

Penicillin Group	Examples	Spectrum of Activity	Resistance	Administration	Therapeutic Uses
<b>Narrow Spectrum (Natural) Penicillins</b>	Penicillin G, Penicillin V	Mostly gram-positive cocci; ineffective against most Staph. aureus strains	Hydrolyzed by penicillinase	IV, IM (Penicillin G), Oral (Penicillin V)	Streptococcal infections, Pneumococcal infections, Syphilis, Rheumatic fever prophylaxis
<b>Penicillinase Resistant Penicillins</b>	Methicillin, Nafcillin, Oxacillin, Cloxacillin, Dicloxacillin	Very narrow spectrum, active against penicillinase-producing Staph. aureus	Ineffective against bacilli and gram-negative organisms	Mostly IV	Treatment of penicillinase-producing Staph. aureus and Staph. epidermidis; Surgical prophylaxis
<b>Broad Spectrum Penicillins (Aminopenicillins)</b>	Ampicillin, Amoxicillin	Both gram-positive and gram-negative bacteria; often used with $\beta$ -lactamase inhibitors	Susceptible to destruction by penicillinase; $\beta$ -lactamase inhibitors can overcome resistance	Oral, IV (Ampicillin, Amoxicillin)	Upper respiratory tract infections, Meningitis, H. pylori eradication, Cellulitis
<b>Extended Spectrum Penicillins (Anti-pseudomonal)</b>	Carbenicillin, Mezlocillin, Piperacillin, Ticarcillin	Pseudomonas, Enterobacter, Proteus species; sensitive to $\beta$ -lactamases with some variations	Sensitive to destruction by $\beta$ -lactamases; often used with $\beta$ -lactamase inhibitors	Mostly IV	Pseudomonas infections, Urinary tract infections, Infections by gram-negative bacilli

<b>Adverse Reactions</b>	<b>Definition</b>	<b>Penicillin</b>	<b>Symptoms</b>
<b>Hypersensitivity Reactions</b>	- Allergic responses to penicillins, ranging from rashes to life-threatening anaphylactic shock	Penicillin G, amoxicillin	Maculopapular rash, urticarial rash, fever, angioedema, anaphylactic shock (0.05% incidence)
<b>Hematologic Reactions</b>	- Blood-related complications such as hemolytic anemia, eosinophilia, and DRESS syndrome	Penicillin G, amoxicillin	Hemolytic anemia, eosinophilia, rare but sometimes fatal DRESS syndrome
<b>Cross-Hypersensitivity</b>	- Allergic response to other $\beta$ -lactams like cephalosporins, carbapenems	Penicillin G, amoxicillin	Cross-hypersensitivity to other $\beta$ -lactams may occur, especially with cephalosporins and carbapenems
<b>Environmental Exposure</b>	- Reactions occurring without prior exposure, possibly from environmental sources like foods or organisms	Penicillin G, amoxicillin	Reactions may occur without known previous exposure; exposure in the environment (foods, organisms-producing penicillins) may contribute
<b>Desensitization</b>	- Process of reducing hypersensitivity through gradual exposure or skin testing	Penicillin G, amoxicillin	Desensitization can be accomplished with gradually increasing doses of penicillin; skin testing and history can help identify hypersensitivity
<b>Jarisch-Herxheimer Reaction (JHR)</b>	- Transient clinical phenomenon in spirochetal infections; fever, chills, and myalgia due to toxin release	Penicillin G	Fever, chills, rigors, nausea, vomiting, headache, tachycardia, hypotension, hyperventilation, flushing, exacerbation of skin lesions
<b>Acute Generalized Exanthematous Pustulosis (AGEP)</b>	- Severe pustular drug eruption, often triggered by beta-lactam antibiotics	Amoxicillin	Sterile superficial pustules; associated with L36RN gene mutations
<b>Other Adverse Effects</b>	- Various side effects, including pain at injection sites, gastrointestinal issues, and specific complications	Carbenicillin, Nafcillin, Oxacillin	Pain and inflammation at injection sites, nausea, vomiting, diarrhea, alterations in normal intestinal flora, hepatitis, and specific complications with certain penicillins