

Aminopenicillin Mechanisms

Aminopenicillins are antibiotics that belong to the penicillin family. Like penicillins, aminopenicillins are beta-lactam antibiotics, which work by inhibiting bacterial cell wall synthesis. They are classified as bactericidal agents. Aminopenicillins have a broader spectrum of activity than penicillin and are not degraded by acid hydrolysis and can therefore be administered orally. Aminopenicillins are susceptible to beta-lactamase, which is why they are often given with beta-lactamase inhibitors like clavulanic acid. Aminopenicillins are used to treat most gram-positive infections and some gram-negative infections such as *Escherichia coli* and *Haemophilus influenzae*. Common aminopenicillins include ampicillin and amoxicillin. Adverse reactions include hypersensitivity reactions, ampicillin rash when given to patients with infectious mononucleosis, and pseudomembranous colitis.



PLAY PICMONIC

Indications

Broader Spectrum

[Broad Spectrum of Colors](#)

Aminopenicillins have a wider spectrum of coverage than penicillins because they can cover some gram-negative bacteria, like *Escherichia coli* and *Haemophilus influenzae*.

Drug Names

Ampicillin

[Amp-pencil](#)

Ampicillin is a beta-lactam antibiotic in the aminopenicillin family. It can be used against gram-positive organisms and limited gram-negative bacteria. It can sometimes cause a rash if accidentally used for patients with mononucleosis.

Amoxicillin

[Armor-ox-pencil](#)

Amoxicillin is a popular oral beta-lactam antibiotic used for infections such as otitis media, skin infections, and strep throat. It is susceptible to degradation by beta-lactamase-producing bacteria and is, therefore, often combined with beta-lactamase inhibitors like clavulanic acid.

Mechanism and Characteristics

Beta-Lactamase Sensitive

[Black-beta-fish-ace Crying](#)

Beta-lactamase is an enzyme produced by some bacteria to cleave beta-lactam antibiotics, rendering them ineffective. When an antibiotic is described as beta-lactamase-sensitive, it means it is likely ineffective against beta-lactamase-producing bacteria. Beta-lactamase inhibitors are commonly combined with penicillin-group antibiotics to overcome resistance to these enzymes. Commonly used beta-lactamase inhibitors include clavulanic acid, sulbactam, and tazobactam.

Combine with Clavulanic Acid

[Cleaver Acidic-lemon](#)

Clavulanic acid is a beta-lactamase inhibitor commonly combined with penicillin-group antibiotics to overcome resistance in bacteria that secrete beta-lactamase, which inactivates most penicillins. Clavulanic acid shares a similar beta-lactam ring structure and is known as a suicide inhibitor because it covalently binds to the active site of beta-lactamase, thereby inactivating it. Clavulanic acid is commonly combined with amoxicillin and marketed under the name Augmentin

Side Effects

Hypersensitivity Reactions

[Hiker-sensitive-crying](#)

Because penicillin and aminopenicillins are relatively similar in structure, individuals with hypersensitivity reactions to penicillins may also demonstrate a hypersensitivity or anaphylactic reaction to aminopenicillins. A hypersensitivity or anaphylactic reaction is an overreaction of the body's immune response. Symptoms may include rashes, hives, itchy eyes, and a swollen tongue or face.

Ampicillin Rash

[Amp-pencil Rash with Dermatologist](#)

Patients with infectious mononucleosis caused by the Epstein-Barr virus are sometimes misdiagnosed with streptococcal pharyngitis due to the similarity of symptoms and are given antibiotics like ampicillin. About 80-90% of patients with acute Epstein-Barr virus infection treated with ampicillin develop a diffuse red rash called ampicillin rash.

Pseudomembranous Colitis

[Sumo-man-bra Colon](#)

Ampicillin is associated with pseudomembranous colitis, an infection of the colon characterized by foul-smelling diarrhea, fever, and abdominal pain caused by *Clostridioides* (formerly known as *Clostridium*) *difficile* infection. Ampicillin is known to be an antibiotic that can precipitate pseudomembranous colitis due to a broad spectrum that can destroy normal gut flora, allowing the gut to be overrun with *C. difficile*.