

# Antibiotics for research

Natural antibiotics have existed for centuries prior to scientists identifying and isolating active moieties responsible for antibacterial activity. Today antibiotics are widely used in the Life Sciences not only to eliminate contamination, but also to identify bacterial mechanisms of resistance, protein modification and DNA/RNA manipulation to develop new antineoplastic compounds.

Antibiotics are frequently interchangeably called antibacterials, yet the term antibiotic today often includes antifungal and antineoplastic reagents. Antibacterials are generally divided into two major groups based on their biological mode of action on microorganisms: Bactericidal compounds actually kill bacteria, while bacteriostatic compounds inhibit or interfere with protein synthesis and cell wall biosynthesis. Additionally, antibacterial antibiotics may target certain specific types of bacteria, such as gram-positive or gram-negative organisms, while others are more broad-spectrum and attack a range of bacteria.

Specific antibacterials may inhibit the synthesis of cell walls, preventing further bacterial growth. Ampicillin and bacitracin are examples of antibiotics that inhibit enzymes associated with cell wall synthesis, preventing bacterial growth. Ciprofloxacin and Actinomycin D interfere with DNA and RNA synthesis respectively and are often studied as

antitumor compounds which can attack quickly growing malignant cells. Doxycycline, streptomycin and kanamycin are examples of antibiotics that inhibit protein synthesis by interfering with formation processes at the 30S or 50S subunits of the 70S bacterial ribosome. Finally, antibiotics like monensin and valinomycin act as ionophores and form cationic (Na<sup>+</sup>, K<sup>+</sup>, H<sup>+</sup>) channels in bacterial cell walls and membranes, which in turn detrimentally change the intracellular cationic environment of the bacterial cells, typically causing lysis and cell death.

Alfa Aesar, now part of Thermo Fisher Scientific, is pleased to present a sampling of our diverse antibiotic showcase. These antibiotics are widely used in both mammalian and plant cell culture, cancer research, as antineoplastic agents, and in proteomics research. Our extensive line of antibiotics includes more than 240 high purity compounds for all of your antibacterial research needs. For additional antibiotics not listed in this brochure, please visit our website, [www.alfa.com/en/antibiotics/](http://www.alfa.com/en/antibiotics/)

## Product application

The materials and products featured in this publication are for research use only. They are not intended for animal or human diagnostic or therapeutic use.

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# Antibiotics for research

## Antibiotics for mammalian cell culture

In Mammalian cell culture there are typically two types of contamination of concern: contamination of one cell line with another and the contamination of cultures with microbiological organisms like bacteria, mycoplasma, fungi, yeast, and endotoxin. The detrimental impact of microbiological contamination should not be underestimated. Fortunately, judicious use of selected antibiotics in cell culture media may control and eliminate contamination from bacteria, fungi, mycoplasma, and yeasts. Alfa Aesar offers a wide range of antibiotics to control bacterial contamination in cell culture media, and a selected sampling is listed below. Be sure to consult our website, [www.alfa.com/en/antibiotics/](http://www.alfa.com/en/antibiotics/), for a complete list of all our antibiotics.

Stock No.	Name	Description	Sizes
J61491	Amphotericin B	From <i>Streptomyces nodosus</i> . Antifungal agent useful in cell culture to prevent contamination by fungi.	100mg, 1g, 5g
J60977	Ampicillin	A beta-lactam antibiotic effective against gram-positive bacteria and some gram-negative bacteria. Inhibits transpeptidase.	5g, 25g
J63807	Ampicillin sodium salt	Broad spectrum beta-lactam antibiotic widely used in cell culture. Inhibits the final stage of bacterial cell wall formation, resulting in lysis.	1g, 5g, 10g
J61317	Ciprofloxacin, 98%	A fluoroquinolone antibiotic with broad-spectrum activity against both gram-positive and gram-negative bacteria. Inhibits DNA gyrase, thus interfering with bacterial cell division.	5g, 25g
J61970	Ciprofloxacin hydrochloride	An antibacterial agent effective against anaerobic bacteria. Widely used in cell culture research for its' broad-spectrum activity against bacterial contamination of the media.	5g, 25g
J62834	Gentamycin sulfate, 600 IU/mg	Bactericidal antibiotic in the aminoglycoside class. Predominantly effective against gram-negative bacteria. Disrupts protein synthesis of the 30S ribosome.	1g, 5g, 10g
J61669	Monensin sodium salt, 90-95.5%	A polyether antibiotic that functions as an ionophore with monovalent cations (Na <sup>+</sup> , K <sup>+</sup> , Li <sup>+</sup> ). Blocks intracellular protein transport.	1g, 5g
J61499	Neomycin sulphate hydrate	An aminoglycoside antibiotic effective against gram-negative bacteria. It can inhibit protein synthesis. Useful in tissue culture studies.	25g, 100g
J62486	Nystatin	A polyene antifungal useful in mammalian cell culture against molds, fungi and yeast contamination. It binds to ergosterol and leads to K <sup>+</sup> leakage.	5g, 10g
J63032	Penicillin G sodium salt	(Benzylpenicillin). A penicillin antibiotic effective against gram-positive bacteria. It inhibits bacterial cell wall synthesis by disrupting peptidoglycan cross-linking.	5g, 25g, 100g
J61763	Polymixin B sulfate, Cell Culture Reagent	Antibiotic for gram-negative bacteria. It binds to cell walls, making them more permeable.	1g, 5g
J62633	Tylosin tartrate, 95%	A macrolide antibiotic mainly effective against gram-positive bacteria. Its' bacteriostatic effect is caused by binding to the 50S ribosome thus inhibiting protein synthesis.	1g, 5g, 10g

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# Antibiotics for research

## Antibiotics for plant cell culture

For plant cell culture, antibiotics are typically used to maintain sterility of the media. Bacteria, fungi and mycoplasma which contaminate the media can rapidly deplete essential nutrients necessary for plant cell growth. It is best to use the minimum inhibitory concentration (MIC) of antibiotics that are effective for controlling bacteria, because the antibiotics themselves may be phytotoxic, and may restrict rooting, general growth and multiplication in some plant cultures. We are pleased to offer a large range of antibiotic for cell culture research. Don't see what you're looking for here? Please visit our website, [www.alfa.com/en/antibiotics/](http://www.alfa.com/en/antibiotics/)

Stock No.	Name	Description	Sizes
J62432	Bacitracin	A cyclic polypeptide antibiotic effective against both gram-positive and gram-negative bacteria. It interferes with peptidoglycan bacterial cell wall formation.	5g, 25g
J61949	Carbenicillin disodium salt	A water-soluble bacteriolytic antibiotic of the carboxypenicillin subgroup. Effective against gram-negative bacteria.	1g, 5g, 25g
J62690	Cefotaxime sodium salt	A broad-spectrum cephalosporin antibiotic effective against gram-positive and gram-negative bacteria. It inhibits transpeptidation of peptidoglycan synthesis.	1g, 5g, 25g
J62671	G418 disulfate, Cell Culture Reagent	(Geneticin). An aminoglycoside antibiotic similar to gentamicin. It blocks polypeptide synthesis in both prokaryotic and eukaryotic cells.	1g, 5g, 25g
J63871	G418 disulfate, 50mg/ml solution	An aminoglycoside antibiotic that is toxic to bacteria, yeast, and protozoans. Useful for selecting genetically engineered cells.	10ml, 50ml
J62834	Gentamycin sulfate, 600 IU/mg	Bactericidal antibiotic in the aminoglycoside class. Predominantly effective against gram-negative bacteria. Disrupts protein synthesis of the 30S ribosome.	1g, 5g, 10g
J60681	Hygromycin B	An aminoglycoside antibiotic that kills bacteria, fungi and higher eukaryotic cells by disrupting protein synthesis. Useful for the Hygromycin B resistance.	100mg, 250mg, 1g
J60668	Kanamycin monosulfate, Cell Culture Grade	An aminoglycoside bacteriocidal antibiotic effective against both gram-positive and gram-negative bacteria. Useful for plasmids that are kanamycin resistant.	1g, 5g, 10g
J61274	Paromomycin sulfate	An aminoglycoside antibiotic especially effective against gram-negative bacteria and to a lesser degree some gram-positive bacteria.	1g, 5g, 25g
J60836	Rifampin, Molecular Biology Grade	(Rifampicin). A bactericidal antibiotic that inhibits bacterial RNA polymerase. Especially effective against mycobacteria.	1g, 5g, 25g
J61299	Streptomycin sulfate, Cell Culture Reagent	An aminoglycoside antimycobacterial effective against gram-positive and gram-negative bacteria. Inhibits protein synthesis by misreading of the codon.	50g, 100g
J62790	Vancomycin hydrochloride, Molecular Biology Grade	A glycopeptide antibiotic effective against gram-positive bacteria. It inhibits cell wall formation by interfering with bacterial mucopeptide synthesis.	1g, 5g

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# Antibiotics for research

## Antibiotics for nucleic acid and protein modification

Numerous antibiotics have been shown to be involved in modifying nucleic acid and protein synthesis. Their mode of action is the interference and inhibition of DNA and RNA synthesis. Other antibiotics disrupt cell wall synthesis and cause premature chain termination. Below are several of our many antibiotics useful for proteomics research.

Stock No.	Name	Description	Sizes
J60148	Actinomycin D	A polypeptide antibiotic with anti-cancer activity. It inhibits DNA/nucleic acid synthesis and potently induces apoptosis by binding to DNA complexes and inhibiting RNA polymerase.	5mg
J60849	Amikacin	An aminoglycoside antibiotic derived from Kanamycin A. UC Binds to bacterial 30S ribosomes interfering with protein synthesis.	1g, 5g, 25g
J60727	Bleomycin sulfate	A glycopeptide antibiotic with anti-cancer properties. Inhibits DNA synthesis by causing breaks in DNA strands.	1mg, 10mg, 100mg
J60422	Doxycycline hydrochloride	A tetracycline antibiotic effective against bacteria, fungi, and protozoans. It inhibits angiogenesis and reduces lung metastases by inhibiting matrix metalloproteinases.	5g, 25g
J62279	Erythromycin, Cell Culture Grade	A macrolide antibiotic that inhibits bacterial protein synthesis. By preventing aminoacyl translocation, blocking tRNA transfer.	10g, 25g
J60668	Kanamycin monosulfate, Cell Culture Grade	An aminoglycoside bacteriocidal antibiotic effective against both gram-positive and gram-negative bacteria.	1g, 5g, 10g
J61251	Lincomycin hydrochloride	A lincosamide antibiotic active against gram-positive bacteria. Binding to the 50S subunit of bacterial ribosomes.	1g, 5g, 25g
J63193	Mitomycin C	Antineoplastic agent which inhibits DNA synthesis and induces apoptosis. It is a potent DNA linker, which makes it an effective destroyer of bacteria.	5mg, 10mg
J60928	Novobiocin sodium salt	An aminocoumarin antibiotic that acts as a bacterial topoisomerase (DNA gyrase) inhibitor. It is effective against gram-positive bacteria, and is widely used in cell culture research.	1g, 5g, 10g
J62473	Rapamycin, 99+% (Sirolimus)	A macrolide immunosuppressant agent that blocks cytokine-mediated signal transduction pathways. Suppressing T and B cell activation.	50mg, 100mg, 200mg
J61820	Spectinomycin diHCl, Cell Culture Grade	An aminocyclitol antibiotic that binds to the 30S ribosomal subunit of bacteria and interrupts protein synthesis. It is effective against both gram-positive and gram-negative bacteria.	5g, 25g
J61299	Streptomycin sulfate, Cell Culture Reagent	An aminoglycoside antimycobacterial effective against gram-positive and gram-negative bacteria. Inhibits protein synthesis by codon misreading.	50g, 100g
J61714	Tetracycline	Antibiotic effective against gram-positive and gram-negative bacteria. A potent protein synthesis inhibitor. Also shown to induce apoptosis in osteoblasts.	5g, 25g, 100g
J62312	Valinomycin	A cyclodepsipeptide antibiotic that inhibits mitochondrial action. Highly selective potassium ionophore that facilitates movement of K <sup>+</sup> ions through cellular membranes.	100mg

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# Antibiotics for research

## Antibiotics selection chart

Stock No.	Name	Antibiotic type	Gram-positive bacteria	Gram-negative bacteria	Fungi	Yeasts	Mycoplasma
J60148	Actinomycin D	Polypeptide	+	+			
J60849	Amikacin	Aminoglycoside		+	+		+
J61491	Amphotericin B	Polyene			+	+	
J60977	Ampicillin	-lactam penicillin	+	+			
J62432	Bacitracin	Polypeptide	+	+			
J60727	Bleomycin sulfate	Aminoglycoside	+	+			
J61949	Carbenicillin disodium salt	Carboxypenicillin		+			
J65274	Cefazolin sodium salt	Cephalosporin	+				
J62690	Cefotaxime sodium salt	Cephalosporin	+	+			
J61317	Ciprofloxacin, 98%	Fluoroquinone	+	+			
J62927	Chromomycin A3, 98%	Glycoside	+	+	+		
J60495	Dihydrostreptomycin sulfate	Aminoglycoside	+	+			
J60422	Doxycycline hydrochloride	Tetracycline	+	+	+	+	
J62279	Erythromycin	Macrolide	+	+			+
J62671	G418 disulfate	Aminoglycoside	+	+	+	+	+
J62834	Gentamycin sulfate	Aminoglycoside		+			+
J60681	Hygromycin B	Aminoglycoside	+		+	+	+
J60668	Kanamycin monosulfate	Aminoglycoside	+	+			+
J61251	Lincomycin hydrochloride	Lincosamide	+				
J63193	Mitomycin C	Antineoplastic	+	+			
J61669	Monensin sodium salt	Polyether	+	+	+	+	
J61499	Neomycin sulfate	Aminoglycoside		+		+	
J60928	Novobiocin sodium salt	Aminocoumarin	+				
J62486	Nystatin	Polyene			+	+	
J61274	Paromomycin sulfate	Aminoglycoside	+	+			
J63032	Penicillin G sodium salt	Penicillin	+				
J61763	Polymixin B sulfate	Polypeptide		+			
J61278	Puromycin diHCl, 99+%	Aminonucleoside	+		+		
J62473	Rapamycin, 99+%	Macrolide			+	+	
J60836	Rifampin	Rifamycin					+
J61820	Spectinomycin diHCl	Aminocyclitol	+	+			
J61299	Streptomycin sulfate	Aminoglycoside	+	+			+
J61714	Tetracycline	Tetracycline	+	+			+
J62633	Tylosin tartrate, 98%	Macrolide	+				+
J62312	Valinomycin	Polypeptide	+	+	+	+	
J62790	Vancomycin hydrochloride	Glycopeptide	+				

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