💊 FLUOROQUINOLONE ANTIBIOTICS 💊

Generic examples: Ciprofloxacin • Levofloxacin • Moxifloxacin

Brand names: Cipro® • Levaquin® • Avelox®

CLASS: Broad-Spectrum Antibiotic | **SYSTEM:** Anti-Infective (multi-system effects)

⚠️ **MULTIPLE FDA BLACK BOX WARNINGS** ⚠️

1. DRUG OVERVIEW

KEY INDICATIONS — WHY we give it:

- Complicated UTIs & pyelonephritis (ciprofloxacin)
- Community-acquired pneumonia / COPD exacerbations (levofloxacin, moxifloxacin)
- Bacterial sinusitis & bronchitis (reserved — black box warning)
- GI infections → traveler's diarrhea, intra-abdominal infections
- Anthrax post-exposure prophylaxis (ciprofloxacin — first-line)
- Bone & joint infections, prostatitis, skin/soft tissue infections

HIGH-YIELD CLINICAL USE:

- Broad-spectrum: gram-negative coverage + some gram-positive & atypicals
- RESERVED for serious infections when safer alternatives fail — NOT first-line for uncomplicated infections due to black box warnings

2. MECHANISM OF ACTION

Fluoroquinolones are BACTERICIDAL — they KILL bacteria.

- Inhibit bacterial DNA gyrase (topoisomerase II) → blocks DNA supercoiling
- Inhibit topoisomerase IV → blocks DNA replication & cell division
- ↓ Bacterial DNA synthesis → bacterial cell death

🧬 *Drug → enters bacterial cell → binds DNA gyrase/topo IV → DNA can't uncoil → replication fails → bacteria dies*

3. THERAPEUTIC EFFECTS

What tells you it's WORKING:

- ↓ Fever (afebrile within 48–72 hours)
- ↓ WBC count trending toward normal
- ↓ CRP / procalcitonin
- Negative follow-up cultures
- Resolution of infection-specific signs (cough, dysuria, purulent drainage)
- Improved energy, appetite, and overall clinical appearance

4. SIDE EFFECTS & ADVERSE REACTIONS

COMMON (expected — monitor):

- Nausea, vomiting, diarrhea
- Headache, dizziness, insomnia
- Photosensitivity → severe sunburn with UV exposure
- Mild rash

SERIOUS / BLACK BOX — STOP drug & notify:

- **TENDON RUPTURE (Achilles most common)** — risk ↑ in >60 y/o, corticosteroid use, organ transplant recipients
- **Peripheral neuropathy** (numbness, tingling, burning) — may be **PERMANENT**
- **CNS effects:** seizures, hallucinations, psychosis, confusion, ↑ ICP
- **QT prolongation → Torsades de Pointes** (moxifloxacin = highest risk)
- **Aortic aneurysm / dissection** — avoid in elderly with hx or risk factors
- **C. difficile–associated diarrhea / pseudomembranous colitis**
- **Hypoglycemia / hyperglycemia** (especially diabetics on sulfonylureas/insulin)
- **Worsening of myasthenia gravis** → respiratory failure
- **Hepatotoxicity** — ↑ LFTs, jaundice

5. PRIORITY NURSING CONSIDERATIONS

MONITOR:

- Vital signs (BP, HR, temp, RR, SpO_2)
- ECG → QT interval (especially with moxifloxacin)
- Blood glucose — fingersticks for diabetic patients
- Renal function (BUN/Cr) — dose adjust in CKD
- LFTs — baseline & during therapy
- Signs of tendon pain/swelling, neuropathy, mood changes
- Stool pattern → watch for C. diff (foul-smelling, watery, frequent)

HOLD the drug & NOTIFY provider if:

- New tendon pain, swelling, or inflammation (ANY joint)
- Numbness / tingling / burning in extremities
- Palpitations, syncope, or QTc >500 ms
- Severe watery diarrhea (possible C. diff)
- New rash, hives, facial swelling (anaphylaxis)
- Hypoglycemia symptoms or altered mental status

CONTRAINDICATIONS:

- Myasthenia gravis (can precipitate respiratory failure)
- History of tendon disorders with quinolone use
- Prolonged QT interval / concurrent QT-prolonging drugs
- Pregnancy (Category C) & lactation — cartilage damage concern
- Children <18 (use only when benefits outweigh risks)

KEY DRUG INTERACTIONS:

- **Antacids, iron, calcium, zinc, magnesium, dairy, sucralfate** → chelation ↓ absorption (give FQ 2 hr BEFORE or 6 hr AFTER)
- **Warfarin** → ↑ INR / bleeding risk
- **NSAIDs** → ↑ CNS stimulation / seizure risk
- **Theophylline** → theophylline toxicity (↑ level, seizures, arrhythmias)
- **Corticosteroids** → ↑ tendon rupture risk
- **Class IA/III antiarrhythmics, macrolides, TCAs, antipsychotics** → ↑ QT prolongation
- **Sulfonylureas / insulin** → dysglycemia (hypo- or hyper-)

6. LABS & DIAGNOSTICS

BASELINE & ONGOING LABS:

- **Cultures** → obtain BEFORE first dose (blood, urine, sputum, wound)
- **BUN / Creatinine / eGFR** → dose adjust if CrCl <50 mL/min
- **LFTs (AST, ALT, alk phos, bilirubin)** → monitor for hepatotoxicity
- **CBC with differential** → WBC trends show therapeutic response
- **Blood glucose** → especially diabetics
- **ECG / QTc** → baseline + during therapy if QT-prolonging drugs or cardiac risk
- **Serum electrolytes** → K^+ and Mg^{2+} must be normal (↓ levels ↑ Torsades risk)

CRITICAL VALUES — ACT FAST:

- QTc > 500 ms → HOLD drug, notify provider STAT
- Blood glucose <70 or >250 mg/dL → treat & reassess regimen
- AST/ALT >3× upper limit of normal → hepatotoxicity
- K^+ <3.5 or Mg^{2+} <1.5 → correct before continuing

7. ADMINISTRATION & SAFETY

ROUTE & TIMING:

- PO or IV (switch to PO when clinically stable — high oral bioavailability)
- Take PO with a FULL glass of water (hydration = ↓ crystalluria)
- IV: infuse over 60 minutes — NEVER rapid push (hypotension, cardiac risk)
- Maintain fluid intake of 1.5–2 L/day

TIMING AROUND OTHER DRUGS/FOOD:

- Give fluoroquinolone 2 hr BEFORE or 6 hr AFTER antacids, iron, calcium, zinc, magnesium, sucralfate, and dairy products
- Avoid enteral feeds within 1–2 hr of dose (cation content chelates drug)

SPECIAL SAFETY INSTRUCTIONS:

- Complete the FULL course even if feeling better (prevents resistance)
- Avoid direct sun / tanning beds — use broad-spectrum SPF 30+ and protective clothing
- Avoid strenuous exercise early in therapy (tendon stress)
- Caution with driving/machinery until response known (dizziness, CNS effects)
- Refrigerate PO suspensions per label; do not freeze

HIGH-ALERT: Reserved-use antibiotic per FDA — weigh benefit vs. risk, document indication, and discontinue immediately at first sign of serious adverse reaction.

8. PATIENT EDUCATION

PATIENT MUST KNOW:

- Take exactly as prescribed; finish entire course
- Drink plenty of water throughout the day
- Separate from dairy, antacids, vitamins/minerals (iron, calcium, zinc, Mg) by 2 hr before or 6 hr after
- Use sunscreen SPF 30+, hat, sunglasses — even on cloudy days
- Avoid excessive caffeine (drug may ↑ caffeine levels → jitters, insomnia)
- Diabetics: check blood glucose more frequently; carry fast-acting carbs

SEEK HELP IMMEDIATELY IF:

- **Sudden pain, swelling, or 'pop' in a tendon** (Achilles, shoulder, wrist) — STOP the drug and rest the joint
- **Numbness, tingling, burning pain** in hands, feet, arms, or legs
- **Palpitations, fainting, chest pain** (possible QT prolongation/Torsades)
- **Severe, watery, or bloody diarrhea** (possible C. diff — do NOT take antidiarrheals)
- **Sudden severe abdominal, chest, or back pain** (possible aortic dissection)

- **Mood changes, confusion, hallucinations, or suicidal thoughts**
- **Yellowing of skin/eyes, dark urine** (hepatotoxicity)

9. NCLEX TEST TRAPS ⚠️

⚠️ COMMON NCLEX MISTAKES:

- **Trap:** Student picks 'take with milk to prevent GI upset' — WRONG (dairy chelates the drug)
- **Trap:** Student dismisses heel pain as 'normal soreness' — tendon rupture is the priority concern
- **Trap:** Tendon rupture can occur DURING therapy or up to MONTHS after discontinuation
- **Trap:** Photosensitivity is NOT a minor issue — can cause severe burns/blistering
- **Trap:** Giving fluoroquinolone concurrently with tube feeds → decreased efficacy (hold feeds)
- **Trap:** Administering to a patient with myasthenia gravis — can cause respiratory failure
- **Trap:** Ignoring NSAIDs on MAR — combo ↑ seizure risk

🎯 PRIORITY vs NON-PRIORITY:

- **PRIORITY:** chest pain/palpitations, sudden Achilles pain, watery diarrhea, altered mental status
- **NON-PRIORITY:** mild nausea, mild headache, transient rash (still report, but not FIRST action)

🔀 DRUG CONFUSION ALERTS:

- '-floxacin' suffix = fluoroquinolone (cipro-, levo-, moxi-, gemi-, oflox-)
- Do NOT confuse ciprofloxacin (oral/IV antibiotic) with ciclosporin (immunosuppressant) — name similarity
- Levofloxacin (Levaquin) ≠ Lovenox (enoxaparin) — different drug classes

10. MEMORY BOOSTERS

🧠 KEY MNEMONIC — 'FLOXIN' side effects:

- **F —** Floppy tendons (rupture)
- **L —** Light sensitivity (photosensitivity)
- **O —** Older adults at higher risk (>60)
- **X —** QT prolongation (think 'eXtended QT')
- **I —** Infection — broad spectrum coverage
- **N —** Neuropathy (peripheral, often permanent)

🥛 DRUGS/FOODS THAT CHELATE FQs — 'DAMN AIMS':

- Dairy • Antacids • Minerals (multivitamins) • No-concurrent-meds • Aluminum • Iron • Magnesium • Sucralfate/Zinc/Calcium

🩹 QUICK RECALL PATTERNS:

- Suffix rule: '-floxacin' = fluoroquinolone class
- 'Cipro for Sip-row' — think UTIs and anthrax (urinary/respiratory)
- 'Levo for Lungs' — levofloxacin = respiratory tract infections
- 'Moxi for Max QT' — moxifloxacin has the highest QT-prolonging risk
- Rule of 2 & 6: give FQ 2 hr BEFORE or 6 hr AFTER cations
- Quinolones 'pop' tendons — picture an Achilles snapping when you hear '-floxacin'

🚨 ★. CLINICAL JUDGMENT SNAPSHOT

🧠 CLINICAL JUDGMENT SNAPSHOT — NCJMM RAPID RECALL

❓ What is the #1 priority RISK with this drug?

- **Tendon rupture (Achilles) AND QT prolongation → Torsades de Pointes** — both are potentially life- or limb-altering and occur without warning.

❓ What will harm the patient FIRST?

- **Cardiac:** QTc prolongation → Torsades → cardiac arrest (can occur within hours in high-risk patients).
- **Musculoskeletal:** Acute Achilles rupture, often within the first 2 weeks (especially >60 y/o + steroids).
- **Anaphylaxis** with first dose (rare but rapid).

❓ What is the FIRST nursing action?

- **1) STOP / HOLD the drug** at the first sign of tendon pain, QTc >500, neuropathy, severe diarrhea, or mental status change.
- **2) ASSESS** ABCs, vital signs, ECG, pain, neurovascular status of affected tendon.
- **3) NOTIFY provider** for alternative antibiotic and further workup.
- **4) DOCUMENT** as adverse drug reaction; educate patient to avoid fluoroquinolones lifelong.

💊 +. MOST TESTED DRUGS IN THIS CLASS

Most tested fluoroquinolones on the NCLEX — know indications, key features, and watch-fors.

DRUG	PRIMARY USE	KEY FEATURE	WATCH FOR
Ciprofloxacin (Cipro®)	UTIs, prostatitis, GI infections, anthrax prophylaxis	Excellent gram-negative & Pseudomonas coverage; renal dose adjust	↑ theophylline, warfarin, caffeine; crystalluria if dehydrated
Levofloxacin (Levaquin®)	Community-acquired pneumonia, complicated UTI, sinusitis	'Respiratory' FQ — covers S. pneumoniae & atypicals; once-daily dosing	QT prolongation, dysglycemia (esp. diabetics on sulfonylureas)
Moxifloxacin (Avelox®)	CAP, acute bacterial sinusitis, intra-abdominal infections	Best anaerobic + respiratory coverage; NO renal dose adjustment	HIGHEST QT prolongation risk; hepatotoxicity; NOT for UTI (low urine levels)
Ofloxacin (Floxin®)	Otic/ophthalmic drops; pelvic inflammatory disease	Often used topically (ear/eye) — ↓ systemic exposure	Systemic use = same FQ class warnings; rarely first-line PO
Gemifloxacin (Factive®)	CAP, acute bacterial exacerbation of chronic bronchitis	Respiratory FQ; 5–7 day course	Rash (esp. in women <40 on extended courses); QT prolongation

✅ **Quick-review infographic • NCLEX-RN 2026 Test Plan aligned**

For educational review only — always follow current clinical protocols.