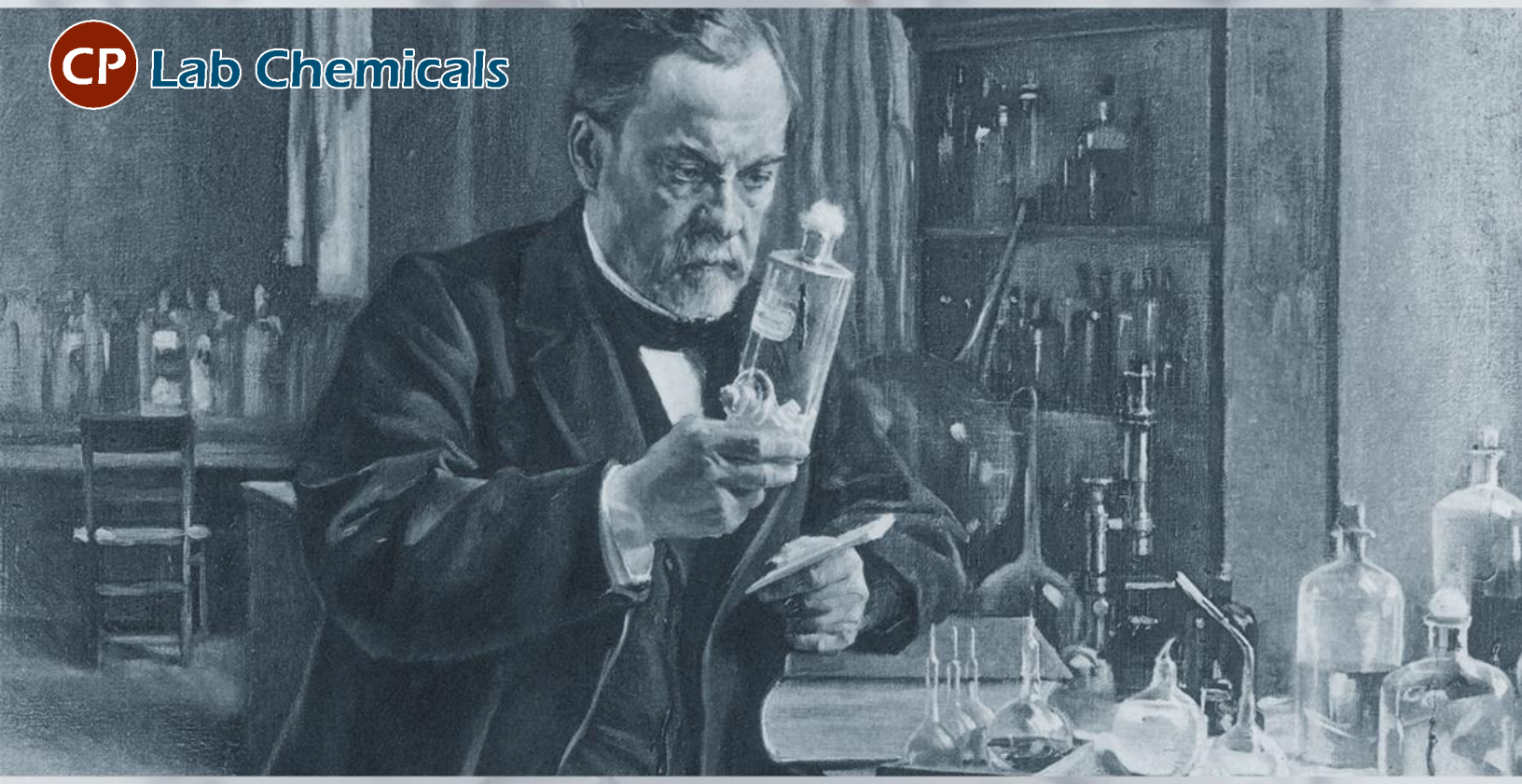
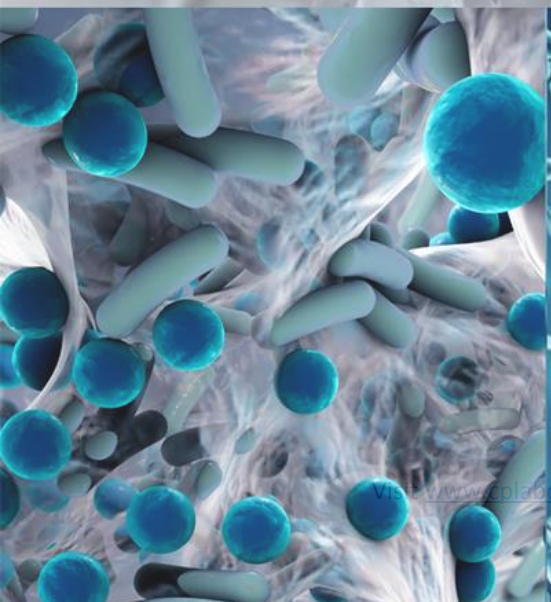
CP Lab Chemicals

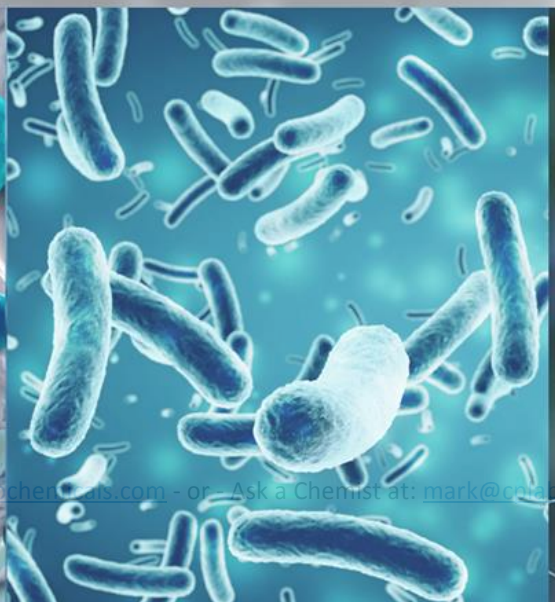


The World Atlas of Antibiotics

An annotated guide to the major antibiotics used in medicine, agriculture, and commerce provided by CP Lab Chemicals®

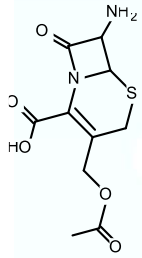
Jimena Lara Ruiz and Mark L. Nelson, Ph.D.





7-Aminocephalosporanic Acid

CAS#: 957-68-6



Catalog#: TCI-A1266-5G

Synonyms: 7-Aminocephalosporanic acid, 957-68-6, 7-ACA, 7-Aminocephalosporinic acid

Molecular Formula: $C_{10}H_{12}N_2O_5S$

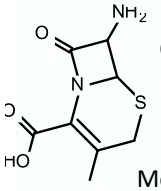
7-Aminocephalosporanic Acid, also known as 7beta-aminocephalosporanic acid derives from a cephalosporanic acid and functions as the alpha, beta-unsaturated monocarboxylic acid that is categorized as the active nucleus for the synthesis of cephalosporins and intermediates. Additionally, 7-ACA is a valuable resource for the production of many semisynthetic β-lactam antibiotics, and presents itself as a favorable synthesis scaffold for the pharmaceutical industry.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 441328, 7-Aminocephalosporanic acid. Retrieved July 20, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/441328.

Ding J, Zhou Y, Zhu H, Deng M, Gao Y, Yang Y, Huang Z. Characterization of EstZY: A new acetylesterase with 7-aminocephalosporanic acid deacetylase activity from Alicyclobacillus tengchongensis. Int J Biol Macromol. 2020 Apr 1;148:333-341. doi: https://doi.org/10.1016/j.ijbiomac.2020.01.151 Epub 2020 Jan 16. PMID: 31954783.

7-Aminodesacetoxycephalosporanic Acid



CAS#: 22252-43-3

Catalog#: TCI-A2075-25G

Synonyms: 7-aminodesacetoxycephalosporanic acid, 22252-43-3, 7-aminodeacetoxycephalosporanic acid, (6R,7R)-7-amino-3-methyl-8-oxo-5-thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid

Molecular Formula: $C_8H_{10}N_2O_3S$

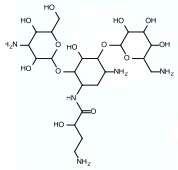
7-Aminodesacetoxycephalosporanic acid, also known as 7-beta-aminodeacetoxycephalosporanic acid is a cephem monocarboxylic acid that derives from possessing a cephalosporanic acid scaffold, deacetoxylated. 7-ADCA is a synthetic intermediate used in the synthesis of cephalosporins, and is environmentally safe. It as it has undergone a production process that is able to replace the expensive and environmentally unfriendly chemical method that is normally used.

References

Stedman, RJ, Swered, K, Hoover, JR. 7-Aminodesacetoxycephalosporanic Acid and Its Derivatives. J Med Chem. 1964 Jan;7:117-9. doi:10.1021/jm00331a029. PMID: 14186012.

Velasco J, Luis Adrio J, Angel Moreno M, Díez B, Soler G, Barredo JL. Environmentally safe production of 7-aminodeacetoxycephalosporanic acid (7-ADCA) using recombinant strains of Acremonium chrysogenum. Nat Biotechnol. 2000 Aug;18(8):857-61. doi: 10.1038/78467. PMID: 10932155.

Amikacin base



CAS#: 37517-28-5

Catalog#: CP-29020680-1g

Synonyms: amikacin, 37517-28-5, Amikin, Amicacin

Molecular Formula: $C_{22}H_{43}N_5O_{13}$

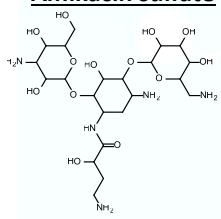
Amikacin is a broad-spectrum semi-synthetic aminoglycoside antibiotic that is commonly used to treat severe gram infections. It is derived from kanamycin and contains antimicrobial property. It also functions as an antibacterial drug and a nephrotoxin. Additionally, amikacin is useful for analysis and quantitation within regards to pharmacokinetics studies and other investigations.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 37768, Amikacin. Retrieved July 21, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/37768.

Sardella R, Xiroudaki S, Mercolini L, Sabbatini S, Monari C, Perito S, Ianni F, Vecchiarelli A, Giovagnoli S. Optimized Extraction of Amikacin from Murine Whole Blood. Molecules. 2021 Jan 27;26(3):665. doi: https://doi.org/10.3390/molecules26030665. PMID: 33513993; PMCID: PMC7865403.

Amikacin sulfate



CAS#: 39831-55-5
Catalog#: CP-58576285-1G
Synonyms: Amikacin disulfate, AMIKACIN SULFATE, 39831-55-5
Molecular Formula: $C_{22}H_{47}N_5O_{21}S_2$

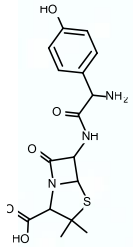
Amikacin Sulfate is the sulfate salt derived from amikacin, a broad-spectrum semisynthetic aminoglycoside antibiotic which contains antimicrobial property. This agent is effective when treating short-term serious infections caused by strains of Gram-negative bacteria. It also contains pharmacologic properties that have been extensively studied, in which it achieves high, predictable, and prolonged blood concentrations with a commendatory therapeutic index.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 38351, Amikacin sulfate. Retrieved July 25, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/38351.

Pien, FD, Ho PW. Antimicrobial spectrum, pharmacology, adverse effects, and therapeutic use of amikacin sulfate. Am J Hosp Pharm. 1981 Jul;38(7):981-9. PMID: 7020413.

Amoxicillin, Trihydrate



CAS#: 61336-70-7
Catalog#: CP-35061441
Synonyms: Amoxicillin trihydrate, 61336-70-7, Larotid, Polymox
Molecular Formula: $C_{16}H_{25}N_3O_8S$

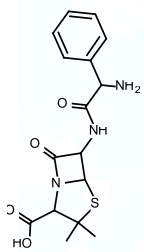
Amoxicillin trihydrate is a semisynthetic antibiotic with bactericidal activity. It is used either alone or in a combination with potassium clavulanate specifically for treatment of bacterial infections possessing beta lactamase enzymes. It is also used in agriculture, treating foot rot and mastitis in cattle and dairy cows.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 62883, Amoxicillin trihydrate. Retrieved July 12, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/62883.

Braun RK, Bates DB, Shearer JK, Tran TQ, el Keiey M. Efficacy of amoxicillin trihydrate for the treatment of experimentally induced foot rot in cattle. Am J Vet Res. 1987 Dec;48(12):1751-4. PMID: 2893570.

Ampicillin



CAS#: 69-53-4
Catalog#: SPC-AM206-5G
Synonyms: 69-53-4, Ampicillin, Aminobenzylpenicillin, Ampicillin acid
Molecular Formula: $C_{16}H_{19}N_3O_4S$

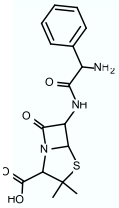
Ampicillin is a broad-spectrum, semi-synthetic derivative of penicillin that contains bactericidal activity. It serves as an antibacterial drug, a penicillin allergen, and a beta-lactam antibiotic. Ampicillin can be used in a wide range of Gram-positive and Gram-negative infections. It also contains properties that act as an orally active broad-spectrum antibiotic.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 6249, Ampicillin. Retrieved July 27, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/6249.

Chavan C, Kamble S, Murthy AVR, Kale SN. Ampicillin-mediated functionalized gold nanoparticles against ampicillin-resistant bacteria: strategy, preparation and interaction studies. Nanotechnology. 2020 May 22;31(21):215604. doi: https://doi.org/10.1088/1361-6528/ab72b4. Epub 2020 Feb 4. PMID: 32018229.

Ampicillin Sodium Salt



CAS#: 69-52-3
Catalog#: SPC-AM206-25GM
Synonyms: 200-708-1, 69-52-3, Ampicillin sodium, Ampicillin sodium salt
Molecular Formula: $C_{16}H_{18}N_3NaO_4S$

Ampicillin sodium salt is the sodium salt form of ampicillin, which is classified as a broad-spectrum semisynthetic derivative of aminopenicillin. This organic sodium salt form functions as a water soluble and orally active antibiotic. Ampicillin sodium inhibits bacterial cell wall synthesis through the binding of penicillin binding proteins, therefore inhibiting a critical component of the bacterial cell wall during synthesis and causing bacterial cell lysis.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 23663979, Ampicillin sodium. Retrieved July 27, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/23663979.

Zhang Y, Trissel LA. Stability of Ampicillin Sodium, Nafcillin Sodium, And Oxacillin Sodium in AutoDose Infusion System Bags. Int J Pharm Compd. 2002 May-Jun;6(3):226-9. PMID: 23979189.

Antibiotic-Antimycotic Solution

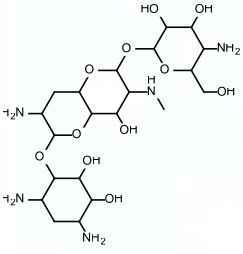
CAS#: 113-98-4
Catalog#: B22110
Molecular Formula: $C_{16}H_{18}N_2O_4S$

Antibiotic-Antimycotic solution is a solution that contains penicillin, streptomycin, and Amphotericin B and is effective against forms of cell culture contamination such as fungi, bacteria, and yeasts. It is integrated within cell culture media and helps prevent contamination by various forms of bacteria.

References

Campos, CO; Bernuci, MP; Vireque, AA; Campos, JR; Silva-de-Sá, MF; Jamur, MC; Rosa-E-Silva, AC (2012). Preventing Microbial Contamination during Long-Term In Vitro Culture of Human Granulosa-Lutein Cells: An Ultrastructural Analysis. ISRN Obstetrics and Gynecology. 2012: 152781. doi:10.5402/2012/152781.

Apramycin Sulfate



CAS#: 65710-07-8
Catalog#: CP-51745110-1g
Synonyms: Apramycin sulfate, 65710-07-8, Apramycin sulphate, Apramycin (sulfate)
Molecular Formula: $C_{21}H_{43}N_5O_{15}S$

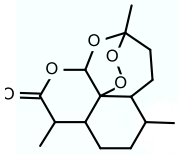
Apramycin sulfate is an aminoglycoside antibiotic that is active against Gram-negative bacteria through the inhibition of protein synthesis. It is composed of amino groups arranged on glycosidic scaffolds and is active against resistant bacteria such as *Eschericia coli* and salmonella species.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 3081544, Apramycin sulfate. Retrieved July 27, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/3081544.

Jensen VF, Jakobsen L, Emborg HD, Seyfarth AM, Hammerum AM. Correlation between apramycin and gentamicin use in pigs and an increasing reservoir of gentamicin-resistant Escherichia coli. J Antimicrob Chemother. 2006 Jul;58(1):101-7. doi: 10.1093/jac/dkl201. Epub 2006 May 18. PMID: 16709594.

Artemisinin



CAS#: 63968-64-9
Catalog#: CP-68081748-5G
Synonyms: artemisinin, Qinghaosu, 63968-64-9, Artemisinine
Molecular Formula: $C_{15}H_{22}O_5$

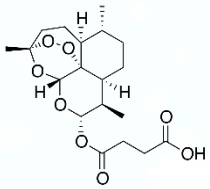
Artemisinin is classified as a sesquiterpene lactone that is obtained from sweet wormwood, *Artemisia annua*. It is used as an antimalarial agent for treatment for multi-drug resistant strains of *Falciparum* malaria. It serves as a plant metabolite and antimalarial and acts through its endoperoxide ring system, binding to heme by free radical mechanisms during all the phases of the malaria life cycle.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 68827, Artemisinin. Retrieved July 27, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/68827.

Ma N, Zhang Z, Liao F, Jiang T, Tu Y. The birth of artemisinin. Pharmacol Ther. 2020 Dec;216:107658. doi: https://doi.org/10.1016/j.pharmthera.2020.107658. Epub 2020 Aug 8. PMID: 32777330.

Artesunate



CAS#: 88495-63-0
Catalog#: TCI-A2191-25G
Synonyms: Artesunate, Artesunic acid, Arsumax, 88495-63-0
Molecular Formula: $C_{19}H_{28}O_8$

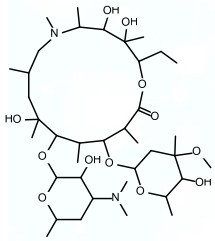
Artesunate is a water-soluble, semi-synthetic derivative of the lactone artemisinin which contains anti-malarial, antiviral, and potential anti-neoplastic activities. It is generally used as the sodium salt for the treatment of malaria. It also serves as a ferroptosis inducer, antineoplastic agent, in addition to its antimalarial properties.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 6917864, Artesunic acid. Retrieved July 27, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/6917864.

Kong Z, Liu R, Cheng Y. Artesunate alleviates liver fibrosis by regulating ferroptosis signaling pathway. Biomed Pharmacother. 2019 Jan;109:2043-2053. doi: https://doi.org/10.1016/j.biopha.2018.11.030. Epub 2018 Nov 26. PMID: 30551460.

Azithromycin



CAS#: 83905-01-5
Catalog#: CP-20077299-1g
Synonyms: azithromycin, Zithromax, 83905-01-5, Sumamed
Molecular Formula: $C_{38}H_{72}N_2O_{12}$

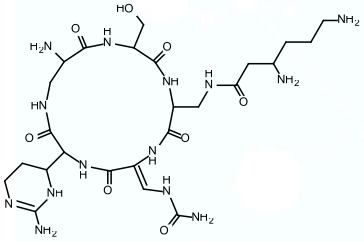
Azithromycin is a semisynthetic macrolide antibiotic, as well as an antibacterial prescription medicine that is made to treat bacterial infections such as respiratory diseases, acute sinus and ear infections, chronic bronchitis, community-acquired pneumonia, and throat/tonsil infections. It also acts through inhibition of protein synthesis and can modulate the formation of biofilms and quorum-sensing.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 447043, Zithromax. Retrieved July 27, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/447043.

Firth A, Prathapan P. Azithromycin: The First Broad-spectrum Therapeutic. Eur J Med Chem. 2020 Dec 1;207:112739. doi: https://doi.org/10.1016/j.ejmech.2020.112739. Epub 2020 Aug 19. PMID: 32871342; PMCID: PMC7434625.
Parnham MJ, Erakovic Haber V, Giamarellos-Bourboulis EJ, Perletti G, Verleden GM, Vos R. Azithromycin: mechanisms of action and their relevance for clinical applications. Pharmacol Ther. 2014 Aug;143(2):225-45. doi: 10.1016/j.pharmthera.2014.03.003. Epub 2014 Mar 11. PMID: 24631273.

Capreomycin



CAS#: 11003-38-6
Catalog#: CP-90021020-1g
Synonyms: capreomycin, SCHEMBL3666, BETA-SITOSTEROLACETATE, Q415909
Molecular Formula: $C_{50}H_{88}N_{28}O_{15}$

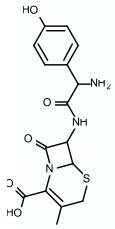
Capreomycin is an injectable broad spectrum cyclic peptide antibiotic. It is most commonly used in the therapy of drug resistant tuberculosis as a second line agent in combination with other antituberculosis drugs.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 3000502, Capreomycin. Retrieved July 29, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/3000502.

hao Z, Tai W, Qiu Y, Man RCH, Liao Q, Chow MYT, Kwok PCL, Lam JKW. Spray-Dried Powder Formulation of Capreomycin Designed for Inhaled Tuberculosis Therapy. Pharmaceutics. 2021 Nov 30;13(12):2044. doi: https://doi.org/10.3390/pharmaceutics13122044. PMID: 34959328; PMCID: PMC8706516.

Cefadroxil



CAS#: 50370-12-2
Catalog#: CP-14064590-1g
Synonyms: cefadroxil, 50370-12-2, Cephadroxil, Cefadroxil anhydrous
Molecular Formula: $C_{16}H_{17}N_3O_5S$

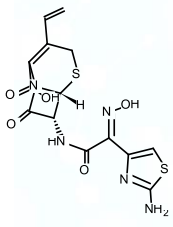
Cefadroxil is a semisynthetic first-generation cephalosporin that possesses antibacterial activity. Similar to action as penicillin, it binds to and inactivates penicillin-binding proteins located on the inner membrane of the bacterial cell wall. The compound has favorable oral activity and is active against Gram-negative and Gram-positive bacteria, acting as a bacteriocidal agent.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 47965, Cefadroxil. Retrieved July 29, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/47965.

Nguyen HM, Graber CJ. A Critical Review of Cephalexin and Cefadroxil for the Treatment of Acute Uncomplicated Lower Urinary Tract Infection in the Era of "Bad Bugs, Few Drugs". Int J Antimicrob Agents. 2020 Oct;56(4):106085. doi: Epub 2020 Jul 10. PMID: 32659466.

Cefdinir



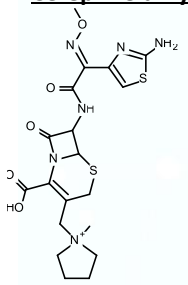
CAS#: 91832-40-5
Catalog#: CP-64816621
Synonyms: cefdinir, 91832-40-5, Omnicef, CFDN
Molecular Formula: $C_{14}H_{13}N_5O_5S_2$

Cefdinir is classified as a semi-synthetic, broad-spectrum cephalosporin and beta-lactam antibiotic that possesses bactericidal activity. It serves a significant role binding to penicillin-binding proteins that are located in the bacterial cytoplasmic membrane. It is quite effective against organisms that are resistant to first-line cephalosporin therapy, and active in skin and skin structure infections and respiratory pathogens.

References
National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 6915944, Cefdinir. Retrieved July 29, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/6915944.

Sader HS, Jones RN. Cefdinir: an oral cephalosporin for the treatment of respiratory tract infections and skin and skin structure infections. Expert Rev Anti Infect Ther. 2007 Feb;5(1):29-43. 10.1586/14787210.5.1.29. Erratum in: Expert Rev Anti Infect Ther. 2007 Aug;5(4):754.. Dosage error in article text. PMID: 17266451.

Cefepime dihydrochloride



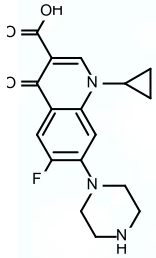
CAS#: 123171-59-5
Catalog#: CP-90018543-1g
Synonyms: Cefepime hydrochloride, Cefeprime dihydrochloride, cefepime dihydrochloride, UNII-2A1O4F5N0C
Molecular Formula: $C_{19}H_{26}Cl_2N_6O_5S_2$

Cefepime dihydrochloride is a fourth-generation cephalosporin that acts as an antibacterial agent and is commonly used in the treatment of infections pertaining to the urinary tract, respiratory tract, abdomen, and skin. It is effective and active against *Pseudomonas aeruginosa* and is also used in the empiric treatment of febrile neutropenia.

References
National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 76959248, Cefepime dihydrochloride. Retrieved July 29, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/76959248.

Kummer M, Šestáková N, Theurillat R, Huynh-Do U, Endimiani A, Sendi P, Thormann W. Monitoring of cefepime in urine by micellar electrokinetic capillary chromatography with ultraviolet detection and liquid chromatography coupled to mass spectrometry. J Sep Sci. 2018 Nov;41(21):4067-4074. doi: https://doi.org/10.1002/jssc.201800763. Epub 2018 Sep 25. PMID: 30198147.

Ciprofloxacin



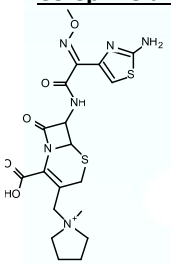
CAS#: 85721-33-1
Catalog#: CP-39826880-5g
Synonyms: ciprofloxacin, 85721-33-1, Ciprobay, Ciprofloxacine, Cipro
Molecular Formula: $C_{17}H_{18}FN_3O_3$

Ciprofloxacin is a fluoroquinolone antibiotic that is used for therapeutic treatment of urinary and respiratory tract infections usually caused by susceptible organisms. It has several functions, as it is able to act as an antiinfective agent, a topoisomerase IV inhibitor, and a DNA synthesis inhibitor. As an antimicrobial agent ad widely used, it is considered an environmental contaminant, and a xenobiotic. It has been approved by the U.S Food and Drug Administration as a prescribed form of medication that can prevent infections caused by certain types of bacteria.

References
National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 2764, Ciprofloxacin. Retrieved July 11, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/2764.

Zhang GF, Liu X, Zhang S, Pan B, Liu ML. Ciprofloxacin derivatives and their antibacterial activities. Eur J Med Chem. 2018 Feb 25;146:599-612. doi: 10.1016/j.ejmech.2018.01.078. Epub 2018 Feb 4. PMID: 29407984.

Cefepime dihydrochloride



CAS#: 123171-59-5
Catalog#: CP-90018543-1g
Synonyms: Cefepime hydrochloride, Cefeprime dihydrochloride, cefepime dihydrochloride, UNII-2A1O4F5N0C
Molecular Formula: $C_{19}H_{26}Cl_2N_6O_5S_2$

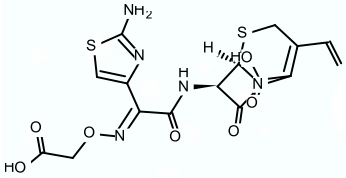
Cefepime dihydrochloride is a fourth-generation cephalosporin that acts as an antibacterial agent and is commonly used in the treatment of infections pertaining to the urinary tract, respiratory tract, abdomen, and skin. It is effective against *Pseudomonas aeruginosa* and is also used in the empiric treatment of febrile neutropenia.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 76959248, Cefepime dihydrochloride. Retrieved July 29, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/76959248.

Kummer M, Šestáková N, Theurillat R, Huynh-Do U, Endimiani A, Sendi P, Thormann W. Monitoring of cefepime in urine by micellar electrokinetic capillary chromatography with ultraviolet detection and liquid chromatography coupled to mass spectrometry. J Sep Sci. 2018 Nov;41(21):4067-4074. doi: https://doi.org/10.1002/jssc.201800763. Epub 2018 Sep 25. PMID: 30198147.

Cefixime



CAS#: 79350-37-1
Catalog#: CP-18918748-1g
Synonyms: Cefixime, Cefixime Anhydrous, Cefixime Trihydrate, FK 027
Molecular Formula: $C_{16}H_{15}N_2O_7S_2$

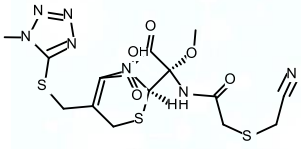
Cefixime is a 3rd-generation cephalosporin with a chemically distinct cepham scaffold used in the treatment of STDs, tonsilitis, and urinary tract infections. Sold and branded as Suprax™, it acts by disrupting bacterial cell walls resulting in bacterial cell lysis.

References

Suprax- cefixime tablet Suprax- cefixime capsule Suprax- cefixime tablet, chewable Suprax- cefixime powder, for suspension. *DailyMed*. 26 November 2019.

Leggett NJ, Caravaggio C, Rybak MJ. Cefixime. DICP. 1990 May;24(5):489-95. doi: 10.1177/106002809002400510. PMID: 2188437.

Cefmetazole



CAS#: 56796-20-4
Catalog#: TCI-C3029-1G
Synonyms: cefmetazole, 56796-20-4, Cefmetazolo, Cefmetazolum
Molecular Formula: $C_{15}H_{17}N_7O_5S_3$

Cefmetazole is a second-generation cephamycin antibiotic with a methylthiotetrazole side chain (NMTT) which can cleave in vivo releasing free NMTT and acting to inhibit aldehyde dehydrogenase, similar to disulfiram, blocking ethanol metabolism. It acts against a broad spectrum of bacteria causing urinary and skin infections.

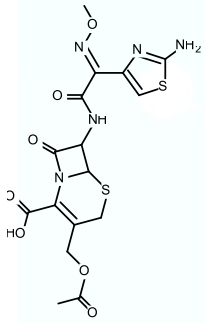
References

Breen GA, St Peter WL. Hypoprothrombinemia associated with cefmetazole. Ann Pharmacother. 1997 Feb;31(2):180-4. doi: 10.1177/106002809703100210. PMID: 9034420.

Matsumura Y, Yamamoto M, Nagao M, Komori T, Fujita N, Hayashi A, Shimizu T, Watanabe H, Doi S, Tanaka M, Takakura S, Ichiyama S. Multicenter retrospective study of cefmetazole and flomoxef for treatment of extended-spectrum-β-lactamase-

producing Escherichia coli bacteremia. Antimicrob Agents Chemother. 2015 Sep;59(9):5107-13. doi: 10.1128/AAC.00701-15. Epub 2015 Jun 22. PMID: 26100708; PMCID: PMC4538479.

Cefotaxime



CAS#: 63527-52-9
Catalog#: CP-85979953-1g
Synonyms: cefotaxime, Cephotaxime, 63527-52-6, Cefotaxime acid, UNII-N2GI8B1GK7
Molecular Formula: $C_{16}H_{17}N_5O_7S_2$

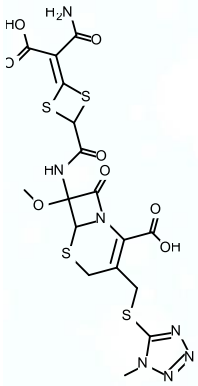
Cefotaxime is a beta-lactam antibiotic similar to ceftriaxone, and used to treat lower respiratory tract infections, skin and soft tissue infections, urinary tract infections as well as bloodstream and bacterial meningitis infections. It is dosed once a day and acts by binding to penicillin-binding proteins inhibiting the final transpeptidation step of peptidoglycan synthesis in bacterial cell walls, causing lysis. The spectrum of activity is enlarged to include several β-lactamase-producing organisms and can block protein synthesis in cyanobacteria, but also the division of cyanelles, photosynthetic organelles and the division of chloroplasts of bryophytes. It does not affect land plants, showing the endosymbiotic origins of such organelles.

References

Jones RN, Thornsberry C. Cefotaxime: a review of in vitro antimicrobial properties and spectrum of activity. Rev Infect Dis. 1982 Sep-Oct;4 Suppl:S300-15. doi: 10.1093/clinids/4.supplement_2.s300. PMID: 6294779.

Kasten B, Reski R (1997). "β-Lactam antibiotics inhibit chloroplast division in a moss (*Physcomitrella patens*) but not in tomato (*Lycopersicon esculentum*)". *Journal of Plant Physiology*. **150** (1–2): 137–40. doi:10.1016/S0176-1617(97)80193-9

Cefotetan



CAS#: 69712-56-7
Catalog#: CP-18528286-1g
Synonyms: cefotetan, 69712-56-7, Cefotetanum, Cefotan
Molecular Formula: $C_{17}H_{17}N_7O_8S_4$

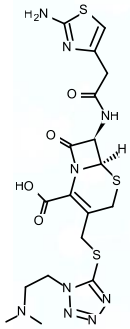
Cefotetan is a semisynthetic cephamycin that is given IV or IM, and possesses a broad spectrum of activity against bacteria in intra-abdominal, obstetric and gynecological infections. Cefotetan is acceptable in nursing mothers and is not shown to cause changes in infant gastrointestinal flora.

References

Ward A, Richards DM. Cefotetan. A review of its antibacterial activity, pharmacokinetic properties and therapeutic use. Drugs. 1985 Nov;30(5):382-426. doi: 10.2165/00003495-198530050-00002. PMID: 3905336.

Drugs and Lactation Database (LactMed) [Internet] Bethesda (MD): National Library of Medicine (US); 2006-.

Cefotiam hydrochloride



CAS#: 61622-34-2
Catalog#: CP-89991046-100mg
Synonyms: Abbott 48999, Cefotiam, Cefotiam Hydrochloride, Ceradolan, CGP 14221 E, Haloapor
Molecular Formula: $C_{18}H_{23}N_9O_4S_3$

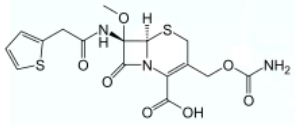
Cefotiam is a third-generation cephalosporin antibiotic active against Gram-negative and Gram-positive bacteria and active against urinary tract infections. It has stability against hepatic metabolism and excellent solubility and is largely unchanged in the urine.

References

Cefotiam, a new cephalosporin. Microbiological research, preliminary evaluation of its effect on phagocytosis and clinical multicenter research]. Minerva Med. 1986 Nov 30;77(45-46):2163-82. Italian.

Brogard JM, Jehl F, Willemin B, Lamalle AM, Blickle JF, Monteil H. Clinical pharmacokinetics of cefotiam. Clin Pharmacokinet. 1989 Sep;17(3):163-74. doi: 10.2165/00003088-198917030-00003. PMID: 2680212.

Cefoxitin Sodium Salt



CAS#: 35607-66-0
Catalog#: CP-40351828
Synonyms: Cefoxitin, Cefoxitin Sodium, Méfoxin, Mefoxin, Mefoxitin, MK 306
Molecular Formula: $C_{16}H_{17}N_3O_7S_2$

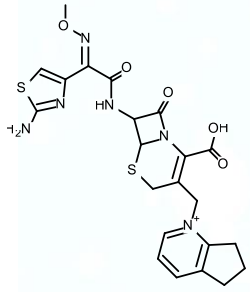
Cefoxitin is a cephamycin antibiotic resistant to beta-lactamases and active against *Pseudomonas* and *Enterobacter* species. It is used against clinically relevant anaerobic bacteria including *Bacteroides fragilis* and infections of mixed aerobe-anaerobe nature in obstetric and gynecological patients.

References

Sweet RL, Ledger WJ. Cefoxitin: single-agent treatment of mixed aerobic-anaerobic pelvic infections. Obstet Gynecol. 1979 Aug;54(2):193-8. PMID: 460753.

Cunningham FG, Gilstrap LC 3rd, Kappus SS. Cefamandole for treatment of obstetrical and gynecological infections. Scand J Infect Dis Suppl. 1980; suppl 25:75-82. PMID: 7010540.

Cefpirome sulfate



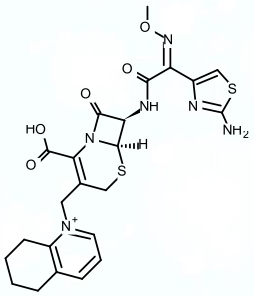
CAS#: 84957-29-9
Catalog#: CP-90028899-1g
Synonyms: CEFPIROME, Cefpiroma, Cefpiromum, 84957-29-9, Cefrom
Molecular Formula: $C_{22}H_{22}N_6O_5S_2$

Cefpirome is an injectable fourth-generation cephalosporin active against hospital acquired infections such as Enterobacter, MRSA and Streptococcus pneumoniae. As an injectable cephalosporin, it has comparable activity to other cephalosporins and useful for serious infections in hospitalized patients.

Wiseman LR, Lamb HM. Cefpirome. A review of its antibacterial activity, pharmacokinetic properties and clinical efficacy in the treatment of severe nosocomial infections and febrile neutropenia. Drugs. 1997 Jul;54(1):117-40. doi: 10.2165/00003495-199754010-00013. PMID: 9211085.

Norrby SR. Cefpirome: efficacy in the treatment of urinary and respiratory tract infections and safety profile. Scand J Infect Dis Suppl. 1993;91:41-50. PMID: 8290902.

Cefquinome sulfate



CAS#: 118443-89-3
Catalog#: CP-90026898-1g
Synonyms: Cefquinome sulfate, 118443-89-3, UNII-3858K104DQ, Cefquinome sulphate, HR111V-SULFATE
Molecular Formula: $C_{23}H_{26}N_6O_9S_3$

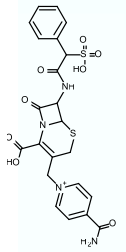
Cefquinone is a fourth-generation cephalosporin active against coliform mastitis, rapidly penetrating membranes as a zwitterion and with a higher affinity to penicillin-binding proteins. It is approved in the US for veterinary use only, and its disposition and characterization after dosing allows for a decrease of concentrations following IV administration to those levels safe for human consumption.

References

Zonca A, Gallo M, Locatelli C, Carli S, Moroni P, Villa R, Cagnardi P. Cefquinome sulfate behavior after intramammary administration in healthy and infected cows. J Dairy Sci. 2011 Jul;94(7):3455-61. doi: 10.3168/jds.2010-4109. PMID: 21700031.

Gehring R, Smith GW. An overview of factors affecting the disposition of intramammary preparations used to treat bovine mastitis. J Vet Pharmacol Ther. 2006 Aug;29(4):237-41. doi: 10.1111/j.1365-2885.2006.00750.x. PMID: 16846460.

Cefsulodin Sodium Salt



CAS#: 62587-73-9
Catalog#: CP-17381527-250mg
Synonyms: Cefquinome sulfate, 118443-89-3, UNII-3858K104DQ, Cefquinome sulphate, HR111V-SULFATE
Molecular Formula: $C_{23}H_{26}N_6O_9S_3$

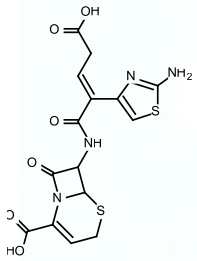
Cefsulodin is a third-generation cepahalosprin antibiotic possessing a positively charged pyridinium ring system, and is active against Pseudomonas species. Administered by IM or IV route, Cefsulodin works by inhibiting PBP1b, increasing its spectrum of activity against Gram-negative pathogens.

References

Routman A, Van Manen W, Haddad R, Pollock B, Holmes B, Mogabgab WJ. *Cefsulodin treatment for serious Pseudomonas aeruginosa* infections. J Int Med Res. 1986;14(5):242-53. doi: 10.1177/030006058601400504. PMID: 3770290.

Sarkar SK, Dutta M, Kumar A, Mallik D, Ghosh AS. Sub-inhibitory cefsulodin sensitization of *E. coli* to β-lactams is mediated by PBP1b inhibition. PLoS One. 2012;7(11):e48598. doi: 10.1371/journal.pone.0048598. Epub 2012 Nov 6. PMID: 23139798; PMCID: PMC3490869.

Ceftibuten dihydrate



CAS#: 97519-39-6
Catalog#: CP-89967603-100mg
Synonyms: 97519-39-6, Cedax, Ceftibuteno, Ceftibutenum, Ceftibutene
Molecular Formula: $C_{15}H_{14}N_4O_6S_2$

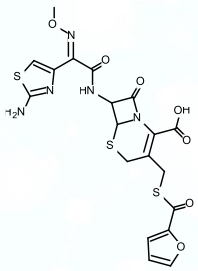
Ceftibuten is an orally active third-generation cephalosporin and is used to treat chronic bronchitis, otitis media and infections of the pharynx and tonsils. It has high affinity for penicillin binding proteins (PBPs) and is stable to betalactamases, unlike other third-generation compounds.

References

Jones RN. Ceftibuten: a review of antimicrobial activity, spectrum and other microbiologic features. Pediatr Infect Dis J. 1995 Jul;14(7 Suppl):S77-83. PMID: 7567314.

Guay DR. Ceftibuten: a new expanded-spectrum oral cephalosporin. Ann Pharmacother. 1997 Sep;31(9):1022-33. doi: 10.1177/106002809703100913. PMID: 9296244.

Ceftiofur



CAS#: 80370-57-6
Catalog#: CP-81340424-1g
Synonyms: Ceftiofur, 80370-57-6, U-67279A, CHEMBL3348962
Molecular Formula: $C_{19}H_{17}N_5O_7S_3$

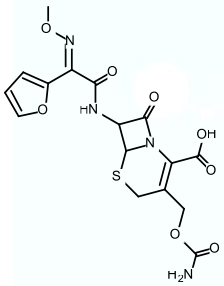
Ceftiofur is an injectable cephalosporin used mainly in agriculture to treat infections in cattle, swine and horses, particularly foot rot and skin diseases of feedlot cattle. It is also used intramuscularly for severe mastitis in dairy cattle.

References

Kausche FM, Robb EJ. A comprehensive review of ceftiofur sodium and hydrochloride formulations for treatment of acute bovine foot rot. Vet Ther. 2003 Spring;4(1):83-93. PMID: 12756639.

Erskine RJ, Bartlett PC, VanLente JL, Phipps CR. Efficacy of systemic ceftiofur as a therapy for severe clinical mastitis in dairy cattle. J Dairy Sci. 2002 Oct;85(10):2571-5. doi: 10.3168/jds.S0022-0302(02)74340-3. PMID: 12416809.

Cefuroxime



CAS#: 55268-75-2
Catalog#: CP-22930039-1g
Synonyms: cefuroxime, Cephuroxime, Cefuroxim, Cefuroximo
Molecular Formula: $C_{16}H_{16}N_4O_8S$

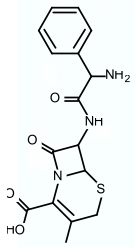
Cefuroxime is a semisynthetic cephalosporin resistant to beta-lactamases produced by Staphylococci and Gram-negative bacteria. Additionally, the prodrug form of cefuroxime (axetil) possessed activity in infections in patients with community acquired pneumonia.

References

Brogden RN, Heel RC, Speight TM, Avery GS. Cefuroxime: a review of its antibacterial activity, pharmacological properties and therapeutic use. Drugs. 1979 Apr;17(4):233-66. doi: 10.2165/00003495-197917040-00001. PMID: 37064.

Scott LJ, Ormrod D, Goa KL. Cefuroxime axetil: an updated review of its use in the management of bacterial infections. Drugs. 2001;61(10):1455-500. doi: 10.2165/00003495-200161100-00008. PMID: 11558834.

Cephalexin hydrate



CAS#: 97519-39-6
Catalog#: CP-89984984
Synonyms: Cephalexin hydrate, Cephalexin hydrate, first-generation cephalosporin antibiotic
Molecular Formula: $C_{16}H_{19}N_3O_5S$

Cephalexin is a first-generation cyclosporin active in urinary tract infections, respiratory infections and gonorrhea, scarlet fever, beta-lactamase staphylococcal infections and septicemia caused by streptococci. This antibiotic also affects macrophage in Staphylococcus infections, which is useful in treating immunocompromised patients, decreasing bacterial levels without affect macrophage function.

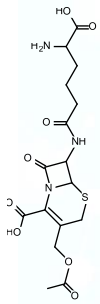
References

Herman TF, Hashmi MF. Cephalexin. [Updated 2022 Feb 16]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK549780/

Lallemand, E.A., Zemirline, C., Toutain, PL. *et al.* Dynamic interactions between cephalexin and macrophages on different *Staphylococcus aureus* inoculum sizes: a tripartite in vitro model. *BMC Vet Res* **17,** 23 (2021). https://doi.org/10.1186/s12917-021-02746-8

Cephalosporin C sodium salt

CAS#: 51762-04-0



Catalog#: CP-90023326-1g
Synonyms: Cephalosporin C sodium salt, CHEMBL1554742, NCGC00094863-01, NCGC00094863-02, NCGC00094863-03
Molecular Formula: $C_{16}H_{20}N_3NaO_8S$

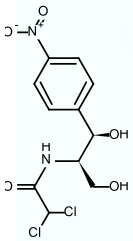
The beta lactam cephalosporin C is used to generate 7-aminocephalosporanic acid (7-ACA), one of the most important medical intermediates used to semisynthesize further generation cephalosporins. The biosynthetic pathway has been elucidated in Acremonium chrysogenum, one of the most studied pathways in industrial fermentation.

References

Liu J, Liu G. [Advances in the regulation of cephalosporin C biosynthesis - A review]. Wei Sheng Wu Xue Bao. 2016 Mar 4;56(3):461-70. Chinese. PMID: 27382789.

Zhou W, Holzhauer-Rieger K, Dors M, Schügerl K. Influence of medium composition on the cephalosporin C production with a highly productive strain Cephalosporium acremonium. J Biotechnol. 1992 May;23(3):315-29. doi: 10.1016/0168-1656(92)90078-n. PMID: 1368249.

Chloramphenicol 98%



CAS#: 56-75-7
Catalog#: TCI-A2705-25MG
Synonyms: Amphenicol, Amphenicols, Chloramphenicol, Chlornitromycin
Molecular Formula: $C_{11}H_{12}Cl_2N_2O_5$

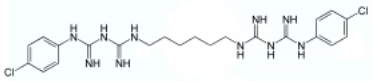
Chloramphenicol is a small molecule antibiotic that penetrates into the central nervous system, and is highly active against *Hemophilus, Streptococcus* and *Neisseria* species, although therapeutic drug monitoring is necessary in some patients with liver disease. It also used in the treatment of eye infections, conjunctivitis and otitis externa. Its mechanism of action is by inhibition of bacterial protein synthesis.

References

Feder HM Jr, Osier C, Maderazo EG. Chloramphenicol: A review of its use in clinical practice. Rev Infect Dis. 1981 May-Jun;3(3):479-91. doi: 10.1093/clinids/3.3.479. PMID: 6792681.

Oong GC, Tadi P. Chloramphenicol. 2022 Jul 4. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID: 32310426.

Chlorhexidine dihydrochloride



CAS#: 3697-42-5
Catalog#: CP-18056269-25g
Synonyms: Chlorhexidine dihydrochloride, 3697-42-5, MLS001304094
Molecular Formula: $C_{22}H_{31}Cl_3N_{10}$

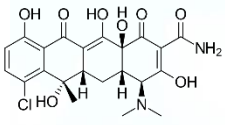
Chlorhexidine is an antiseptic and disinfectant used in medicine, dentistry and in in general use to topically sterilize skin and surface tissues including the oral cavity. It is useful in reducing dental plaque, and can be formulated into mouthwashes and lozenges for ready use.

References

Lim KS, Kam PC. Chlorhexidine--pharmacology and clinical applications. Anaesth Intensive Care. 2008 Jul;36(4):502-12. doi: 10.1177/0310057X0803600404. PMID: 18714617.

Kaufman AY, Tal H, Perlmutter S, Shwartz MM. Reduction of dental plaque formation by chlorhexidine dihydrochloride lozenges. J Periodontal Res. 1989 Jan;24(1):59-62. doi: 10.1111/j.1600-0765.1989.tb00858.x. PMID: 2524571.

Chlortetracycline Hydrochloride



CAS#: 64-72-2
Catalog#: CP-10896698-100g
Synonyms: Aureocyclin, Aureomycin, Aureomycine, Biomycin
Molecular Formula: $C_{22}H_{24}Cl_2N_2O_8$

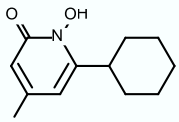
Chlortetracycline was the first tetracycline discovered in the 1940's by Benjamin Duggar while at Lederle Labs from a soil sample obtained from Sanborn field at the University of Missouri. It was named *aureofaciens* due to its golden color. While used in the 1950's particularly against *Rickettisial* infections in humans, it is used today in agriculture, aquaculture and in the treatment of diseases of livestock.

References

Jukes TH. Some historical notes on chlortetracycline. Rev Infect Dis. 1985 Sep-Oct;7(5):702-7. doi: 10.1093/clinids/7.5.702. PMID: 3903946.

Stanton TB, Humphrey SB, Stoffregen WC. Chlortetracycline-resistant intestinal bacteria in organically raised and feral Swine. Appl Environ Microbiol. 2011 Oct;77(20):7167-70. doi: 10.1128/AEM.00688-11. Epub 2011 Aug 5. PMID: 21821750; PMCID: PMC3194871.

Ciclopirox olamine



CAS#: 29342-05-0
Catalog#: CP-21723158-1g
Synonyms: CICLOPIROX, 29342-05-0, Loprox, HOE 296b
Molecular Formula: $C_{12}H_{17}NO_2$

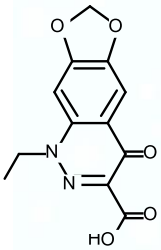
Ciclopirox is an anti-fungal agent with broad activity especially against skin and nail infections caused by *Tinea versicolor*. As a nail lacquer it is a safe and effective treatment for mild-to-moderate onychomycosis.

References

Subissi A, Monti D, Togni G, Mailland F. Ciclopirox: recent nonclinical and clinical data relevant to its use as a topical antimycotic agent. Drugs. 2010 Nov 12;70(16):2133-52. doi: 10.2165/11538110-000000000-00000. PMID: 20964457.

Brenner MA, Harkless LB, Mendicino RW, Page JC. Ciclopirox 8% nail lacquer topical solution for the treatment of onychomycosis in patients with diabetes: a multicenter, open-label study. J Am Podiatr Med Assoc. 2007 May-Jun;97(3):195-202. doi: 10.7547/0970195. PMID: 17507527.

Cinoxacin



CAS#: 28657-80-9
Catalog#: CP-41007001-1g
Synonyms: cinoxacin, 28657-80-9, Cinobac, Compound 64716
Molecular Formula: $C_{12}H_{10}N_2O_5$

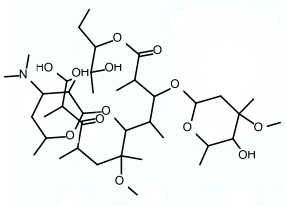
Cinoxacin is a structural analog of nalidixic acid, and is active against Gram-negative pathogens with a low propensity to cause antibiotic resistance. It is useful in urinary tract infections with favorable pharmacokinetics and metabolism.

References

Sisca TS, Heel RC, Romankiewicz JA. Cinoxacin. A review of its pharmacological properties and therapeutic efficacy in the treatment of urinary tract infections. Drugs. 1983 Jun;25(6):544-69. doi: 10.2165/00003495-198325060-00002. PMID: 6347618.

Cox CE, Simmons JR. Cinoxacin therapy for urinary tract infections: therapeutic safety and efficacy. South Med J. 1982 May;75(5):549-50. doi: 10.1097/00007611-198205000-00010. PMID: 7043747.

Clarithromycin



CAS#: 81103-11-9
Catalog#: CP-37077446-1g
Synonyms: clarithromycin, 81103-11-9, Biaxin, 6-O-Methylerythromycin
Molecular Formula: $C_{38}H_{69}NO_{13}$

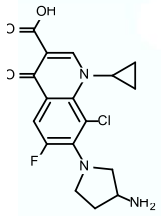
Clarithromycin is a 14-membered ring macrolide that binds to and inhibits 50S bacterial ribosomes similar to erythromycin, and is used against community-acquired infections including respiratory illnesses. It is also active against *Helicobacter pylori* implicated in cardiovascular and inflammation of the GI tract and disease.

References

Fraschini F, Scaglione F, Demartini G. Clarithromycin clinical pharmacokinetics. Clin Pharmacokinet. 1993 Sep;25(3):189-204. doi: 10.2165/00003088-199325030-00003. PMID: 8222460.

Wong AY, Root A, Douglas IJ, Chui CS, Chan EW, Ghebremichael-Weldeselassie Y, Siu CW, Smeeth L, Wong IC. Cardiovascular outcomes associated with use of clarithromycin: population based study. BMJ. 2016 Jan 14;352:h6926. doi: 10.1136/bmj.h6926. PMID: 26768836.

Clinafloxacin



CAS#: 105956-97-6
Catalog#: CP-30768336-25mg
Synonyms: AM 1091, AM-1091, CI 960, CI-960, clinafloxacin
Molecular Formula: $C_{17}H_{17}ClFN_3O_3$

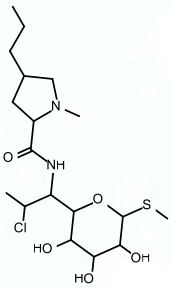
Clinifloxacin is a potent quinolone antibiotic effective against bacterial endocarditis caused by Staphylococcus aureus and MRSA. Compared with other fluoroquinolones, cephalosporins, gentamicin, vancomycin, imipenem, piperacillin/tazobactam, clindamycin, and metronidazole, clinafloxacin was the most active compound tested.

References

Levine DP, Holley HP, Eiseman I, Willcox P, Tack K. Clinafloxacin for the treatment of bacterial endocarditis. Clin Infect Dis. 2004 Mar 1;38(5):620-31. doi: 10.1086/381670. Epub 2004 Feb 17. PMID: 14986244.

Deshpande LM, Diekema DJ, Jones RN. Comparative activity of clinafloxacin and nine other compounds tested against 2000 contemporary clinical isolates from patients in United States hospitals. Diagn Microbiol Infect Dis. 1999 Sep;35(1):81-8. doi: 10.1016/s0732-8893(99)00020-6. PMID: 10529885.

Clindamycin Hydrochloride



CAS#: 18323-44-9
Catalog#: CP-15582939-1g
Synonyms: clindamycin, 18323-44-9, Chlolincocin, Clinimycin
Molecular Formula: $C_{18}H_{34}Cl_2N_2O_5S$

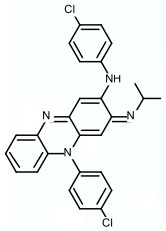
Clindamycin is a semi-synthetic derivative of lincomycin, treating septicemia, intra-abdominal infections, lower respiratory infections, gynecological infections, bone and joint infections, and skin and skin structure infections. It is also used in the treatment of pharyngitis, acne vulgaris, bacterial vaginosis, and severe pelvic inflammatory disease. As a topical agent it also has anti-inflammatory properties in severe to moderate acne.

References

Murphy PB, Bistas KG, Le JK. Clindamycin. 2022 Jun 27. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID: 30137858.

Del Rosso JQ, Schmidt NF. A review of the anti-inflammatory properties of clindamycin in the treatment of acne vulgaris. Cutis. 2010 Jan;85(1):15-24. PMID: 20184207.

Clofazimine



CAS#: 2030-63-9
Catalog#: CP-30617468-1g
Synonyms: clofazimine, 2030-63-9, Lamprene, Lampren
Molecular Formula: $C_{27}H_{22}Cl_2N_4$

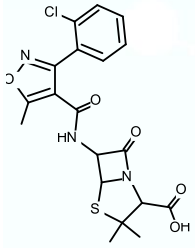
Clofazimine is a hydrophobic small molecule antibiotic active mycobacterial species and possesses a favorable pharmacokinetic profile. It is exceptionally active against drug-resistant tuberculosis although its exact mechanisms of action are not identified despite being used in medicine for over 40 years.

References

Riccardi N, Giacomelli A, Canetti D, Comelli A, Intini E, Gaiera G, Diaw MM, Udwadia Z, Besozzi G, Codecasa L, Biagio AD. Clofazimine: an old drug for never-ending diseases. Future Microbiol. 2020 May;15:557-566. doi: 10.2217/fmb-2019-0231. Epub 2020 Jun 1. PMID: 32476494.

Mirnejad R, Asadi A, Khoshnood S, Mirzaei H, Heidary M, Fattorini L, Ghodousi A, Darban-Sarokhalil D. Clofazimine: A useful antibiotic for drug-resistant tuberculosis. Biomed Pharmacother. 2018 Sep;105:1353-1359. doi: 10.1016/j.biopha.2018.06.023. Epub 2018 Jun 29. PMID: 30021373.

Cloxacillin sodium salt



CAS#: 642-78-4
Catalog#: CP-90025568
Synonyms: MLS001336043, MLS001336044, Cloxacillin sodium salt hydrate, SCHEMBL5550210
Molecular Formula: $C_{19}H_{20}ClN_3NaO_6S$

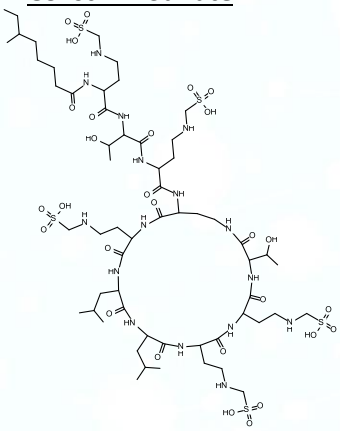
Cloxacillin is a first-line antibiotic with a narrow bacterial spectrum against methicillin sensitive *Staphylococci*, easing selection pressure and decreasing the possibility of antibiotic resistance. It is also used to treat bovine mastitis in agriculture.

References

Bru JP, Garraffo R. Role of intravenous cloxacillin for inpatient infections. Med Mal Infect. 2012 Jun;42(6):241-6. doi: 10.1016/j.medmal.2011.10.015. Epub 2012 Apr 27. PMID: 22542764.

Cummins KA, McCaskey TA. Multiple infusions of cloxacillin for treatment of mastitis during the dry period. J Dairy Sci. 1987 Dec;70(12):2658-65. doi: 10.3168/jds.S0022-0302(87)80336-3. PMID: 3448114.

Colistin B Sulfate



CAS#: 97519-39-6
Catalog#: CP-49952997
Synonyms: polymyxin E2 sulfate, colistin B sulfate, colistin B sulphate, CHEBI:59675
Molecular Formula: $C_{104}H_{206}N_{32}O_{46}S_5$

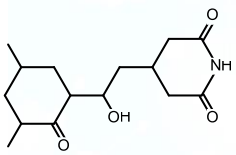
Belonging to the polymyxin family of macrocyclic peptides, Colistin B is active against Gram-negative pathogens including *Pseudomonas aeruginosa* and multiple-drug resistant pathogens. Compounds in the class also exhibit nephrotoxicity and can complicate the treatment of sepsis and septic shock.

References

Pop-Vicas A, Opal SM. The clinical impact of multidrug-resistant gram-negative bacilli in the management of septic shock. Virulence. 2014 Jan 1;5(1):206-12. doi: 10.4161/viru.26210. Epub 2013 Aug 27. PMID: 24200870; PMCID: PMC3916376.

Horton J, Pankey GA. Polymyxin B, colistin, and sodium colistimethate. Med Clin North Am. 1982 Jan;66(1):135-42. doi: 10.1016/s0025-7125(16)31447-x. PMID: 6278236.

Cycloheximide



CAS#: 68-81-9
Catalog#: CP-15065373-5g
Synonyms: cycloheximide, 66-81-9, ACTIDIONE, Cicloheximide, NARAMYCIN A
Molecular Formula: $C_{15}H_{23}NO_4$

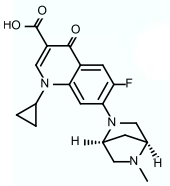
Cycloheximide is a protein synthesis inhibitor used to study translation dynamics in cells and translation elongation kinetics. Cycloheximide chase can also be used to elucidate protein degradation kinetics where protein synthesis and degradation rates can be separated.

References

Schneider-Poetsch T, Ju J, Eyler DE, Dang Y, Bhat S, Merrick WC, Green R, Shen B, Liu JO. Inhibition of eukaryotic translation elongation by cycloheximide and lactimidomycin. Nat Chem Biol. 2010 Mar;6(3):209-217. doi: 10.1038/nchembio.304. Epub 2010 Jan 31. PMID: 20118940; PMCID: PMC2831214.

Buchanan BW, Lloyd ME, Engle SM, Rubenstein EM. Cycloheximide Chase Analysis of Protein Degradation in Saccharomyces cerevisiae. J Vis Exp. 2016 Apr 18;(110):53975. doi: 10.3791/53975. PMID: 27167179; PMCID: PMC4941941.

Danofloxacin



CAS#: 112398-08-0
Catalog#: CP-51051393-100mg
Synonyms: Danofloxacin, 112398-08-0, UNII-24CU1YS91D, Danofloxacino, Advocin
Molecular Formula: $C_{19}H_{20}FN_3O_3$

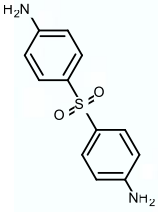
Danofloxacin was developed for veterinary medicine and is used in avian species against a variety of bacterial infections. Fluoroquinolones are used to treat bovine respiratory disease complex in beef cattle; however, little is known about their effects on gut microbiota and resistome.

References

Sartini I, Łebkowska-Wieruszewska B, Lisowski A, Poapolathep A, Giorgi M. Danofloxacin pharmacokinetics and tissue residues in Bilgorajska geese. Res Vet Sci. 2021 May;136:11-17. doi: 10.1016/j.rvsc.2021.01.017. Epub 2021 Jan 28. PMID: 33556838.

Beyi AF, Brito-Goulart D, Hawbecker T, Slagel C, Ruddell B, Hassall A, Dewell R, Dewell G, Sahin O, Zhang Q, Plummer PJ. Danofloxacin Treatment Alters the Diversity and Resistome Profile of Gut Microbiota in Calves. Microorganisms. 2021 Sep 24;9(10):2023. doi: 10.3390/microorganisms9102023. PMID: 34683343; PMCID: PMC8538188.

Dapsone



CAS#: 80-08-0
Catalog#: CP-28069836-500g
Synonyms: Avlosulfone, DADPS, Dapsoderm-X, Dapson-Fatol, Dapsone
Molecular Formula: $C_{12}H_{12}N_2O_2S$

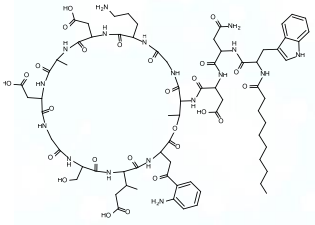
Dapsone was synthesized over a century ago, and is a useful medicine to treat skin diseases due to dermatological pathogens. Dapsone has antimicrobial/antiprotozoal effects and anti-inflammatory features similarly to non-steroidal anti-inflammatory drugs, and has many activities including affecting cellular toxic oxygen metabolism, myoloperoxidase-/halogenid system, adhesion molecules, chemotaxis, membrane-associated phospholipids, prostaglandins, leukotrienes, interleukin-8, tumor necrosis factor α, lymphocyte functions, and tumor growth.

References

Wolf R, Matz H, Orion E, Tuzun B, Tuzun Y. Dapsone. Dermatol Online J. 2002 Jun;8(1):2. PMID: 12165212.

Wozel G, Blasum C. Dapsone in dermatology and beyond. Arch Dermatol Res. 2014 Mar;306(2):103-24. doi: 10.1007/s00403-013-1409-7. Epub 2013 Dec 6. PMID: 24310318; PMCID: PMC3927068.

Daptomycin



CAS#: 103060-53-3
Catalog#: CP-64342447-100mg
Synonyms: Cubicin, Daptomycin, Daptomycin, 9 L beta Aspartic Acid, Deptomycin, LY 146032
Molecular Formula: $C_{72}H_{101}N_{17}O_{26}$

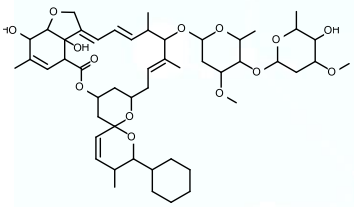
Daptomycin is the first-in-class lipopeptide and is active against Gram-positive infections. It has recently shown to be membrane active, depolarizing membranes similar to ionophore compounds that cause ion leakage.

References

Tedesco KL, Rybak MJ. Daptomycin. Pharmacotherapy. 2004 Jan;24(1):41-57. doi: 10.1592/phco.24.1.41.34802. PMID: 14740787.

Huang HW. DAPTOMYCIN, its membrane-active mechanism vs. that of other antimicrobial peptides. Biochim Biophys Acta Biomembr. 2020 Oct 1;1862(10):183395. doi: 10.1016/j.bbamem.2020.183395. Epub 2020 Jun 9. PMID: 32526177.

Doramectin



CAS#: 117704-25-3
Catalog#: CP-48672805-1g
Synonyms: Dectomax, doramectin, L-701023, L701023
Molecular Formula: $C_{50}H_{74}O_{14}$

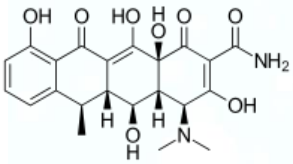
Dorimectin is a highly active veterinary drug useful against worms, nematodes and lice in farm animals and cattle especially. It also is used in companion animals for the generalized treatment of demodicosis, an inflammatory skin disease found in dogs and cats.

References

Mehlhorn H, Jones HL, Weatherley AJ, Schumacher B. Doramectin, a new avermectin highly efficacious against gastrointestinal nematodes and lungworms of cattle and pigs: two studies carried out under field conditions in Germany. Parasitol Res. 1993;79(7):603-7. doi: 10.1007/BF00932246. PMID: 8278344.

Cordero AM, Quek S, Mueller RS. Doramectin in the treatment of generalized demodicosis. Vet Dermatol. 2018 Apr;29(2):104-e41. doi: 10.1111/vde.12515. Epub 2017 Dec 29. PMID: 29285807.

Doxycycline hydrochloride



CAS#: 10592-13-9
Catalog#: CP-19948073-5g
Synonyms: Doryx, Doxycycline, Doxycycline Calcium
Molecular Formula: $C_{22}H_{25}ClN_2O_8$

Doxycycline is shown clinically to be highly effective in infections of the respiratory tract, atypical pneumonias, skin and soft tissue, genitourinary infection including gonorrhea, syphilis, nonspecific urethritis, and prostatitis; intraabdominal infection due to trauma, sepsis, or surgery; and cholera. It also has potent anti-inflammatory activity and can modify the immune responses to myocardial infarction, sparing tissue. More recently, doxycycline has shown increase the longevity of *Caenorhabditis elegans* worms by affecting the process of mitochondrial signaling and the unfolded protein response.

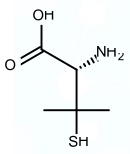
References

Cunha BA, Sibley CM, Ristuccia AM. Doxycycline. Ther Drug Monit. 1982;4(2):115-35. doi: 10.1097/00007691-198206000-00001. PMID: 7048645.

Griffin, M.O., Jinno, M., Miles, L.A. *et al.* Reduction of myocardial infarct size by doxycycline: A role for plasmin inhibition. *Mol Cell Biochem* **270,** 1–11 (2005). https://doi.org/10.1007/s11010-005-2540-3

Moullan N, Mouchiroud L, Wang X, Ryu D, Williams EG, Mottis A, Jovaisaite V, Frochaux MV, Quiros PM, Deplancke B, Houtkooper RH, Auwerx J. Tetracyclines Disturb Mitochondrial Function across Eukaryotic Models: A Call for Caution in Biomedical Research. Cell Rep. 2015 Mar 17;10(10):1681-1691. doi: 10.1016/j.celrep.2015.02.034. Epub 2015 Mar 12. PMID: 25772356; PMCID: PMC4565776.

D-Penicillamine



CAS#: 52-67-5
Catalog#: CP-47221894-5g
Synonyms: D-Penicillamine, penicillamine, 52-67-5, D-(-)-Penicillamine
Molecular Formula: $C_5H_{11}NO_2S$

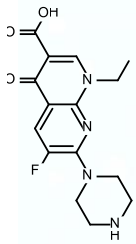
Penicillamine is a chelating agent used to remove copper from the systemic circulation in Wilson's disease and also has immunomodulatory activity against lupus and scleroderma, among other diseases. It also has activity against rheumatoid arthritis, showing improvement in such disease indications.

References

Levy RS, Fisher M, Alter JN. Penicillamine: review and cutaneous manifestations. J Am Acad Dermatol. 1983 Apr;8(4):548-58. doi: 10.1016/s0190-9622(83)70062-9. PMID: 6222087.

Doyle DV, Perrett D, Foster OJ, Ensor M, Scott DL. The long-term use of D-penicillamine for treating rheumatoid arthritis: is continuous therapy necessary? Br J Rheumatol. 1993 Jul;32(7):614-7. doi: 10.1093/rheumatology/32.7.614. PMID: 8339135.

Enoxacin



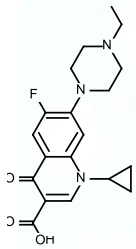
CAS#: 74011-58-8
Catalog#: CP-71188914-1g
Synonyms: 97519-39-6, Enoxacin, Enoxacin Sesquihydrate, Enoxin, Enoxor, PD 107779
Molecular Formula: $C_{15}H_{17}FN_4O_3$
Enoxacin is fluoroquinolone derivative used as oral and intravenous preparations. It is bactericidal for a wide range of bacteria, including *Staphylococcus aureus*, *S. epidermidis*, Enterobacteriaceae and *Pseudomonas aeruginosa.* It is also useful for treating serious or complicated urinary tract infections by a dosing regimen of four and eight days.

References

Zinner SH. Clinical overview of enoxacin. Clin Pharmacokinet. 1989;16 Suppl 1:59-64. doi: 10.2165/00003088-198900161-00010. PMID: 2653698.

Foot M, Williams G, Want S, Roe M, Quaghebeur G, Bates S. An open study of the safety and efficacy of enoxacin in complicated urinary tract infections. J Antimicrob Chemother. 1988 Feb;21 Suppl B:97-103. doi: 10.1093/jac/21.suppl_b.97. PMID: 3129393.

Enrofloxacin hydrochloride



CAS#: 93106-60-6
Catalog#: CP-71188914-1g
Synonyms: Baytril, Enrofloxacine, CFPQ, Enrofloxacino
Molecular Formula: $C_{19}H_{22}FN_3O_3$

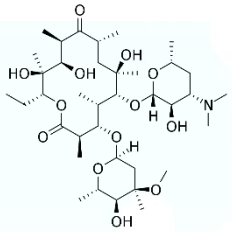
Enrofloxacin is a fluoroquinolone antibiotic with a broad spectrum of activity against Gram-positive and Gram-negative bacteria as well as against Mycoplasma spp. in various animals. It is approved by the FDA for use in pets and domestic animals, but is prohibited for use in humans due to its hallucinogenic effects.

References

Schroder J. Enrofloxacin: a new antimicrobial agent. J S Afr Vet Assoc. 1989 Jun;60(2):122-4. PMID: 2691696.

Boothe DM, Boeckh A, Boothe HW, Wilkie S, Jones S. Plasma concentrations of enrofloxacin and its active metabolite ciprofloxacin in dogs following single oral administration of enrofloxacin at 7.5, 10, or 20 mg/kg. Vet Ther. 2002 Winter;3(4):409-19. PMID: 12584678.

Erythromycin



CAS#: 114-07-8
Catalog#: CP-28466420-5g
Synonyms: erythromycin, 114-07-8, Erythromycin A, E-Mycin, Erythrocin
Molecular Formula: $C_{37}H_{67}NO_{13}$

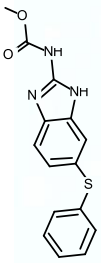
Erythromycin is a macrolide antibiotic that blocks the translocation reaction during protein synthesis in bacteria. It is active against most Gram-positive bacteria; some Gram-negative bacteria, including *Neisseria, Bordetella, Brucella, Campylobacter*, and *Legionella,* and *Treponema*, *Chlamydia*, and species. It also has anti-inflammatory activity due to neutrophil activation and decreases mucosal inflammation.

References

Washington JA 2nd, Wilson WR. Erythromycin: a microbial and clinical perspective after 30 years of clinical use (1). Mayo Clin Proc. 1985 Mar;60(3):189-203. doi: 10.1016/s0025-6196(12)60219-5. PMID: 3974301.

Maekawa T, Tamura H, Domon H, Hiyoshi T, Isono T, Yonezawa D, Hayashi N, Takahashi N, Tabeta K, Maeda T, Oda M, Ziogas A, Alexaki VI, Chavakis T, Terao Y, Hajishengallis G. Erythromycin inhibits neutrophilic inflammation and mucosal disease by upregulating DEL-1. JCI Insight. 2020 Aug 6;5(15):e136706. doi: 10.1172/jci.insight.136706. PMID: 32603314; PMCID: PMC7455085.

Fenbendazole



CAS#: 43210-67-9
Catalog#: CP-10896222-5g
Synonyms: fenbendazole, 43210-67-9, Panacur, Fenbendazol, Phenbendasol
Molecular Formula: $C_{15}H_{13}N_3O_2S$

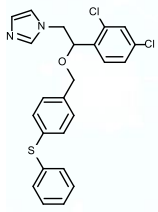
Fenbendazole is abroad spectrum anti-helminthic against pinworms, and more recently has shown a series of effects in species suggesting that the ability of B and T lymphocytes to proliferate in the secondary immune response may be suppressed. Further studies also show that it destabilizes microtubulin, showing promise as a possible anti-cancer agent.

References

Villar D, Cray C, Zaias J, Altman NH. Biologic effects of fenbendazole in rats and mice: a review. J Am Assoc Lab Anim Sci. 2007 Nov;46(6):8-15. PMID: 17994667.

Dogra N, Kumar A, Mukhopadhyay T. Fenbendazole acts as a moderate microtubule destabilizing agent and causes cancer cell death by modulating multiple cellular pathways. Sci Rep. 2018 Aug 9;8(1):11926. doi: 10.1038/s41598-018-30158-6. PMID: 30093705; PMCID: PMC6085345.

Fenticonazole Nitrate



CAS#: 73151-29-8
Catalog#: F1008
Synonyms: Fenizolan, fenticonazole, fenticonazole mononitrate, Laurimic
Molecular Formula: $C_{24}H_{21}Cl_2N_3O_4S$

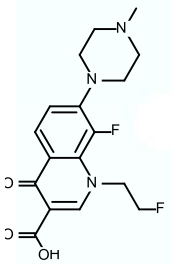
Fenticonazole is an effective topical drug for the treatment of mycotic infections of skin and mucosa, and helps contribute to reduce the selection of resistant strains of *Candida*, decreasing the incidence of antibiotic resistance. It exerts its mechanism of action in the following ways: (i) inhibition of the secretion of protease acid by *Candida albicans* (ii) damage to the cytoplasmic membrane, and (iii) by blocking cytochrome oxidases and peroxidases.

References

Tumietto F, Giacomelli L. Fenticonazole: an effective topical treatment for superficial mycoses as the first-step of antifungal stewardship program. Eur Rev Med Pharmacol Sci. 2017 Jun;21(11):2749-2756. PMID: 28678309.

Veraldi S, Milani R. Topical fenticonazole in dermatology and gynaecology: current role in therapy. Drugs. 2008;68(15):2183-94. doi: 10.2165/00003495-200868150-00007. PMID: 18840006.

Fleroxacin



CAS#: 79660-72-3
Catalog#: TCI-F0646-25G
Synonyms: fleroxacin, 79660-72-3, Megalone, Fleroxicin, Megalocin
Molecular Formula: $C_{17}H_{18}F_3N_3O_3$

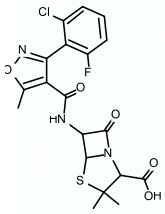
Fleroxacin is an oral and IV fluoroquinolone inhibiting DNA gyrase with pronounced activity against aerobic gram-negative bacteria, but also against gram-positive pathogens such as staphylococci.
It is also effective and safe in the treatment of acute osteomyelitis and acute septic arthritis.

References

Naber KG. Fleroxacin overview. Chemotherapy. 1996 Mar;42 Suppl 1:1-9. doi: 10.1159/000239485. PMID: 8861529.

Liu YC, Cheng DL, Liu CY, de Garis ST, Lin HH, Hsieh TL, Yen MY, Wang RS, Chen YS. Clinical evaluation of fleroxacin in the treatment of bone and joint infections. Southeast Asian J Trop Med Public Health. 1992 Sep;23(3):514-9. PMID: 1488710.

Flucloxacillin Sodium



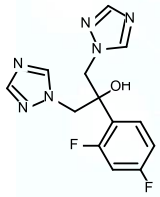
CAS#: 1847-24-1
Catalog#: CP-90028579-100mg
Synonyms: flucloxacillin sodium, 1847-24-1, Flucloxacillin sodium salt, Floxacillin sodium
Molecular Formula: $C_{19}H_{16}ClFN_3NaO_5S$

Flucloxacillin, an isoxazolilpenicillin, shows low acute and chronic toxicity, and enteric absorption and binding capability with serum proteins. It is particularly active in Gram-positive bacteria and on penicillinase producing staphylococci. It is useful in skin and soft tissue infections and in implant related infections and biofilm formation.

Mastroviti S, Cassarino G. La flucloxacillina [Flucloxacillin]. G Batteriol Virol Immunol. 1975 Jul-Dec;68(7-12):279-88. Italian. PMID: 1234594.

Greimel F, Scheuerer C, Gessner A, Simon M, Kalteis T, Grifka J, Benditz A, Springorum HR, Schaumburger J. Efficacy of antibiotic treatment of implant-associated *Staphylococcus aureus* infections with moxifloxacin, flucloxacillin, rifampin, and combination therapy: an animal study. Drug Des Devel Ther. 2017 Jun 14;11:1729-1736. doi: 10.2147/DDDT.S138888. PMID: 28652709; PMCID: PMC5476658.

Fluconazole



CAS#: 86386-73-4
Catalog#: CP-68611425-1g
Synonyms: fluconazole, 86386-73-4, Diflucan, Triflucan
Molecular Formula: $C_{13}H_{12}F_2N_6O$

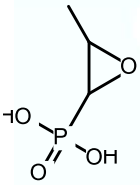
Fluconazole is a potent triazole anti-fungal agent, used to treat vaginal candidiasis, oropharyngeal and esophageal candidiasis, urinary tract infections, peritonitis, and systemic *Candida* infections. including candidemia, disseminated candidiasis, pneumonia, and cryptococcal meningitis. It is also effective in reducing the incidence of yeast colonization, superficial infection, and systemic infection in neutropenic pediatric and adult patients undergoing bone marrow transplantation.

References

Govindarajan A, Bistas KG, Ingold CJ, Aboeed A. Fluconazole. 2022 Jun 21. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID: 30725843.

MacMillan ML, Goodman JL, DeFor TE, Weisdorf DJ. Fluconazole to prevent yeast infections in bone marrow transplantation patients: a randomized trial of high versus reduced dose, and determination of the value of maintenance therapy. Am J Med. 2002 Apr 1;112(5):369-79. doi: 10.1016/s0002-9343(01)01127-5. PMID: 11904111.

Fosfomycin Disodium Salt



CAS#: 23155-02-4
Catalog#: TCI-F0889
Synonyms: Fosfomycin disodium salt, 016P999
Molecular Formula: $C_3H_7Na_2O_4P$

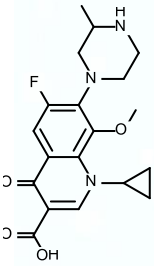
Fosfomycin is a low-molecular weight, broad-spectrum antibiotic, with activity against bacteria, including multidrug-resistant Gram-negative bacteria, by inhibiting cell wall synthesisIt is bactericidal, low toxicity, and acts as an inhibitor of the MurA enzyme, which catalyzes the first committed step of peptidoglycan synthesis.

References

Dijkmans AC, Zacarías NVO, Burggraaf J, Mouton JW, Wilms EB, van Nieuwkoop C, Touw DJ, Stevens J, Kamerling IMC. Fosfomycin: Pharmacological, Clinical and Future Perspectives. Antibiotics (Basel). 2017 Oct 31;6(4):24. doi: 10.3390/antibiotics6040024. PMID: 29088073; PMCID: PMC5745467.

Silver LL. Fosfomycin: Mechanism and Resistance. Cold Spring Harb Perspect Med. 2017 Feb 1;7(2):a025262. doi: 10.1101/cshperspect.a025262. PMID: 28062557; PMCID: PMC5287057.

Gatifloxacin



CAS#: 112811-59-3
Catalog#: TCI-F0889
Synonyms: Gatifloxacin, 112811-59-3, Tequin, Gatiflo
Molecular Formula: $C_{19}H_{22}FN_3O_4$

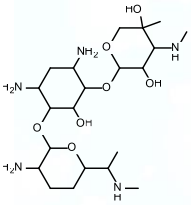
Gatifloxacin is a fourth-generation fluoroquinolone that inhibits DNA gyrase enzymes and is orally or administered by IV routes. AS an extended-spectrum fluoroquinolone it has improved Gram-positive and anaerobe activity compared with older agents such as ciprofloxacin. It has good activity against Enterobacteriaceae.
It is used in the clinic to treat ocular infection, although one limitation of gatifloxacin is its relatively poor corneal penetration, which is increased by ultra-sound permeation.

References

Perry CM, Barman Balfour JA, Lamb HM. Gatifloxacin. Drugs. 1999 Oct;58(4):683-96; discussion 697-8. doi: 10.2165/00003495-199958040-00010. PMID: 10551438.

Jegal U, Lee JH, Lee J, Jeong H, Kim MJ, Kim KH. Ultrasound-assisted gatifloxacin delivery in mouse cornea, in vivo. Sci Rep. 2019 Oct 29;9(1):15532. doi: 10.1038/s41598-019-52069-w. PMID: 31664145; PMCID: PMC6820539.

Gentamicin Sulfate



CAS#: 112811-59-3
Catalog#: MIL-G3632-5G
Synonyms: CHEMBL1200643, HMS1568O22, Gentamicin, sulfate (salt), Gentamicin sulfate salt
Molecular Formula: $C_{60}H_{125}N_{15}O_{25}S$

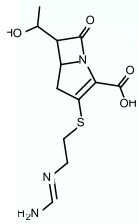
Gentamicin is useful in treating infection due to *Klebsiella pneumoniae, Escherichia coli, Serratia marcescens*, *Citrobacter* spp., *Enterobacteriaceae* spp., *Pseudomonas* spp., Staphylococcus infectious diseases and bacterial meningitis. It is used to treat bacterial sepsis of newborns, bacterial septicemia, infections of the eye, bone, skin and/or subcutaneous tissue. In sexually transmitted diseases it is effective against resistant *Neisseria* species, as an effective treatment for gonorrhea.

References

Chen C, Chen Y, Wu P, Chen B. Update on new medicinal applications of gentamicin: evidence-based review. J Formos Med Assoc. 2014 Feb;113(2):72-82. doi: 10.1016/j.jfma.2013.10.002. Epub 2013 Nov 9. PMID: 24216440.

Hathorn E, Dhasmana D, Duley L, Ross JD. The effectiveness of gentamicin in the treatment of Neisseria gonorrhoeae: a systematic review. Syst Rev. 2014 Sep 19;3:104. doi: 10.1186/2046-4053-3-104. PMID: 25239090; PMCID: PMC4188483.

Imipenem



CAS#: 64221-86-9
Catalog#: TOK-I001-5mg
Synonyms: Imipenem, 64221-86-9, Imipemide, N-Formimidoylthienamycin, Tienamycin
Molecular Formula: $C_{12}H_{17}N_3O_4S$

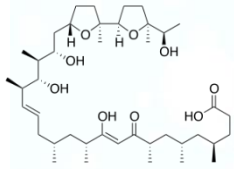
Imipenem is a broad spectrum carbapenem beta-lactam antibiotic, active against Gram-negative and Gram-positive aerobic and anaerobic bacteria, including many multiresistant strains. It is stable to many beta-lactamases. It is active against streptococci, MSSA staphylococci, Neisseria, Haemophilus, anaerobes, and the common aerobic gram-negative nosocomial pathogens including *Pseudomonas*. Combinations with beta-lactamase inhibitors overcome Class A carbapenem lactamases in *Pseudomonas*.

References

Hellinger WC, Brewer NS. Imipenem. Mayo Clin Proc. 1991 Oct;66(10):1074-81. doi: 10.1016/s0025-6196(12)61732-7. PMID: 1921491.

Mushtaq S, Meunier D, Vickers A, Woodford N, Livermore DM. Activity of imipenem/relebactam against Pseudomonas aeruginosa producing ESBLs and carbapenemases. J Antimicrob Chemother. 2021 Jan 19;76(2):434-442. doi: 10.1093/jac/dkaa456. PMID: 33152755.

Ionomycin free acid



CAS#: 56092-81-0
Catalog#: CP-22000466-1mg
Synonyms: NA
Molecular Formula: $C_{41}H_{72}O_9$

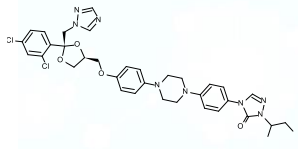
Ionomycin is an ionophore capable of binding calcium ions and crossing cell membranes, and is produced by the soil bacterium *Streptomyces conglobatus*. As a biochemical probe it is used to facilitate calcium entry into cells as well as to study calcium dynamics in cells and animal models of disease.

References

Toeplitz BK, et al. (1979). Structure of ionomycin - a novel diacidic polyether antibiotic having high affinity for calcium ions. Journal of the American Chemical Society. **101** (12): 3344–3353. doi:10.1021/ja00506a035. ISSN 0002-786

Nakamura S, Nakanishi A, Takazawa M, Okihiro S, Urano S, Fukui K. Ionomycin-induced calcium influx induces neurite degeneration in mouse neuroblastoma cells: analysis of a time-lapse live cell imaging system. Free Radic Res. 2016;50(11):1214-1225. doi: 10.1080/10715762.2016.1227074. Epub 2016 Sep 29. PMID: 27573976.

Itraconazole



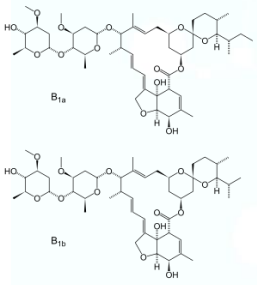
CAS#: 84625-61-6
Catalog#: CP-22000466-1mg
Synonyms: itraconazole, 84625-61-6, Oriconazole, Sporanox
Molecular Formula: $C_{35}H_{38}Cl_2N_8O_4$

Itraconazole is an antifungal agent in the triazole family useful in the treatment of superficial fungal infections. It also has additional anti-inflammatory action for application in difficult-to-treat inflammatory skin disorders, such as seborrheic dermatitis. It also active against invasive Aspergillosis.

Caputo R. Itraconazole (Sporanox) in superficial and systemic fungal infections. Expert Rev Anti Infect Ther. 2003 Dec;1(4):531-42. doi: 10.1586/14787210.1.4.531. PMID: 15482150.

Groll AH. Itraconazole--perspectives for the management of invasive aspergillosis. Mycoses. 2002;45 Suppl 3:48-55. doi: 10.1111/j.1439-0507.2002.tb04770.x. PMID: 12690972.

Ivermectin



CAS#: 70288-86-7
Catalog#: CP-21022571-1g
Synonyms: Ivermectin B1a, 70288-86-7, Dihydroavermectin B1a
Molecular Formula: $C_{48}H_{74}O_{14}$

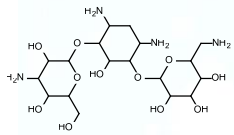
Ivermectin is a macrocyclic compound produced by Streptomyces avermitilis. It has numerous biological and mechanistic effects, and as an anti-parasitic compound it is active against microfilariae of *Onchocerca volvulus* but not the adult form. In-vitro it has antiviral effects, suggesting a use for SARS-CoV-2 (COVID-19) infection, although at very high concentrations the drugs pharmacokinetic parameters reduce the likelihood that high concentrations of the drug can be achieved *in-vivo*.

References

Laing R, Gillan V, Devaney E. Ivermectin - Old Drug, New Tricks? Trends Parasitol. 2017 Jun;33(6):463-472. doi: 10.1016/j.pt.2017.02.004. Epub 2017 Mar 9. PMID: 28285851; PMCID: PMC5446326.

Johnson-Arbor K. Ivermectin: a mini-review. Clin Toxicol (Phila). 2022 May;60(5):571-575. doi: 10.1080/15563650.2022.2043338. Epub 2022 Feb 28. PMID: 35225114.

Kanamycin Sulfate



CAS#: 25389-94-0
Catalog#: CP-15202460-100g
Synonyms: Kanamycin A, Kanamycin Sulfate, Kantrex
Molecular Formula: $C_{18}H_{38}N_4O_{15}S$

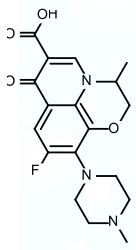
Kanamycin is an aminoglycoside antibiotic, produced by the bacterium *Streptomyces kanamycetius*, and is potent agent against bacterial infections caused *E. coli*, *Klebsiella pneumoniae*, *Serratia marcescens, Proteus* species (indole-positive and indole-negative), *Enterobacter aerogenes*, and *Acinetobacter* species. A protected derivative of kanamycin, arbekacin, ABK, overcomes kanamycin resistance due to enzymatic phosphorylation and acetylation.

References

Kanamycin, DrugBank. 17 August 2016.

Hotta K, Kondo S. Kanamycin and its derivative, arbekacin: significance and impact. J Antibiot (Tokyo). 2018 Mar;71(4):417-424. doi: 10.1038/s41429-017-0017-8. Epub 2018 Feb 5. PMID: 29402999.

Levofloxacin



CAS#: 100986-85-4
Catalog#: CP-24520686-5g
Synonyms: LEVOFLOXACIN, 100986-85-4, Levaquin, Quixin
Molecular Formula: $C_{18}H_{20}FN_3O_4$

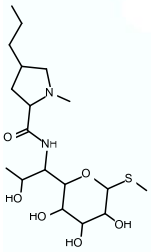
Levofloxacin, a fluoroquinolone antibiotic, is the active isomer of ofloxacin and more potent in vitro and in vivo. The safety and efficacy of levofloxacin in lower respiratory tract infections, skin and soft tissue infections, and urinary tract infections are well documented. Additionally, safety concerns and the risks of phototoxicity, CNS toxicity and cardiac reactions of the prolongation of QT-time are low. Fluoroquinolones have been found to have immunomodulatory properties, these compounds modify the TLR4/NF-κB inflammatory signaling pathway.

References

Norrby SR. Levofloxacin. Expert Opin Pharmacother. 1999 Nov;1(1):109-19. doi: 10.1517/14656566.1.1.109. PMID: 11249554.

Zusso M, Lunardi V, Franceschini D, Pagetta A, Lo R, Stifani S, Frigo AC, Giusti P, Moro S. Ciprofloxacin and levofloxacin attenuate microglia inflammatory response via TLR4/NF-kB pathway. J Neuroinflammation. 2019 Jul 18;16(1):148. doi: 10.1186/s12974-019-1538-9. PMID: 31319868; PMCID: PMC6637517.

Lincomycin hydrochloride



CAS#: 154-21-2
Catalog#: CP-13052257-5g
Synonyms: lincomycin, 154-21-2, Cillimycin, Lincolnensin
Molecular Formula: $C_{18}H_{34}N_2O_6S$

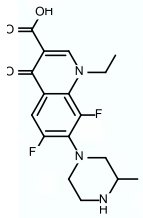
Lincomycin is a lincosamide antibiotic used in clinical practice and acts by bacteriostasis to inhibit protein synthesis in sensitive bacteria in the treatment of bacterial infections, in particular, those caused by anaerobic species. It's also active against protozoal diseases, such as malaria, most effectively in combination with primaquine. Resistance to lincomycin is caused by methylation of 23S ribosomal RNA. Its sometime used with its derivative clindamycin in diseases of ungulates and domestic hoof animals.

References

Spízek J, Rezanka T. Lincomycin, clindamycin and their applications. Appl Microbiol Biotechnol. 2004 May;64(4):455-64. doi: 10.1007/s00253-003-1545-7. Epub 2004 Feb 5. PMID: 14762701.

Sreeshitha Gouri S, Venkatachalam D, Dumka VK. Pharmacokinetics of lincomycin following single intravenous administration in buffalo calves. Trop Anim Health Prod. 2014 Aug;46(6):1099-102. doi: 10.1007/s11250-014-0595-4. Epub 2014 May 4. PMID: 24792222.

Lomefloxacin hydrochloride



CAS#: 154-21-2
Catalog#: CP-39370200-1g
Synonyms: lomefloxacin, 98079-51-7, Lomefloxacine, Lomefloxacino
Molecular Formula: $C_{17}H_{19}F_2N_3O_3$

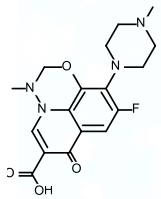
Lomefloxacin is a fluoroquinolone with activity similar to ciprofloxacin against Enterobacter species, and less activity against Gram-positive Staphylococci. It also has demonstrated efficacy similar to other therapies in the treatment of lower respiratory-tract infections and urinary-tract infections, and is used for prophylaxis before surgical procedures in the urinary tract. In the eye the compound has demonstrated permeation systemically, and may have anti-inflammatory properties against endophthalmitis.

References

Symonds WT, Nix DE. Lomefloxacin and temafloxacin: two new fluoroquinolone antimicrobials. Clin Pharm. 1992 Sep;11(9):753-66. PMID: 1325892.

Krustev SZ, Rusenova NV, Haritova AM. Effect of diclofenac on ocular levels of ciprofloxacin and lomefloxacin in rabbits with endophthalmitis. Drug Dev Ind Pharm. 2014 Nov;40(11):1459-62. doi: 10.3109/03639045.2013.828225. Epub 2013 Aug 13. PMID: 23937580.

Marbofloxacin



CAS#: 154-21-2
Catalog#: CP-73817541-100mg
Synonyms Marbofloxacin, 115550-35-1, Zeniquin, Marbocyl
Molecular Formula: $C_{17}H_{19}FN_4O_4$

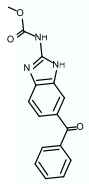
Marbofloxacin is a third-generation fluoroquinolone used in veterinary and agricultural medicine. It is used in cattle, poultry, and avian species in addition to domesticated animals and companion animals.

References

AliAbadi FS, Lees P. Antibiotic treatment for animals: effect on bacterial population and dosage regimen optimisation. Int J Antimicrob Agents. 2000 May;14(4):307-13. doi: 10.1016/s0924-8579(00)00142-4. PMID: 10794952.

Banovic F, Koch S, Robson D, Jacob M, Olivry T. Deep pyoderma caused by Burkholderia cepacia complex associated with ciclosporin administration in dogs: a case series. Vet Dermatol. 2015 Aug;26(4):287-e64. doi: 10.1111/vde.12210. Epub 2015 May 12. PMID: 25962868.

Mebendazole



CAS#: 31431-39-7
Catalog#: TCI-M2273-25G
Synonyms: mebendazole, 31431-39-7, Vermox, Telmin, Mebenvet
Molecular Formula: $C_{16}H_{13}N_3O_3$

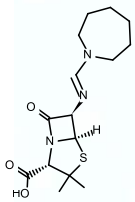
Mebendazole is an antihelminthic compound used against pinworm and other worm infections such as richinosis, capillariasis and toxocariasis. Recent in silco modeling showed the compound could directly bind to MAPK14, and could be a potential starting scaffold for novel MAPK14/p38α inhibitors to treat human glioblastoma (GBM).

References

Keystone JS, Murdoch JK. Mebendazole. Ann Intern Med. 1979 Oct;91(4):582-6. doi: 10.7326/0003-4819-91-4-582. PMID: 484964.

Ariey-Bonnet J, Carrasco K, Le Grand M, Hoffer L, Betzi S, Feracci M, Tsvetkov P, Devred F, Collette Y, Morelli X, Ballester P, Pasquier E. In silico molecular target prediction unveils mebendazole as a potent MAPK14 inhibitor. Mol Oncol. 2020 Dec;14(12):3083-3099. doi: 10.1002/1878-0261.12810. Epub 2020 Oct 18. PMID: 33021050; PMCID: PMC7718943.

Mecillinam



CAS#: 32887-01-7
Catalog#: CP-72134727-1g
Synonyms: AMDINOCILLIN, 32887-01-7, Penicillin HX, Coactin
Molecular Formula: $C_{15}H_{23}N_3O_3S$

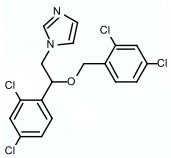
Mecillinam is a broad spectrum beta-lactam penicillin that binds directly to PBP-2 which disrupts peptidoglycan crosslinking causing the cell to lyse. It is used in susceptible *N. gonorrhoeae* uncomplicated urinary tract infections.

References

Boel JB, Antsupova V, Knudsen JD, Jarløv JO, Arpi M, Holzknecht BJ. Intravenous mecillinam compared with other β-lactams as targeted treatment for Escherichia coli or Klebsiella spp. bacteraemia with urinary tract focus. J Antimicrob Chemother. 2021 Jan 1;76(1):206-211. doi: 10.1093/jac/dkaa411. PMID: 32989447.

Fuchs F, Wille J, Hamprecht A, Parcina M, Lehmann C, Schwarze-Zander C, Seifert H, Higgins PG. In vitro activity of mecillinam and nitroxoline against Neisseria gonorrhoeae - re-purposing old antibiotics in the multi-drug resistance era. J Med Microbiol. 2019 Jul;68(7):991-995. doi: 10.1099/jmm.0.001014. Epub 2019 Jun 4. PMID: 31162022.

Miconazole



CAS#: 22916-47-8
Catalog#: CP-66179873-5g
Synonyms: miconazole, 22916-47-8, Monistat, Monistat IV, Daktarin IV
Molecular Formula: $C_{18}H_{14}Cl_4N_2O$

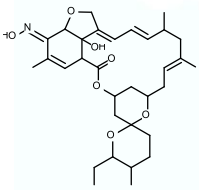
Miconazole is an azole antifungal agent active against pharyngeal candidiasis with activity against Gram-positive bacteria as well. It is used to treat mucosal yeast infections, including both oral and vaginal infections. Relative to relative to amphotericin B and ketoconazole miconazole has potential to treat coccidioidal disease, those that fail to respond to amphotericin B.

References

Fothergill AW. Miconazole: a historical perspective. Expert Rev Anti Infect Ther. 2006 Apr;4(2):171-5. doi: 10.1586/14787210.4.2.171. PMID: 16597199.

Stevens DA. Miconazole in the treatment of coccidioidomycosis. Drugs. 1983 Oct;26(4):347-54. doi: 10.2165/00003495-198326040-00004. PMID: 6354686.

Milbemycin oxime



CAS#: 129496-10-2
Catalog#: CP-56079360-1g
Synonyms: Milbemycin Oxime(Mixture of Milbemycin Oxime A3 and Milbemycin Oxime A4, 10:1), BS-52928
Molecular Formula: $C_{63}H_{88}N_2O_{14}$

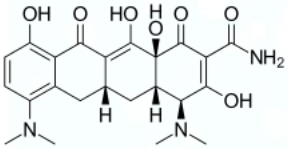
Milbemycin is active against *Dirofilaria immitis*, a filarial parasite of dogs, known to cause serious or fatal cardiopulmonary disease. Milbemycin oxime and lotilaner co-administered were effective as compared to for the prevention of heartworm disease. The combination also shows activity in treating infections in the stingrays caused by *Argukus* parasites.

References

Young LM, Wiseman S, Crawley E, Wallace K, Snyder DE. Field study to investigate the effectiveness and safety of a novel orally administered combination drug product containing milbemycin oxime and lotilaner (Credelio® Plus) for the prevention of heartworm disease (Dirofilaria immitis) in client-owned dogs in the USA. Parasit Vectors. 2021 May 28;14(1):284. doi: 10.1186/s13071-021-04767-6. PMID: 34044864; PMCID: PMC8161898.

Tang KN, O'Connor MR, Landolfi J, Bonn WV. SAFETY AND EFFICACY OF MILBEMYCIN OXIME AND LUFENURON TO TREAT *ARGULUS* SPP. INFESTATION IN SMOOTH BACK RIVER STINGRAYS (*POTAMOTRYGON ORBIGNYI*) AND MAGDALENA RIVER STINGRAYS (*POTAMOTRYGON MAGDALENAE*). J Zoo Wildl Med. 2019 Jun 13;50(2):383-388. doi: 10.1638/2018-0162. PMID: 31260204.

Minocycline hydrochloride



CAS#: 13614-98-7
Catalog#: CP-39523551-1g
Synonyms: MINOCYCLINE HYDROCHLORIDE, 13614-98-7, Minocycline HCl, Arestin, Minomycin
Molecular Formula: $C_{23}H_{28}ClN_3O_7$

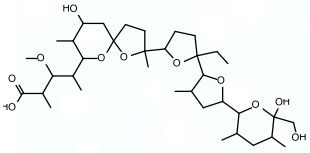
Minocycline is a second-generation tetracycline antibiotic generated by semi-synthesis from sancycline, and has enhanced tissue and secretion penetration due to its higher lipid solubility, good broad spectrum activity, superior gastrointestinal absorption, decreased alteration of the fecal flora. It also possesses a prolonged half-life and is used against Gram-positive and Gram-negative infections. Minocycline also has activity against neuroinflammation and inflammation based disease states, and is an anti-oxidant, anti-apoptotic, neuroprotective and possesses numerous non-antibiotic effects.

References

Jonas M, Cunha BA. Minocycline. Ther Drug Monit. 1982;4(2):137-45. PMID: 7048646.

Singh S, Khanna D, Kalra S. Minocycline and Doxycycline: More Than Antibiotics. Curr Mol Pharmacol. 2021;14(6):1046-1065. doi: 10.2174/1874467214666210210122628. PMID: 33568043.

Monensin sodium salt



CAS#: 22373-78-0
Catalog#: TOK-M083-1g
Synonyms: Monensin sodium salt, Monensin sodium, Sodium monensin
Molecular Formula: $C_{36}H_{61}NaO_{11}$

Monensin is a lipid bioactive ionophore and antimicrobial agent, able to exchange sodium and potassium ions across membranes, depolarizing ionic gradients and altering cell survival, especially in bacteria. It is FDA approved to treat poultry

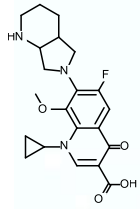
coccidosis and can selectively kill pathogens in this manner. It is also used in bovine diseases and acts as a growth promotor in feedlot cattle.

References

Rajendran V, Ilamathi HS, Dutt S, Lakshminarayana TS, Ghosh PC. Chemotherapeutic Potential of Monensin as an Anti-microbial Agent. Curr Top Med Chem. 2018;18(22):1976-1986. doi: 10.2174/1568026619666181129141151. PMID: 30499391.

Goodrich RD, Garrett JE, Gast DR, Kirick MA, Larson DA, Meiske JC. Influence of monensin on the performance of cattle. J Anim Sci. 1984 Jun;58(6):1484-98. doi: 10.2527/jas1984.5861484x. PMID: 6378865.

Moxifloxacin hydrochloride



CAS#: 186826-86-8
Catalog#: CP-85126157-1g
Synonyms: Moxifloxacin hydrochloride, 186826-86-8, Moxifloxacin HCl, Avelox, Avalox
Molecular Formula: $C_{21}H_{25}ClFN_3O_4$

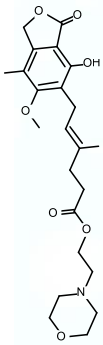
Moxifloxacin is an extended-spectrum fluoroquinolone and is active against major upper and lower respiratory tract pathogens and it is one of the most active fluoroquinolones against pneumococci, including penicillin- and macrolide-resistant strains. Based on its immunomodulatory properties, moxifloxacin and other fluoroquinolones have the pharmacokinetics and safety profile as adjuncts in the treatment of SARS-CoV-2 associated pneumonia.

References

Balfour JA, Lamb HM. Moxifloxacin: a review of its clinical potential in the management of community-acquired respiratory tract infections. Drugs. 2000 Jan;59(1):115-39. doi: 10.2165/00003495-200059010-00010. PMID: 10718103.

Karampela I, Dalamaga M. Could Respiratory Fluoroquinolones, Levofloxacin and Moxifloxacin, Prove to be Beneficial as an Adjunct Treatment in COVID-19? Arch Med Res. 2020 Oct;51(7):741-742. doi: 10.1016/j.arcmed.2020.06.004. Epub 2020 Jun 6. PMID: 32546446; PMCID: PMC7275144.

Mycophenolate Mofetil



CAS#: 128794-94-5
Catalog#: TCI-M2387-1G
Synonyms: mycophenolate mofetil, 128794-94-5, CellCept, RS 61443
Molecular Formula: $C_{23}H_{31}NO_7$

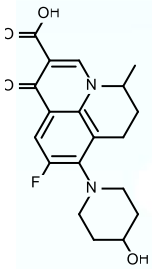
Mycophenolate mofetil is a prodrug of mycophenolic acid and an inhibitor of inosine-5'-monophosphate dehydrogenase which guanosine nucleotides preferentially in T and B lymphocytes. It exerts its anti-inflammatory effect by inhibiting immune cell proliferation and cell-mediated immune responses and has potential uses as an immunosuppressant in the treatment of dermatologic conditions.

References

Allison AC. Mechanisms of action of mycophenolate mofetil. Lupus. 2005;14 Suppl 1:s2-8. doi: 10.1191/0961203305lu2109oa. PMID: 15803924.

Orvis AK, Wesson SK, Breza TS Jr, Church AA, Mitchell CL, Watkins SW. Mycophenolate mofetil in dermatology. J Am Acad Dermatol. 2009 Feb;60(2):183-99; quiz 200-2. doi: 10.1016/j.jaad.2008.08.049. PMID: 19150270.

Nadifloxacin



CAS#: 124858-35-1
Catalog#: CP-11019340-250mg
Synonyms: nadifloxacin, OPC 7251, OPC-7251, R-NDFX
Molecular Formula: $C_{19}H_{21}FN_2O_4$

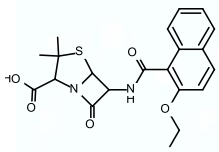
Nadifloxacin is a fifth-generation fluoroquinolone, which is used topically for skin and soft tissue bacterial infections. It is useful in moderate to sever acne caused by Cutibacterium acnes isolated from pateints with acne vulgaris.

References

Rusu A, Lungu IA, Moldovan OL, Tanase C, Hancu G. Structural Characterization of the Millennial Antibacterial (Fluoro)Quinolones-Shaping the Fifth Generation. Pharmaceutics. 2021 Aug 18;13(8):1289. doi: 10.3390/pharmaceutics13081289. PMID: 34452252; PMCID: PMC8399897.

Nenoff P, Koch D, Krüger C, Neumeister C, Götz MR, Schwantes U, Bödeker RH, Borelli C. Activity of nadifloxacin and three other antimicrobial agents against Cutibacterium acnes isolated from patients with acne vulgaris. J Eur Acad Dermatol Venereol. 2021 Oct;35(10):e682-e684. doi: 10.1111/jdv.17386. Epub 2021 Jun 7. PMID: 34018651; PMCID: PMC8518973.

Nafcillin sodium salt



CAS#: 147-52-4
Catalog#: CP-24437544-1g
Synonyms: nafcillin, Naphcillin, Nallpen
Molecular Formula: $C_{21}H_{22}N_2O_5S_4$

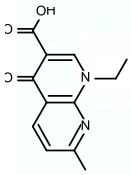
Nafcillin is a beta-lactam compound with a narrow spectrum of antibacterial activity against Gram-positive bacteria, especially those resistant to penicillins. Evidence shows that nafcillin also inhibits cytochrome-P450 enzymes, and has other side-effects that complicate its use.

References

Rajput A, Poudel S, Tsunemoto H, Meehan M, Szubin R, Olson CA, Lamsa A, Seif Y, Dillon N, Vrbanac A, Sugie J, Dahesh S, Monk JM, Dorrestein PC, Knight R, Nizet V, Palsson BO, Feist AM, Pogliano J. Profiling the effect of nafcillin on HA-MRSA D712 using bacteriological and physiological media. Sci Data. 2019 Dec 17;6(1):322. doi: 10.1038/s41597-019-0331-z. PMID: 31848353; PMCID: PMC6917727.

Lang CC, Jamal SK, Mohamed Z, Mustafa MR, Mustafa AM, Lee TC (June 2003). Evidence of an interaction between nifedipine and nafcillin in humans. *Br J Clin Pharmacol*. **55** (6): 58-90. doi:10.1046/j.13652125.2003.01789.x. PMC 1884262. PMID 12814453

Nalidixic acid sodium salt



CAS#: 3374-05-8
Catalog#: CP-75525039
Synonyms: Nalidixic acid sodium salt, 3374-05-8, Baktogram, Nalidixic acid sodium
Molecular Formula: $C_{12}H_{11}N_2NaO_3$

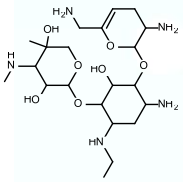
Nalidixic acid is the first quinolone antibiotic to be described, with Gram-negative activity and slight Gram-positive activity. *T was useful* historically for treating urinary tract infections due to *Escherichia coli*, *Proteus*, *Shigella*, *Enterobacter*, and *Klebsiella*. It is no longer clinically as less toxic and more effective agents are available. As the most basic quinolone showing bioactivity, it is often used as a starting material for more complex and advanced quinolones.

References

Pagnini G. [Nalidixic acid]. Antibiotica. 1967 Jun;5(2):134-59. Multiple languages. PMID: 4389549.

Khalil OM, Gedawy EM, El-Malah AA, Adly ME. Novel nalidixic acid derivatives targeting topoisomerase II enzyme; Design, synthesis, anticancer activity and effect on cell cycle profile. Bioorg Chem. 2019 Mar;83:262-276. doi: 10.1016/j.bioorg.2018.10.058. Epub 2018 Oct 30. PMID: 30391699.

Netilmicin sulfate



CAS#: 56391-56-1
Catalog#: CP-53441667-1g
Synonyms: netilmicin, 1-N-Ethylsisomicin, 56391-56-1, NETILMICIN SULFATE, Nettacin
Molecular Formula: $C_{21}H_{41}N_5O_7$

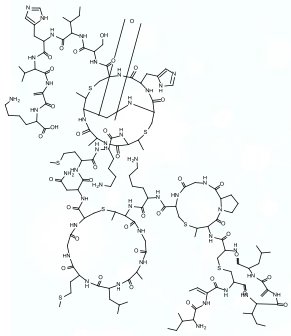
Netilmycin is a soluble aminoglycoside produced by *Micromonospora inyoensis*. It binds to 16S rRNA and the S12 protein at the bacterial 30S subunit. For an aminoglycoside antibiotic it has significantly lower frequency of ototoxicity lowering significant risk factors for ototoxicity, such as advanced age, renal impairment, and others during prolonged aminoglycoside therapy.

References

Craig WA, Gudmundsson S, Reich RM. Netilmicin sulfate: a comparative evaluation of antimicrobial activity, pharmacokinetics, adverse reactions and clinical efficacy. Pharmacotherapy. 1983 Nov-Dec;3(6):305-15. doi: 10.1002/j.1875-9114.1983.tb03283.x. PMID: 6361701.

Edson RS, Keys TF. The aminoglycosides. Streptomycin, kanamycin, gentamicin, tobramycin, amikacin, netilmicin, sisomicin. Mayo Clin Proc. 1983 Feb;58(2):99-102. PMID: 6823164.

Nisin



CAS#: 1415-45-5
Catalog#: CP-19057261-5g
Synonyms: AKOS024418746, Nisin from Lactococcus lactis, 2.5%
Molecular Formula: $C_{143}H_{230}N_{42}O_{37}S_7$

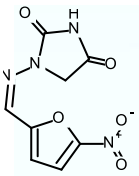
Nisin is an antimicrobial peptide produced by Lactococcus lactis and is composed of 34 Amino acids in a linear chain. Nisin is used in processed foods and cheese, meats, beverages, and extends food shelf life by suppressing Gram-positive bacterial growth and pathogenic bacteria. It is common to use nisin at levels ranging from ~1-25 ppm, depending foodstuff and regulatory guidelines and has an E number of E234.

References

Shin JM, Gwak JW, Kamarajan P, Fenno JC, Rickard AH, Kapila YL. Biomedical applications of nisin. J Appl Microbiol. 2016 Jun;120(6):1449-65. doi: 10.1111/jam.13033. Epub 2016 Feb 12. PMID: 26678028; PMCID: PMC4866897.

Özel B, Şimşek Ö, Akçelik M, Saris PEJ. Innovative approaches to nisin production. Appl Microbiol Biotechnol. 2018 Aug;102(15):6299-6307. doi: 10.1007/s00253-018-9098-y. Epub 2018 May 30. PMID: 29850958.

Nitrofurantoin



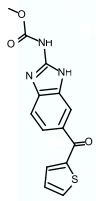
CAS#: 67-20-9
Catalog#: CP-43672322-100g
Synonyms: nitrofurantoin, 67-20-9, Furadantin, 5-Nitrofurantoin, Furadonine
Molecular Formula: $C_8H_6N_4O_5$

Nitrofurantoin is a small molecule nitro-group containing antibiotic used to treat urinary tract infections (UTIs) and has good activity against *E. coli, Staphylococcus aureus, Enterococcus* species, *Klebsiella* and *Bacillus* species. For an organonitro compound it possesses an acceptable safety profile, has good PK/PD and metabolic profile, and has a long historical history as a medicine.

Cunha BA. Nitrofurantoin--current concepts. Urology. 1988 Jul;32(1):67-71. doi: 10.1016/0090-4295(88)90460-8. PMID: 3291373.

Kapral N, Saxena R, Sule AA, Markle B. Nitrofurantoin: friend or foe? Drug Ther Bull. 2019 May;57(5):80-81. doi: 10.1136/dtb.2018.225629rep. PMID: 31018931.

Nocodazole



CAS#: 97519-39-6
Catalog#: CP-90028754
Synonyms: nocodazole, 31430-18-9, Oncodazole, R 17934
Molecular Formula: $C_{14}H_{11}N_3O_3S$

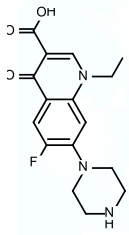
Nocondazole is a tubulin binding agent and induces apoptosis in tumor cells by depolymerizing tubulin in a mechanism distinct from colchicine. AS an anti-cancer agent it can induce dominant lethal mutations in male germ cells by the in vivo dominant lethal test.

References

Surani AA, Colombo SL, Barlow G, Foulds GA, Montiel-Duarte C. Optimizing Cell Synchronization Using Nocodazole or Double Thymidine Block. Methods Mol Biol. 2021;2329:111-121. doi: 10.1007/978-1-0716-1538-6_9. PMID: 34085219.

Attia SM, Ahmad SF, Okash RM, Bakheet SA. Dominant lethal effects of nocodazole in germ cells of male mice. Food Chem Toxicol. 2015 Mar;77:101-4. doi: 10.1016/j.fct.2015.01.004. Epub 2015 Jan 13. PMID: 25595372.

Norfloxacin



CAS#: 70458-96-7
Catalog#: CP-32616814-1g
Synonyms: 97519-39-6, Cedax, Ceftibuteno, Ceftibutenum, Ceftibutene
Molecular Formula: $C_{15}H_{14}N_4O_6S_2$

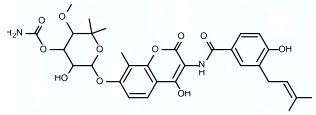
Norfloxacin is a fluorinated congener of nalidixic acid, and it has activity against *Pseudomonas* species especially those antibiotic resistant due to Mex efflux proteins. Norfloxacin is as active as spectinomycin in gonorrhoea due to penicillin-resistant *N. gonorrhoeae*, and is active against bacterial pathogens causing gastroenteritis.

References

Holmes B, Brogden RN, Richards DM. Norfloxacin. A review of its antibacterial activity, pharmacokinetic properties and therapeutic use. Drugs. 1985 Dec;30(6):482-513. doi: 10.2165/00003495-198530060-00003. PMID: 3908074.

Marble DA, Bosso JA. Norfloxacin: a quinoline antibiotic. Drug Intell Clin Pharm. 1986 Apr;20(4):261-6. doi: 10.1177/106002808602000402. PMID: 3516615.

Novobiocin sodium salt



CAS#: 1476-53-5
Catalog#: CP-517587785-5g
Synonyms: Novobiocin sodium salt, 1476-53-5, C31H35N2O11.Na, MFCD00066541
Molecular Formula: $C_{31}H_{35}N_2NaO_{11}$

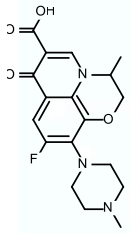
Novobiocin is a coumarin-based antibiotic produced by *Streptomyces niveus* and is an antimicrobial agent EC 5.99, ATP-hydrolysing compound. Coumarin derivatives are potent inhibitors of DNA gyrases, targeting the GyrB subunit involved in energy transduction. Extensive structure-activity studies show the importance of the coumarin scaffold in increasing enhanced bioactivity.

References

Morris A, Russell AD. The mode of action of novobiocin. Prog Med Chem. 1971;8(1):39-59. doi: 10.1016/s0079-6468(08)70127-9. PMID: 4254750.

Moellering RC Jr. Mechanism of action of antimicrobial agents. Clin Obstet Gynecol. 1979 Jun;22(2):277-83. doi: 10.1097/00003081-197906000-00004. PMID: 466873.

Ofloxacin



CAS#: 82419-36-1
Catalog#: CP-11654280-5g
Synonyms: ofloxacin, 82419-36-1, Floxin, Ofloxacine, Tarivid
Molecular Formula: $C_{18}H_{20}FN_3O_4$

Orfloxacin is a quinolone derivative and antibacterial agent that inhibits DNA super-coiling activity in DNA gyrase, stopping DNA replication. Its favorable PK/PD and metabolism characteristics allows it to achieve high tissue and CNS levels.

References

Smythe MA, Rybak MJ. Ofloxacin: a review. DICP. 1989 Nov;23(11):839-46. doi: 10.1177/106002808902301101. PMID: 2688325.

Monk JP, Campoli-Richards DM. Ofloxacin. A review of its antibacterial activity, pharmacokinetic properties and therapeutic use. Drugs. 1987 Apr;33(4):346-91. doi: 10.2165/00003495-198733040-00003. PMID: 3297617.

Oxacillin sodium salt

CAS#: 1173-88-2
Catalog#: CP-525753358-5g
Synonyms: Oxacillin sodium salt, OXACILLIN SODIUM, 1173-88-2, Oxabel, Prostaphlin
Molecular Formula: $C_{19}H_{18}N_3NaO_5S$

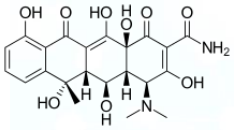
Oxacillin is a penicillinase-resistant and acid-stable penicillin that binds to penicillin-binding proteins causing cross-linking inhibition and cell lysis as a mode of action. It is used against a variety of infectious disease pathogens including those causing skin and soft tissue infections, bacteremia, endocarditis and intravascular infections, pneumonia, osteomyelitis and vertebral discitis, and epidural abscesses.

References

Naas T, Nordmann P. OXA-type beta-lactamases. Curr Pharm Des. 1999 Nov;5(11):865-79. PMID: 10539993.

David MZ, Daum RS. Treatment of Staphylococcus aureus Infections. Curr Top Microbiol Immunol. 2017;409:325-383. doi: 10.1007/82_2017_42. PMID: 28900682.

Oxytetracycline



CAS#: 79-57-2
Catalog#: CP-20887879-25g
Synonyms: Terramycin, 79-57-2, Oxyterracine, Oxytetracyclin
Molecular Formula: $C_{22}H_{24}N_2O_9$

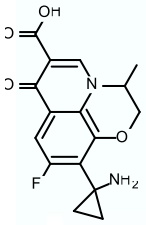
Oxytetracycline is a natural product produced by the soil bacterium *Streptomyces rimosus* and is considered a broad-spectrum antibiotic. Although not used in human medicine often, it is used to control American and European foulbrood diseases in honybees, and has been used in aquaculture and agriculture. Oxytetracycline is used to control citrus greening caused by Candidatus Liberibacter asiaticus that has destroyed half the groves in Florida, among its many uses in agriculture.

References

Nelson ML, Levy SB. The history of the tetracyclines. Ann N Y Acad Sci. 2011 Dec;1241:17-32. doi: 10.1111/j.1749-6632.2011.06354.x. PMID: 22191524.

McManus PS, Stockwell VO, Sundin GW, Jones AL. Antibiotic use in plant agriculture. Annu Rev Phytopathol. 2002;40:443-65. doi: 10.1146/annurev.phyto.40.120301.093927. Epub 2002 Feb 20. PMID: 12147767.

Pazufloxacin Mesylate



CAS#: 163680-77-1
Catalog#: TCI-P1962-5G
Synonyms: Pazufloxacin mesylate, 163680-77-1, Pazufloxacin mesilate, Pazucross
Molecular Formula: $C_{17}H_{19}FN_2O_7S$

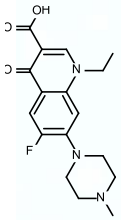
Pazufloxacin, also known as T-3791, is a quinolone antibiotic developed by the Toyama Chemical Company, Japan. Also related was the development of Moxifloxacin, by drug hunter John Barret.

References

Johnson AP. Pazufloxacin Toyama Chemical Co. Curr Opin Investig Drugs. 2000 Sep;1(1):52-7. PMID: 11249595.

Barrett JF. Moxifloxacin Bayer. Curr Opin Investig Drugs. 2000 Sep;1(1):45-51. PMID: 11249594.

Pefloxacin mesylate



CAS#: 70458-95-8
Catalog#: CP-54165700-25g
Synonyms: Pefloxacin mesylate, 70458-95-6, Pefloxacin methanesulfonate, PEFLOXACINE MESYLATE
Molecular Formula: $C_{18}H_{24}FN_3O_6S$

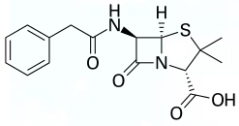
Perfloxacin is a fluoroquinolone antibiotic active against Gram-negative and Gram-positive pathogenic bacteria, capable of cell penetration with high serum levels. The agent partitions into lipophilic tissues and organs, and leads to tissue penetration and selective uptake. With its characteristics this compound also partitions into immune cells readily.

References

Bressolle F, Gonçalves F, Gouby A, Galtier M. Pefloxacin clinical pharmacokinetics. Clin Pharmacokinet. 1994 Dec;27(6):418-46. doi: 10.2165/00003088-199427060-00003. PMID: 7882634.

Desnottes JF, Diallo N, Loubeyre C, Moreau N. Effect of pefloxacin on microorganism: host cell interaction. J Antimicrob Chemother. 1990 Oct;26 Suppl B:17-26. doi: 10.1093/jac/26.suppl_b.17. PMID: 2258345.

Penicillin G sodium salt



CAS#: 69-57-86
Catalog#: CP-47080913-25g
Synonyms: Penicillin G sodium, Penicillin G sodium salt, 69-57-8, Benzylpenicillin sodium, Crystapen
Molecular Formula: $C_{16}H_{17}N_2NaO_4S$

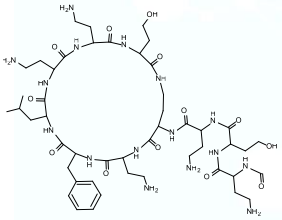
Penicillin G, aka benzylpenicillin, is a broad-spectrum beta-lactam penicillin antibiotic and is bacteriocidal. It binds to penicillin binding proteins and breaks crosslinking of the peptide-glycan chains, causing cell lysis. It is used in skin and structure infections and in pneumococcal pneumonia.

Kim MK, Kang CK, Kim MJ, Jun KI, Lee YK, Jeong SJ, Song KH. Penicillin G-induced hemorrhagic cystitis: a case and review of the literature. Korean J Intern Med. 2013 Nov;28(6):743-5. doi: 10.3904/kjim.2013.28.6.743. Epub 2013 Oct 29. PMID: 24307855; PMCID: PMC3847005.

Plotkin SA. Antibiotics--1975. Clin Pediatr (Phila). 1975 Sep;14(9):816-8. doi: 10.1177/000992287501400905. PMID: 1157433.

Bryan CS, Talwani R, Stinson MS. Penicillin dosing for pneumococcal pneumonia. Chest. 1997 Dec;112(6):1657-64. doi: 10.1378/chest.112.6.1657. PMID: 9404765.

Polymyxin B Sulfate



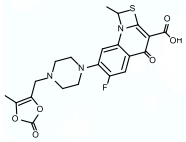
CAS#: 1405-20-5
Catalog#: CP-59662126-5g
Synonyms: Polymxin B sulfate, EINECS 215-774-7, SCHEMBL15106384, Polymyxin B sulfate [USP:JAN], AKOS026750024
Molecular Formula: $C_{48}H_{84}N_{16}O_{17}S$

Polymyxin B is a cyclic peptide antibiotic used for the treatment of multi-drug resistant pathogens. This natural product produced by bacillus species such as *Bacillus polymyxa,* are active against ventilator-associated pneumonia, urinary tract infections, bacteremia, and meningitis caused by multidrug resistant Gram-negative pathogens, such as *Pseudomonas aeruginosa, Acinetobacter baumannii, Klebsiella pneumoniae*, and *Enterobacter* species.

Zavascki AP, Goldani LZ, Li J, Nation RL. Polymyxin B for the treatment of multidrug-resistant pathogens: a critical review. J Antimicrob Chemother. 2007 Dec;60(6):1206-15. doi: 10.1093/jac/dkm357. Epub 2007 Sep 17. PMID: 17878146.

Trimble MJ, Mlynárčik P, Kolář M, Hancock RE. Polymyxin: Alternative Mechanisms of Action and Resistance. Cold Spring Harb Perspect Med. 2016 Oct 3;6(10):a025288. doi: 10.1101/cshperspect.a025288. PMID: 27503996; PMCID: PMC5046685.

Prulifloxacin



CAS#: 123447-62-1
Catalog#: TCI-P2058-5G
Synonyms: Prulifloxacin, 123447-62-1, NM441, Pruvel
Molecular Formula: $C_{21}H_{20}FN_3O_6S$

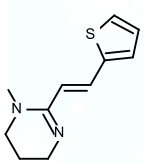
Prufloxacin is a fluoroquinolone antibiotic that showed in urinary tract, acute uncomplicated and complicated, and respiratory tract infections, acute exacerbations of chronic bronchitis, in comparison to ciprofloxacin. As a prodrug prulifloxacin show potential for the treatment of lung and urinary infections.

References

Prats G, Rossi V, Salvatori E, Mirelis B. Prulifloxacin: a new antibacterial fluoroquinolone. Expert Rev Anti Infect Ther. 2006 Feb;4(1):27-41. doi: 10.1586/14787210.4.1.27. PMID: 16441207.

Matera MG. Pharmacologic characteristics of prulifloxacin. Pulm Pharmacol Ther. 2006;19 Suppl 1:20-9. doi: 10.1016/j.pupt.2005.09.009. Epub 2005 Dec 19. PMID: 16360331.

Pyrantel Pamoate



CAS#: 22204-24-6
Catalog#: SPC-P1599-25GM
Synonyms: Pyrantel embonate, Antiminth, Combantrin
Molecular Formula: $C_{23}H_{16}O_6.C_{11}H_{14}N_2S$ or $C_{34}H_{30}N_2O_6S$

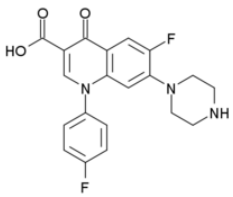
Pyrantel is an antihelminthisc agent, effective against ascariasis, hookworm infections, enterobiasis (pinworm infection), trichostrongyliasis, and trichinellosis and is orally active. It is on the World Health Organization's List of Essential Medicines.

References

Kucik CJ, Martin GL, Sortor BV. Common intestinal parasites. Am Fam Physician. 2004 Mar 1;69(5):1161-8. PMID: 15023017.

Sapulete EJJ, de Dwi Lingga Utama IMG, Sanjaya Putra IGN, Kanya Wati D, Arimbawa IM, Gustawan IW. Efficacy of Albendazole-Pyrantel Pamoate Compared to Albendazole Alone for *Trichuris trichiura* Infection in Children: A Double Blind Randomised Controlled Trial. Malays J Med Sci. 2020 May;27(3):67-74. doi: 10.21315/mjms2020.27.3.7. Epub 2020 Jun 30. PMID: 32684807; PMCID: PMC7337942.

Sarafloxacin Hydrochloride



CAS#: 98105-99-8
Catalog#: TOKU-5003-25g
Synonyms: Sarafloxacin, 98105-99-8, Sarafloxacine
Molecular Formula: $C_{20}H_{17}F_2N_3O_3$ 2

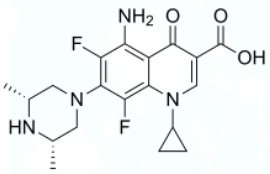
Sarafloxacin is a fluoroquinolone approved for use in Canada but not the US with broad antimicrobial activities against community and hospital-acquired infections such as respiratory tract infections (nosocomial pneumonia, chronic bronchitis and tuberculosis), skin and soft tissue infections, bone and joint infections, intra-abdominal infections and sexually transmitted diseases. Against mammalian targets the drug also affects Cu/Zn superoxide dismutase, and may alter reactive oxygen species and dynamics.

References

Asadipour A, Moshafi MH, Khosravani L, Moghimi S, Amou E, Firoozpour L, Ilbeigi G, Beiki K, Soleimani E, Foroumadi A. N-substituted piperazinyl sarafloxacin derivatives: synthesis and in vitro antibacterial evaluation. Daru. 2018 Dec;26(2):199-207. doi: 10.1007/s40199-018-0226-0. Epub 2018 Nov 3. PMID: 30392156; PMCID: PMC6279671.

Cao Z, Liu R, Dong Z, Yang X, Chen Y. The effect of sarafloxacin on Cu/ZnSOD structure and activity. Spectrochim Acta A Mol Biomol Spectrosc. 2015 Feb 5;136 Pt B:601-6. doi: 10.1016/j.saa.2014.09.073. Epub 2014 Oct 13. PMID: 25448960.

Sparfloxacin Hydrochloride



CAS#: 110871-86-8
Catalog#: CP-48237696-5g
Synonyms: sparfloxacin, 110871-86-8, Zagam, AT-4140
Molecular Formula: $C_{19}H_{22}F_2N_4O_3$

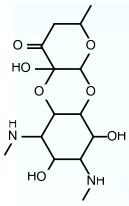
Sparfloxacin is fluoroquinolone that inhibits DNA gyrase, although its photosensitivity limits it market and it is not prescribed in the US. It is active against the major respiratory pathogens and atypical pathogens in pneumonia, and the study of its photosensitivity shows differences based on animal models.

References

Schentag JJ. Sparfloxacin: a review. Clin Ther. 2000 Apr;22(4):372-87; discussion 371. doi: 10.1016/S0149-2918(00)89007-4. PMID: 10823360.

Shimoda K, Ikeda T, Okawara S, Kato M. Possible relationship between phototoxicity and photodegradation of sitafloxacin, a quinolone antibacterial agent, in the auricular skin of albino mice. Toxicol Sci. 2000 Aug;56(2):290-6. doi: 10.1093/toxsci/56.2.290. PMID: 10910986.

Spectinomycin Dihydrochloride



CAS#: 21736-83-4
Catalog#: TOK-5005-25g
Synonyms: Spectinomycin dihydrochloride, 21736-83-4, Spectinomycin hydrochloride, actinospectacin
Molecular Formula: $C_{14}H_{26}Cl_2N_2O_7$

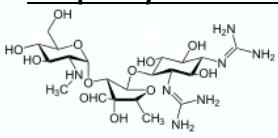
Spectinomycin is an aminocyclitol natural product made from the bacterium *Streptomyces spectabilis.* It is used against sexually transmitted diseases and especially gonorrhea and Neisseria strains. It is particularly effective in ophthalmic infections and is used to treat Gonococcal keratoconjunctivitis.

References

Holloway WJ. Spectinomycin. Med Clin North Am. 1982 Jan;66(1):169-73. PMID: 6460907.

Ullman S, Roussel TJ, Forster RK. Gonococcal keratoconjunctivitis. Surv Ophthalmol. 1987 Nov-Dec;32(3):199-208. doi: 10.1016/0039-6257(87)90095-6. PMID: 2965423.

Streptomycin sulfate



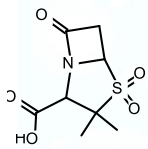
CAS#: 3810-74-0
Catalog#: CP-17865212-100g
Synonyms: Streptomycin sulfate, 3810-74-0, Estreptomicina, Plantomycin
Molecular Formula: $C_{42}H_{84}N_{14}O_{36}S_3$

Streptomycin is an aminoglycoside antibiotic that inhibits the S12 protein at the bacterial 30S ribosome, blocking peptide elongation and protein synthesis, leading to cell death. Discovered by Selman Waksman, this antibiotic is used extensively in agriculture, and is used in conjunction with oxytetracycline to control numerous plant-based diseases of economic importance.

Sakula A. Selman Waksman (1888-1973), discoverer of streptomycin: a centenary review. Br J Dis Chest. 1988 Jan;82(1):23-31. doi: 10.1016/0007-0971(88)90005-8. Erratum in: Br J Dis Chest 1988 Apr;82(2):137. PMID: 3048358.

McManus PS, Stockwell VO, Sundin GW, Jones AL. Antibiotic use in plant agriculture. Annu Rev Phytopathol. 2002;40:443-65. doi: 10.1146/annurev.phyto.40.120301.093927. Epub 2002 Feb 20. PMID: 12147767.

Sulbactam acid



CAS#: 68373-14-8
Catalog#: CP-69388315-1g
Synonyms: SULBACTAM, 68373-14-8, sulbactam acid, Betamaze, Penicillanic Acid Sulfone
Molecular Formula: $C_8H_{11}NO_5S$

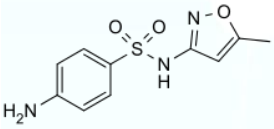
Sulbactam is a beta-lactamase inhibitor that binds to its active site and irreversibly inactivates the lactamase enzyme. Given in combination with another penicillin or cephalosporin the result is increased activity against resistant bacteria. The compound also can act as a neuroprotectant in mammalian cells and in global ischemia, through changes in glutamate receptor activity and modulation.

References

Payne DJ, Cramp R, Winstanley DJ, Knowles DJ. Comparative activities of clavulanic acid, sulbactam, and tazobactam against clinically important beta-lactamases. Antimicrob Agents Chemother. 1994 Apr;38(4):767-72. doi: 10.1128/AAC.38.4.767. PMID: 8031044; PMCID: PMC284540.

Gu WW, Cui X, Liu LZ, Zhang M, Li WB, Xian XH. Sulbactam improves binding property and uptake capacity of glutamate transporter-1 and decreases glutamate concentration in the CA1 region of hippocampus of global brain ischemic rats. Amino Acids. 2021 Nov;53(11):1649-1661. doi: 10.1007/s00726-021-03088-3. Epub 2021 Oct 30. PMID: 34716803.

Sulfamethoxazole



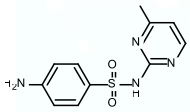
CAS#: 723-46-6
Catalog#: CP-21865528-25g
Synonyms: sulfamethoxazole, 723-46-6, Gantanol, Sulphamethoxazole, Sulfisomezole
Molecular Formula: $C_{17}H_{18}FN_3O_3$

Sulfamethoxazole is a sulfonamide bacteriostatic antibiotic that acts as an antibacterial agent acting at the level of folate synthesis. It is most commonly prescribed in combination with trimethoprim as the drug Bactrim. It is useful for the treatment of bacterial infections, specifically those of the urinary, respiratory, and gastrointestinal tracts.

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 5329, Sulfamethoxazole. Retrieved July 12, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/5329.

Cockerill FR, Edson RS. Trimethoprim-sulfamethoxazole. Mayo Clin Proc. 1991 Dec;66(12):1260-9. doi: 10.1016/s0025-6196(12)62478-1. PMID: 1749295.

Sulfamerazine



CAS#: 127-79-7
Catalog#: CP-28452401-25g
Synonyms: sulfamerazine, 127-79-7, Sulphamerazine, Sulfamerazin, Sulfamethyldiazine
Molecular Formula: $C_{11}H_{12}N_4O_2S$

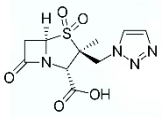
Sulfamerazine is a sulfanilamide based antibiotic that acts on bacterial cell synthesis by inhibiting dihydropteroate synthase. Sulfanilamides as older and less used antibiotics, they are often used specifically in agriculture and aquaculture, controlling Aeromonas and Pseudomonas infections in salmonids and catfish.

References

Struller T. Long-acting and short-acting sulfonamides. Recent developments. Antibiot Chemother. 1968;14:179-215. doi: 10.1159/000386763. PMID: 4883637.

Herman RL, Bullock GL. Antimicrobials and fish: a review of drugs used to treat bacterial diseases of channel catfish and rainbow trout. Vet Hum Toxicol. 1986;28 Suppl 1:11-7. PMID: 3334692.

Tazobactam



CAS#: 89786-04-9
Catalog#: CP-13649308-1g
Synonyms: Tazobactam, 89786-04-9, Tazobactam acid, Tazobactamum
Molecular Formula: $C_{10}H_{12}N_4O_5S$

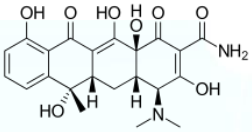
Tazobactam is a derivative of penicillin, an acid sulfone compound, that inhibits beta-lactamases in resistant bacteria. Given in combination with a penicillin or cephalosporin restores activity. These combinations are used to treat complicated intra-abdominal infections and complicated urinary tract infections. Ceftolozane/tazobactam is approved for treatment of hospital-acquired/ventilator-associated bacterial pneumonia (HABP/VABP) and is used currently in Covid units worldwide.

References

López Montesinos I, Montero M, Sorlí L, Horcajada JP. Ceftolozane-tazobactam: When, how and why using it? Rev Esp Quimioter. 2021 Sep;34 Suppl 1(Suppl1):35-37. doi: 10.37201/req/s01.10.2021. Epub 2021 Sep 30. PMID: 34598422; PMCID: PMC8682999.

Timsit JF, Huntington JA, Wunderink RG, Shime N, Kollef MH, Kivistik Ü, Nováček M, Réa-Neto Á, Martin-Loeches I, Yu B, Jensen EH, Butterton JR, Wolf DJ, Rhee EG, Bruno CJ. Ceftolozane/tazobactam versus meropenem in patients with ventilated hospital-acquired bacterial pneumonia: subset analysis of the ASPECT-NP randomized, controlled phase 3 trial. Crit Care. 2021 Aug 11;25(1):290. doi: 10.1186/s13054-021-03694-3. PMID: 34380538; PMCID: PMC8356211.

Tetracycline



CAS#: 60-54-8
Catalog#: CP-32100101-25g
Synonyms: Deschlorobiomycin, Tetracyclinum, Achromycin
Molecular Formula: $C_{22}H_{24}N_2O_8$

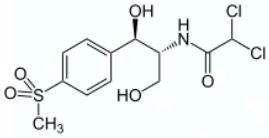
Tetracycline is a broad-spectrum antibiotic produced by the soil bacterium *Streptomyces aureofaciens*. It has a role as an antibacterial drug, an antiprotozoal drug, an antimicrobial agent, and a protein synthesis inhibitor. Mechanistic studies have proven that tetracyclines may exert benefit in osteoarthritis progression: matrix metalloproteinase inhibition, immunomodulation, and nitric oxide synthase inhibition.

References

National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 54675776, Tetracycline. Retrieved July 12, 2022 from https://pubchem.ncbi.nlm.nih.gov/compound/54675776.

Platt BN, Jacobs CA, Conley CEW, Stone AV. Tetracycline use in treating osteoarthritis: a systematic review. Inflamm Res. 2021 Mar;70(3):249-259. doi: 10.1007/s00011-021-01435-4. Epub 2021 Jan 29. PMID: 33512569.

Thiamphenicol



CAS#: 15318-45-3
Catalog#: CP-34470826-1g
Synonyms: thiamphenicol, 15318-45-3, Thiophenicol, (+)-Thiamphenicol
Molecular Formula: $C_{12}H_{15}Cl_2NO_5S_2$

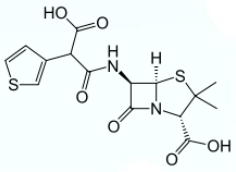
Thiamphenacol is used as a veterinary antibiotic and is available for use in humans in some countries, where its used to treat sexually transmitted and pelvic inflammatory diseases. In agriculture, it is used extensively against avian disease pathogens and in cattle and sheep.

References

Schwarz S, Kehrenberg C, Doublet B, Cloeckaert A. Molecular basis of bacterial resistance to chloramphenicol and florfenicol. FEMS Microbiol Rev. 2004 Nov;28(5):519-42. doi: 10.1016/j.femsre.2004.04.001. PMID: 15539072.

Aboubakr M, Soliman A. Pharmacokinetics of thiamphenicol in Japanese quails (Coturnix japonica) after single intravenous and oral administrations. J Vet Pharmacol Ther. 2020 Sep;43(5):512-515. doi: 10.1111/jvp.12902. Epub 2020 Aug 10. PMID: 32779236.

Ticarcillin disodium salt



CAS#: 4697-14-7
Catalog#: CP-24169145-1g
Synonyms: ticarcillin sodium, TICARCILLIN DISODIUM, Ticarpen, Ticar
Molecular Formula: $C_{15}H_{14}N_2Na_2O_6S_2$

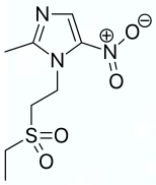
Ticarcillin is broad-spectrum penicillin antibiotic that reacts with transpeptidases C-terminal domains and prevents cross-linking in bacterial cell walls resulting in cell lysis and death. Protection of ticarcillin by clavulanic acid from inactivation of bacterial beta-lactamases in infections restores activity against ticarcillin-resistant strains of *Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, P. vulgaris, and Yersinia enterocolitica*. Restoring activity to ticarcillin allows use in pediatric patiens with cystic fibrosis over extended periods of time.

References

Sutherland R, Beale AS, Boon RJ, Griffin KE, Slocombe B, Stokes DH, White AR. Antibacterial activity of ticarcillin in the presence of clavulanate potassium. Am J Med. 1985 Nov 29;79(5B):13-24. doi: 10.1016/0002-9343(85)90124-x. PMID: 3878080.

Zobell JT, Stockmann C, Young DC, Cash J, McDowell BJ, Korgenski K, Sherwin CM, Spigarelli M, Chatfield BA, Ampofo K. Population pharmacokinetic and pharmacodynamic modeling of high-dose intermittent ticarcillin-clavulanate administration in pediatric cystic fibrosis patients. Clin Ther. 2011 Nov;33(11):1844-50. doi: 10.1016/j.clinthera.2011.09.010. Epub 2011 Oct 21. PMID: 22018680.

Tinidazole



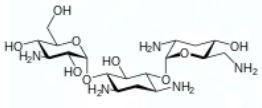
CAS#: 19387-91-8
Catalog#: TCI-T3058-25g
Synonyms: tinidazole, 19387-91-8, Tindamax, Trimonase, Fasigyn
Molecular Formula: $C_8H_{13}N_3O_4S$

Tinidazole is a small molecule nitroimidazole antibiotic used against protozoan and amoebic infections in Europe, and also harbors activity against *Helicobacter pylori*, Amoebic dysentery, and *Trichomonas* infections.

Fung HB, Doan TL. Tinidazole: a nitroimidazole antiprotozoal agent. Clin Ther. 2005 Dec;27(12):1859-84. doi: 10.1016/j.clinthera.2005.12.012. PMID: 16507373.

Manes G, Balzano A. Tinidazole: from protozoa to Helicobacter pylori--the past, present and future of a nitroimidazole with peculiarities. Expert Rev Anti Infect Ther. 2004 Oct;2(5):695-705. doi: 10.1586/14789072.2.5.695. PMID: 15482233.

Tobramycin Base



CAS#: 32986-56-4
Catalog#: CP-76303024-5g
Synonyms: Tobramycin, 32986-56-4, Nebramycin 6, Nebramycin factor 6, Nebramycin VI
Molecular Formula: $C_{18}H_{37}N_5O_9$

Tobramycin is an aminoglycoside antibiotic produced by *Streptomyces tenebrarius*, and is active against *Pseudomonas* species, especially those posses Mex efflux proteins, and Gram-positive and Gram-negative bacteria. In combination with other antibiotics as powders given by inhalation, they are found useful to treat chronic *Pseudomonas aeruginosa* lung infections in cystic fibrosis.

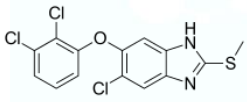
References

Comstock TL, Holland EJ. Loteprednol and tobramycin in combination: a review of their impact on current treatment regimens. Expert Opin Pharmacother. 2010 Apr;11(5):843-52. doi: 10.1517/14656561003667532. PMID: 20210687.

Tappenden P, Harnan S, Uttley L, Mildred M, Carroll C, Cantrell A. Colistimethate sodium powder and tobramycin powder for inhalation for the treatment of chronic Pseudomonas aeruginosa lung infection in cystic fibrosis: systematic review and

economic model. Health Technol Assess. 2013 Dec;17(56):v-xvii, 1-181. doi: 10.3310/hta17560. PMID: 24290164; PMCID: PMC4781138.

Triclabendazole



CAS#: 68786-66-3
Catalog#: CP-65632957-5g
Synonyms: Triclabendazole, 68786-66-3, Fasinex
Molecular Formula: $C_{14}H_9Cl_3N_2O_3$

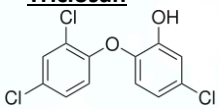
Triclabendazole is an antihelminthic agent based on the benzimidazole scaffold and is used to treat infections by *Fasciola hepatica* (both immature and adult liver flukes), roundworms and ectoparasites. Additionally, the drug can significantly reduce tumor volume by promoting the cleavage of caspase-3, PARP, and GSDME in the xenograft model of cancer, inducing pyroptosis and cell death.

References

Marcos L, Maco V, Terashima A. Triclabendazole for the treatment of human fascioliasis and the threat of treatment failures. Expert Rev Anti Infect Ther. 2021 Jul;19(7):817-823. doi: 10.1080/14787210.2021.1858798. Epub 2020 Dec 14. PMID: 33267701.

Yan L, Liu Y, Ma XF, Hou D, Zhang YH, Sun Y, Shi SS, Forouzanfar T, Lin HY, Fan J, Wu G. Triclabendazole Induces Pyroptosis by Activating Caspase-3 to Cleave GSDME in Breast Cancer Cells. Front Pharmacol. 2021 Jul 8;12:670081. doi: 10.3389/fphar.2021.670081. PMID: 34305590; PMCID: PMC8297466.

Triclosan



CAS#: 3380-34-5
Catalog#: CP-73701909-25g
Synonyms: triclosan, 3380-34-5, 5-CHLORO-2-(2,4-DICHLOROPHENOXY)PHENOL, Irgasan
Molecular Formula: $C_{12}H_7Cl_3O_2$

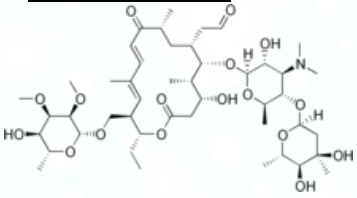
Triclosan is a perchlorinated diphenyl ether, and used in soaps and mouthwashes as an antibacterial agent, although debates and controversy cloud its benefits in the consumer market. There is evidence that this agent can induce antibiotic resistance in a variety of pathogens.

References

Shrestha P, Zhang Y, Chen WJ, Wong TY. Triclosan: antimicrobial mechanisms, antibiotics interactions, clinical applications, and human health. J Environ Sci Health C Toxicol Carcinog. 2020;38(3):245-268. doi: 10.1080/26896583.2020.1809286. PMID: 32955413.

Lu J, Jin M, Nguyen SH, Mao L, Li J, Coin LJM, Yuan Z, Guo J. Non-antibiotic antimicrobial triclosan induces multiple antibiotic resistance through genetic mutation. Environ Int. 2018 Sep;118:257-265. doi: 10.1016/j.envint.2018.06.004. Epub 2018 Jun 11. PMID: 29902774.

Tylosin Phosphate



CAS#: 1405-53-4
Catalog#: SPC-T3461-1KGBL
Synonyms: Tylosin phosphate, 1405-53-4, Tylosin (phosphate), MLS002695913, Farmazin TB
Molecular Formula: $C_{46}H_{80}NO_{21}P$

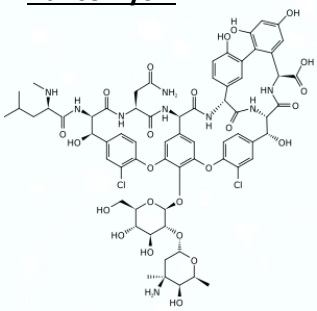
Tylosin phosphate is a bacteriostatic macrolide antibiotic and feed additive produced as a fermentation product by *Streptomyces fradiae.* It is active against Gram-negative and Gram-positive bacterial, and its activity against a wide range of microbes facilitates its use in cattle feedlots. It also acts as a growth promotant, and as a treatment for colitis in dogs and cats.

References

Müller HC, Van Bibber-Krueger CL, Ogunrinu OJ, Amachawadi RG, Scott HM, Drouillard JS. Effects of intermittent feeding of tylosin phosphate during the finishing period on feedlot performance, carcass characteristics, antimicrobial resistance, and incidence and severity of liver abscesses in steers. J Anim Sci. 2018 Jun 29;96(7):2877-2885. doi: 10.1093/jas/sky166. PMID: 29718254; PMCID: PMC6095443.

Stapleton GS, Cazer CL, Gröhn YT. Modeling the Effect of Tylosin Phosphate on Macrolide-Resistant Enterococci in Feedlots and Reducing Resistance Transmission. Foodborne Pathog Dis. 2021 Feb;18(2):85-96. doi: 10.1089/fpd.2020.2835. Epub 2020 Oct 2. PMID: 33006484; PMCID: PMC8020526.

Vancomycin



CAS#: 1404-90-6
Catalog#: CP-16685638-1g
Synonyms: VANCOMYCIN, Vancocin, Vancoled
Molecular Formula: $C_{66}H_{75}Cl_2N_9O_{24}$

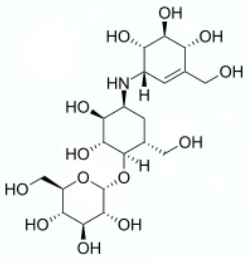
Vancomycin is a cyclic glycopeptide produced by the soil bacterium *Amycolatopsis orientalis*, and acts by binding to D-ala-D-ala segments of the bacterial membrane, blocking cross-linking and causing cell lysis and bacterial death. It is active against Gram-positives, Clostridium difficile, and is used for endocarditis and surgical prophylaxis during prosthetic implants. Prolonged usage demonstrate associated accumulation and can lead to renal compromise, bowel inflammation, and increased patient complexity/morbidity.

References

Álvarez R, López Cortés LE, Molina J, Cisneros JM, Pachón J. Optimizing the Clinical Use of Vancomycin. Antimicrob Agents Chemother. 2016 Apr 22;60(5):2601-9. doi: 10.1128/AAC.03147-14. PMID: 26856841; PMCID: PMC4862470.

Cimolai N. Does oral vancomycin use necessitate therapeutic drug monitoring? Infection. 2020 Apr;48(2):173-182. doi: 10.1007/s15010-019-01374-7. Epub 2019 Nov 11. PMID: 31713055.

Validamycin A



CAS#: 37248-47-8
Catalog#: BIOW-42210000-1g
Synonyms: Validamycin, VALIDAMYCIN A, 37248-47-8, Validacin, Valimon
Molecular Formula: $C_{20}H_{35}NO_{13}$

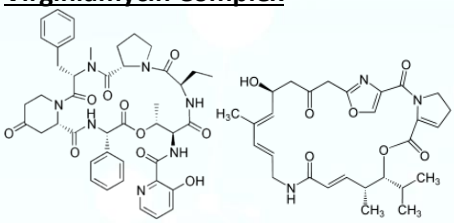
Validamycin A is a natural product found in *Streptomyces* species (*hygroscopicus, lividans and anthocyanicus*) and amino polyol and fungicide. The compound inhibits trehalases, and is used for the treatment of diseases caused by fungi and insects. With this activity it has demonstrated activity against adult mosquitoes, *Aedes aegypti*, acting as an adulticide that can impair normal development of an important malarial disease vector.

References

García MD, Argüelles JC. Trehalase inhibition by validamycin A may be a promising target to design new fungicides and insecticides. Pest Manag Sci. 2021 Sep;77(9):3832-3835. doi: 10.1002/ps.6382. Epub 2021 Apr 10. PMID: 33786994.

Marten AD, Stothard AI, Kalera K, Swarts BM, Conway MJ. Validamycin A Delays Development and Prevents Flight in Aedes aegypti (Diptera: Culicidae). J Med Entomol. 2020 Jul 4;57(4):1096-1103. doi: 10.1093/jme/tjaa004. PMID: 31982917; PMCID: PMC7334893.

Virginiamycin Complex



CAS#: 21411-53-0
Catalog#: BIOW-42210012-1
Synonyms: virginiamycin m1, Pristinamycin IIA;Ostreogrycin A, 21411-53-0, BCP31523, DB-045572
Molecular Formula: $C_{28}H_{35}N_3O_7$

Virginiamycin complex is classified as a streptogramin antibiotics, with group A possessing macrolactones and the group B composed of hexadepsipeptides. They have a mode of action by binding to the 50S bacterial ribosome, blocking translation and protein synthesis. These compounds are importance in the food, dairy, and agricultural industries. Both group A and B can penetrate in macrophages, with rapid killing of intracellular bacteria.

References

Mast Y, Wohlleben W. Streptogramins - two are better than one! Int J Med Microbiol. 2014 Jan;304(1):44-50. doi: 10.1016/j.ijmm.2013.08.008. Epub 2013 Sep 4. PMID: 24119565.

Khosla R, Verma DD, Kapur A, Aruna RV, Khanna N. Streptogramins: a new class of antibiotics. Indian J Med Sci. 1999 Mar;53(3):111-9. PMID: 10798011.

About the Authors

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