

# Antibiotics, The Basics

## Classification of Veterinary Antibiotics

Class	Examples of Compounds
Aminocyclitols	spectinomycin, apramycin
Aminoglycosides	gentamicin, neomycin
Beta-lactams	penicillin, amoxicillin, ceftiofur, cephapirin
Fluoroquinolones	enrofloxacin, danofloxacin
Lincosamides	lincomycin, clindamycin, pirlimycin
Macrolides	erythromycin, tilmicosin, tylosin, tulathromycin
Sulfonamides	sulfadimethoxine, combination sulfas, potentiated sulfas
Tetracyclines	chlortetracycline, oxytetracycline
Phenicol	florfenicol

- Florfenicol is the only compound in its class that is used exclusively in food animals.

## What These Antibiotics Do<sup>1</sup>

Action	Class	Compounds
Cripple production of the bacterial <b>cell wall</b> that protects the cell from the external environment	Beta-lactams	penicillin, amoxicillin, ceftiofur, cephapirin
Obstruct <b>metabolic processes</b> , such as the synthesis of folic acid, that bacteria need to thrive	Sulfonamides	sulfadimethoxine, combination sulfas, potentiated sulfas
Block <b>genetic replication</b> by interfering with synthesis of DNA	Fluoroquinolones	enrofloxacin, danofloxacin
Interfere with <b>protein synthesis</b> by binding to the machinery that builds proteins, one amino acid at a time	Aminocyclitols	spectinomycin, apramycin
	Aminoglycosides	gentamicin, neomycin
	Lincosamides	lincomycin, clindamycin, pirlimycin
	Macrolides	erythromycin, tilmicosin, tylosin, tulathromycin
	Tetracyclines	oxytetracycline, chlortetracycline
	Phenicol	florfenicol

## How the Antibiotic Classes Affect Bacteria

### Bacteriostatic

Aminocyclitols  
Lincosamides  
Macrolides  
Sulfonamides  
Tetracyclines  
Phenicol

### Bactericidal

Aminoglycosides  
Beta-lactams  
Fluoroquinolones  
Phenicol

- **Florfenicol has both bacteriostatic and bactericidal properties.**
- **The incidence of florfenicol-resistant organisms is low in target bovine pathogens.**

## Mechanism of Bacterial Resistance<sup>1</sup>

Class	Compounds	Mechanisms
Aminoglycosides	gentamicin, neomycin	Enzyme-induced Decrease cell wall uptake
Beta-lactams	penicillin, amoxicillin, ceftiofur, cephapirin	Enzyme-induced Altered cell wall binding site Gene resistance, plasmids Gene resistance, transposons Gene resistance, chromosomes
Fluoroquinolones	enrofloxacin, danofloxacin	Efflux pumps Altered DNA binding site Gene resistance, plasmids Gene resistance, chromosomes
Lincosamides	lincomycin, clindamycin, pirlimycin	Altered ribosome binding site Gene resistance, plasmids
Macrolides	erythromycin, tilmicosin, tylosin, tulathromycin	Efflux pumps Altered ribosome binding site Gene resistance, plasmids
Sulfonamides	sulfadimethoxine, combination sulfas, potentiated sulfas	Gene resistance, plasmids
Tetracyclines	oxytetracycline, chlortetracycline	Efflux pumps Gene resistance, plasmids
Phenicol	florfenicol	Enzyme-induced Efflux pumps

**Nuflor. Nothing matches it.**

