

Antibiotics in Mammalian Cell Culture

	Anti-microbial Spectrum ¹⁾	Mode of action ¹⁾	Solubility ^(2,3,4)	Conc. (µg/ml) ^(5, 6, 7)		Stability 37 °C (days) ^(5, 6)
				Recom.	Toxic	
Inhibitors of Cell Wall Synthesis:						
a) β-Lactams						
Ampicillin Trihydrate Carbenicillin, Na ₂ -Salt Penicillin G, K-Salt Ampicillin Sodium	G+, G- G+, G- G+ G+, G-	Inhibit the last step in cell wall synthesis, the crosslinking of different peptidoglycan strands	1p. in 150 p. H ₂ O; soluble in diluted acids and bases; insoluble in alcohols 1p. in 1,2 p. H ₂ O; 1P- in 25 p. 96 % ETOH > 20 mg/ml H ₂ O; > 20 mg/ml MEOH; 10 mg/ml ETOH 1p in 2 p H ₂ O	100 U 100 U 100 U 100 U	10,000	3 3 3 3
Inhibitors of Cell Membrane Function:						
a) Polyene Macrolides						
Amphotericin B Nystatin	F, Y, M F, Y	Form complex with cholesterol. Cause leakage of glucose. Only act on membranes containing cholesterol, hence having no effect on bacteria	2-4 mg/ml DMF; 30-40 mg/ml DMSO; soluble in H ₂ O with Na-deoxycholate freely soluble in DMF; slightly soluble in H ₂ O and MEOH	2,5 50	30 600	3 3
b) Peptides						
Polymyxin-B Sulfate	G-	Causes changes in membrane structure resulting in leakage of small molecules	> 20 mg/ml H ₂ O; 0,3 mg/ml MEOH; 0,1 mg/ml ETOH	50	3000	5
Inhibitors of Protein Synthesis						
a) Aminoglycosides						
Gentamycin Sulfate Kanamycin Sulfate Neomycin Sulfate Streptomycin Sulfate	G+, G-, My G+, G-, My G+, G- G+, G-	Bind to the 30S subunit of the bacterial 70S ribosome and block the initiation complex	Freely soluble in H ₂ O; insoluble in alcohol and acetone 1p. in 1p. H ₂ O; insoluble in alcohol and acetone 1p. in 3 p. H ₂ O; insoluble in acetone > 20 mg/ml H ₂ O; 0,85 mg/ml MEOH; 0,3 mg/ml ETOH	50 100 50 100	3000 10,000 3000 20,000	5 5 5 3
b) Tetracyclines						
7-Chlortetracycline-HCL Oxytetracycline-HCL (7-Hydroxy-Tetracycline) Tetracycline-HCL	G+, G- G+, G- G+, G-, My	Inhibit bacterial protein synthesis by preventing aminoacyl-RNA binding to the A-side of the 30S ribosomal subunit	8,6 mg/ml H ₂ O; 17,4 mg/ml MEOH; soluble in sol. of alkali hydroxide and carbonate; insoluble in acetone 6,9 mg/ml H ₂ O; 16,3 mg/ml MEOH; 11,9 mg/ml ETOH 10,9 mg/ml H ₂ O; > 20 mg/ml MEOH; 7,9 mg/ml ETOH	10 5 10	80 25 35	1 3 4
c) Macrolides						
Erythromycin Base Tylosin Tartrate	G+, My G+, My	Binds to the ribosomal 50S subunit and interferes with the peptidyl transferase activity	2,1 mg/ml H ₂ O; > 20 mg/ml MEOH; > 20 mg/ml ETOH 1p. in 10 p. H ₂ O; soluble in CHCl ₃ ; slightly soluble in alcohol	100 10	300 300	3 3
d) Others						
Chloramphenicol	G+, G-	Inhibits prokaryote but not eukaryote protein synthesis by preventing the peptidyl transferase reaction	4.4 mg/ml; H ₂ O; > 20 mg/ml in MeOH	5	30	5

G+ active against Gram-positive Bacteria; **G-** active against Gram-negative Bacteria;
F active against Fungi; **My** active against Mycoplasma; **Y** active against Yeast

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