓ Allergic rhinitis symptoms (sneezing, congestion, itching)
- Improved exercise tolerance (for EIB)
- ↓ Peak flow variability; improved daily peak flow readings

🟧 4. SIDE EFFECTS & ADVERSE REACTIONS

COMMON (usually mild):

- Headache (most common)
- GI upset, abdominal pain, nausea
- Cough, upper respiratory infection symptoms
- Dizziness, fatigue

🚨 SERIOUS / LIFE-THREATENING:

- **BLACK BOX WARNING (montelukast) → NEUROPSYCHIATRIC EFFECTS:** depression, suicidal ideation, agitation, hallucinations, vivid/abnormal dreams, sleep disturbances, aggression
- **HEPATOTOXICITY →** especially zafirlukast & zileuton (jaundice, ↑ AST/ALT, RUQ pain)
- **Churg-Strauss Syndrome →** eosinophilic vasculitis → rash, worsening pulmonary symptoms, cardiac/neurologic signs
- Anaphylaxis (rare)
- Eosinophilia
- Zafirlukast: ↑ bleeding risk when combined with warfarin

🟪 5. PRIORITY NURSING CONSIDERATIONS

→ ASSESS / MONITOR:

- Mental status & mood — screen for depression, suicidal ideation (EVERY visit)
- Respiratory status: lung sounds, RR, SpO2, peak flow, use of rescue inhaler
- LFTs (AST, ALT, bilirubin) — especially zafirlukast and zileuton
- Signs of Churg-Strauss: new rash, worsening asthma, numbness/tingling, cardiac symptoms

→ HOLD / NOTIFY PROVIDER:

- ALT > 3× upper limit of normal → HOLD drug + notify provider
- New or worsening mood changes, suicidal thoughts, aggression → HOLD + notify immediately
- Signs of hepatotoxicity: jaundice, dark urine, RUQ pain, anorexia

CONTRAINDICATIONS / CAUTIONS:

- Hypersensitivity to the drug
- Severe hepatic impairment (especially zafirlukast, zileuton)
- Active liver disease → zileuton CONTRAINDICATED
- Phenylketonuria (PKU) → chewable montelukast contains phenylalanine
- History of psychiatric disorders — use caution with montelukast

KEY DRUG INTERACTIONS:

- Zafirlukast + warfarin → ↑ INR, bleeding risk (monitor INR closely)
- Zafirlukast + theophylline → ↑ theophylline levels (toxicity risk)
- Phenobarbital, rifampin → ↓ montelukast levels (enzyme inducers)
- Zileuton + propranolol → ↑ propranolol effect (bradycardia, hypotension)

6. LABS & DIAGNOSTICS

KEY LABS TO MONITOR:

- AST & ALT — baseline, monthly × 3 months, then periodically (zafirlukast, zileuton)
- Bilirubin — if hepatotoxicity suspected
- Eosinophil count / CBC — elevated eosinophils may precede Churg-Strauss
- INR — if patient on warfarin + zafirlukast
- Theophylline level — if on concurrent theophylline

CRITICAL VALUES → ACTION:

- ALT > 3× ULN = HOLD drug, notify provider
- ALT > 5× ULN = DISCONTINUE drug
- Rising eosinophil count + new rash/worsening symptoms = possible Churg-Strauss

DIAGNOSTIC MONITORING:

- Peak flow measurements — daily for asthma control
- Pulmonary function tests (PFTs) — baseline and periodic (FEV1 tracking)
- Asthma Control Test (ACT) score

7. ADMINISTRATION & SAFETY

ROUTE & TIMING:

- **Montelukast:** PO once daily in the EVENING (nighttime asthma peaks)
- **Zafirlukast:** PO twice daily on EMPTY STOMACH — 1 hour before OR 2 hours after meals (food ↓ bioavailability 40%)
- **Zileuton:** PO four times daily with meals and at bedtime (poor compliance warning)

SPECIAL INSTRUCTIONS:

- Exercise-induced: Montelukast taken at least 2 hours BEFORE exercise
- Do NOT take an additional dose within 24 hours (even before exercise)
- Available forms: tablets, chewable tablets (contain phenylalanine → PKU warning), oral granules for young children
- Granules: sprinkle on soft food (applesauce) — use within 15 minutes; do NOT mix in liquid

HIGH-ALERT SAFETY PRECAUTIONS:

- This is NOT a RESCUE medication — never substitute for albuterol in an acute attack
- Continue inhaled corticosteroids and SABA as prescribed — LTRA does NOT replace them
- Black box warning (montelukast): document mental-health screening at every encounter

🟦 8. PATIENT EDUCATION

MUST-KNOW TEACHING:

- 'This medicine PREVENTS attacks — it does NOT stop one that's happening.' Always keep rescue inhaler (albuterol) with you.
- Take EVERY DAY — even when feeling well; benefits take days to weeks
- Montelukast → take in the EVENING; zafirlukast → empty stomach
- Don't stop abruptly — asthma symptoms can worsen

🚨 CALL PROVIDER / 911 FOR:

- Any thoughts of self-harm, depression, anxiety, unusual behavior, vivid nightmares, agitation (patient AND family should watch)
- Yellow skin/eyes, dark urine, pale stools, severe fatigue, right upper abdominal pain (liver)
- Worsening breathing, needing rescue inhaler more than usual
- New rash, numbness/tingling, flu-like symptoms (possible Churg-Strauss)

SAFETY TEACHING:

- PKU patients/parents: avoid CHEWABLE montelukast (contains phenylalanine from aspartame)
- Continue avoiding allergens and triggers (smoke, dust, pet dander)
- Keep all provider appointments for LFT monitoring (zafirlukast/zileuton)
- Report all OTC meds, herbals, supplements (interaction risk)

🟨 9. NCLEX TEST TRAPS

⚠️ CLASSIC NCLEX TRAPS:

- **TRAP #1:** *'Patient in acute asthma attack — nurse gives montelukast.'* WRONG → Give SABA (albuterol) FIRST. LTRAs are NEVER for acute attacks.
- **TRAP #2:** *Confusing LTRAs with inhalers.* LTRAs are ORAL tablets/granules — not inhaled.
- **TRAP #3:** *'Patient says, I feel better, so I'll stop.'* WRONG answer — Teach: take DAILY even when asymptomatic.
- **TRAP #4:** *'Take montelukast in the morning.'* WRONG → Evening dosing because nocturnal asthma peaks overnight.
- **TRAP #5:** *Missing the BLACK BOX neuropsychiatric warning.* Mood changes = priority report — NOT a normal side effect to dismiss.
- **TRAP #6:** *Child with PKU + chewable montelukast.* Contains PHENYLALANINE — contraindicated.
- **TRAP #7:** *Zafirlukast + WITH food.* WRONG → Take on empty stomach (food ↓ absorption 40%).
- **TRAP #8:** *LTRA = first-line for asthma?* NO → Inhaled corticosteroids (ICS) are first-line. LTRAs are add-on/alternative.

- **PRIORITY vs NON-PRIORITY:** Suicidal ideation > hepatotoxicity > headache. Always pick AIRWAY + neuropsychiatric safety first.

🟩 10. MEMORY BOOSTERS

🧠 MNEMONICS:

- **'-LUKAST' ending =** LEUKotriene receptor blocker (montelukast, zafirlukast)
- **'-LUTON' ending =** 5-LipOxygenase inhibitor (ziLEUTON)
- **'Montelukast at Moonlight' =** evening dosing
- **'SINGULAIR = SINGLE dose daily' =** once-a-day convenience
- **'MOOD watch with MONTELUKAST' =** depression/suicide black box

🧠 QUICK-RECALL PATTERNS:

- Asthma 'controller' = daily use (LTRA, ICS, LABA) — prevents attacks
- Asthma 'rescue' = PRN (SABA like albuterol) — stops attacks
- LTRAs are the ONLY ORAL asthma controller (other controllers are inhaled)
- Any drug ending in '-lukast' or '-luton' → think ASTHMA + LIVER check + MOOD check

🧠 THE 'LUKAST' CHECKLIST:

- L - Liver labs (LFTs)
- U - Use daily (prophylaxis, not rescue)
- K - Keep albuterol nearby
- A - Adverse mood/mental effects — REPORT
- S - Single evening dose (montelukast)
- T - Teach: not for acute attacks

💊 MOST-TESTED DRUGS IN THIS CLASS — KEY DIFFERENCES

Drug (Brand)	Dose	Frequency	Unique Feature	Top NCLEX Point
Montelukast (Singulair)	10 mg PO (adult)	Once daily — EVENING	Most prescribed; chewable & granule forms for kids	BLACK BOX: neuropsychiatric effects + suicidal ideation
Zafirlukast (Accolate)	20 mg PO	BID — EMPTY stomach	Strong warfarin interaction (↑ INR)	Food ↓ absorption 40%; monitor LFTs & INR
Zileuton (Zyflo)	600 mg PO	QID (poor compliance)	5-LOX inhibitor (different MOA)	CONTRAINDICATED in active liver disease; monitor ALT closely

🧠 FINAL. CLINICAL JUDGMENT SNAPSHOT

🎯 #1 PRIORITY RISK WITH THIS DRUG:

NEUROPSYCHIATRIC EFFECTS → suicidal ideation / depression (BLACK BOX warning, montelukast). Any mood/behavior change = immediate priority concern.

💀 WHAT WILL HARM THE PATIENT FIRST:

Using the LTRA as a RESCUE drug during an acute asthma attack. Onset is too slow — the patient could decompensate into status asthmaticus and respiratory failure.

⚡ FIRST NURSING ACTION (scenario-based):

- **Acute asthma attack →** Administer SABA (albuterol) FIRST. Then assess, position upright, give O2, notify provider.
- **Patient reports suicidal thoughts/mood change →** STAY with patient, ensure safety, notify provider IMMEDIATELY, document, plan for mental-health evaluation, hold drug as ordered.
- **ALT > 3× ULN or jaundice →** HOLD drug, notify provider, reassess LFTs.
- **New rash + worsening respiratory + eosinophilia →** Suspect Churg-Strauss → notify provider, monitor cardiac/neuro status.