Abstract

Antibiotics (from ancient Greek ἀντιβιοτικά, antiviotika), also called antibacterials, are a type of antimicrobials drug used in the treatment and prevention of bacterial infections. Cellulitis is an infection that involves the outer layers of the skin. It is commonly caused by bacteria known as beta-hemolytic streptococcus or Staphylococcus aureus. You may experience pain, swelling, tenderness, warmth, and redness in the infected area. Complicate skin and soft tissue infections (SSTIs) are common for both outpatient and hospitalized patients and traditionally include various clinical symptoms ranging from minor superficial infections to necrotizing fasciitis with high rates of mortality. Delafloxacin (DLX) is a new FQ pending approval, which has shown a good in vitro and in vivo activity against major pathogens associated with ABSSSIs and CA-RTIs. It also shows good activity against a broad spectrum of microorganisms, including those resistant to other FQ, and stability against multiresistant strains.

Keywords: Dalafloxacin; Antibacterial; Bacterial Infections.

1. Introduction

ANTIBIOTICS- Antibiotics (from ancient Greek ἀντιβιοτικά, antiviotika), also called antibacterials, area type of antimicrobials drug used in the treatment and prevention of bacterial infections. They may either kill or inhibit the growth of bacteria. These are the main classes of antibiotics.

1) Penicillins such as penicillin and amoxicillin
2) Cephalosporins such as cephalaxin(Keflex)
3) Macrolides such as erythromycin (E-Mycin), clarithromycin (Biaxin), and azithromycin (Zithromax)
Fluoroquinolones such as ciprofloxacin (Cipro), levofloxacin (Levaquin), and ofloxacin (Floxin).

Sulfonamides such as co-trimoxazole (Bactrim) and trimethoprim (Proloprim).

Tetracyclines such as tetracycline (Sumycin, Panmycin) and doxycycline (Vibramycin).

Aminoglycosides such as gentamicin (Garamycin) and tobramycin (Tobrex).

Bacteria can cause different types of skin infections.

1) cellulitis
2) folliculitis
3) impetigo

**Cellulitis**

*Cellulitis* is an infection that involves the outer layers of the skin. It is commonly caused by bacteria known as *beta-hemolytic streptococcus* or *Staphylococcus aureus*. You may experience pain, swelling, tenderness, warmth, and redness in the infected area. Antibiotics that may be used include cephalosporins, dicloxacillin, clindamycin, or vancomycin.

**Folliculitis**

*It* is a general term used to describe an infection of the hair follicles commonly caused by *Staphylococcus aureus*, resulting in red pimples. You may experience redness, tenderness, or swelling of the affected area. Mild folliculitis can be treated with topical antibiotics, such as erythromycin, clindamycin, or mupirocin. More severe infections, such as carbuncles (a group of infected hair follicles) and larger furuncles, may require a surgical cut and drainage of the affected area. After drainage, it is important to clean the area with antibacterial soap; then you should apply the antibiotic ointment to the affected area of the skin. If needed, your doctor may prescribe oral antibiotics such as cephalosporins or dicloxacillin.

**Impetigo**

*Impetigo* is a contagious skin infection commonly caused by *Staphylococcus aureus*. Although this infection may occur in adults, it is most often seen in children aged 2 to 5 years and is usually spread through direct contact with another person who has the infection. You may experience tenderness, itching, sores, or blisters that can rupture and form honey-colored crusts. It can affect different parts of the body such as the face, arms, or legs. It also can affect moist parts of the body, such as the armpits, neck folds, and diaper areas. Impetigo can be treated with a topical ointment or oral antibiotic. Oral antibiotics such as penicillins or cephalosporins are used for more severe infections.

Complicate skin and soft tissue infections (SSTIs) are common for both outpatient and hospitalized patients and traditionally include various clinical symptoms ranging from minor superficial infections to necrotizing fasciitis with high rates of mortality. Several studies have shown an increase in ambulatory and hospital visits related to these infections and an increase in the length of stay in a hospital, mortality risk and health costs. In North American hospitals, an increase of 29% was detected in hospital admissions because of SSTIs between 2000 and 2004.4 In 2010, the Food and Drug Administration (FDA) proposed a new classification, differentiating acute bacterial skin and skin structure infections (ABSSSIs), which include three entities: cellulitis and erysipelas, wound infections and major skin abscesses. Among the involved
microorganisms, Staphylococcus aureus is the most common, being the detection of methicillin-resistant S. aureus (MRSA) an independent risk factor for increased risk of mortality, length of hospital stay and hospital costs.5 Furthermore, S. aureus has a high tolerance to acidic pH, surviving in acidic environments such as abscesses and empyema, where most antibiotics show decreased activity. Gram-negative organisms are isolated in smaller proportion, but the increase of multiresistant bacteria, such as Pseudomonas aeruginosa and beta-lactamase and carbapenemase enterobacteria carriers, has decreased the available therapeutic arsenal.

In the field of respiratory infection, pneumonia remains, along with influenza, the respiratory infection with the highest mortality. Among the most commonly used antibiotics in the treatment of respiratory tract infections (CA-RTIs) are fluoroquinolones (FQ), as well as β-lactams and macrolides. Despite its still good activity, there has long since been warning about increasing resistance among common pathogens in CA-RTIs, such as Streptococcus pneumonia, Haemophilus influenza and Moraxella catarrhalis.

The resistance of Neisseria gonorrhoeae to quinolones has increased worldwide in the last decade with percentages of ~15%–20%, in some geographical areas reaching 50%.11,12 Main consequence has been a change in World Health Organization (WHO) recommendations for empiric sexually transmitted infections (STIs) therapy to a cephalosporin and azithromycin combination, reserving the quinolone for targeted therapy.

Delafloxacin (DLX) is a new FQ pending approval, which has shown a good in vitro and in vivo activity against major pathogens associated with ABSSIs and CA-RTIs. It also shows good activity against a broad spectrum of microorganisms, including those resistant to other FQ, and stability against multiresistant strains. Its pharmacokinetic properties and excellent activity in acidic environments make it an alternative in the treatment of these and other infections. In this manuscript, a detailed analysis of this new FQ is performed, from its chemical structure to it's in vivo activity in recently published clinical trials. Its possible place in the current antimicrobial outlook and its possible use in other infectious contexts are also discussed. Delafloxacin is unique among the approved quinolones in that its antibacterial activity is enhanced in acidic conditions, an environment seen across many infected sites including abscesses, lung tissues, and abdominal fluids.7 Indeed, delafloxacin is > 8 times more potent than moxifloxacin against S. aureus at pH 5.5; however, at a higher pH the difference decreases.

Is a fluoroquinolone antibiotic used to treat acute bacterial skin and skin structure infection, approved by the FDA in June. It was developed by “Melinda”

**Structure**

![Delafloxacin Structure](http://example.com/dlxf_struct.png)
IUPAC Name - 1-(6-amino-3,5-difluoropyridin-2-yl)-8-chloro-6-fluoro-7-(3-hydroxyazetidin-1-yl)-4Oxo-quinoline-3-carboxylic acid

Formula - C$_{18}$H$_{12}$ClI$_3$N$_4$O$_4$
Molar Mass - 440.76 g/mol

**Gram Positive Bacteria**

1) *Staphylococcus aureus* (including methicillin resistant and methicillin-susceptible [MSSA] isolates).
2) *Staphylococcus haemolyticus*, *Staphylococcus lugdunensis*, *Staphylococcus agalactiae* *Staphylococcus anginosus group*.

**Gram-negative organism**: *Escherichia coli*, *Enterobacter cloacae*, *Klebsiella pneumonia* and *Pseudomonas aruginosa*.

**Warning and precaution**: Tenalinitis and tendon rupture, peripheral neuromyasthenia gravis nervous system effects, Exacerbation of myasthenia gravis, hypersensitivity reaction and *Clostridium difficile*- Associated Diarrhoea, and development of drug resistant bacteria.

**Contraindications**: Baxdela is contraindicated in patients with known hypersensitivity to delafloxacin or any of the fluoroquinolone class of antibacterial drugs or any of the components of baxdela.

Delafloxacin (DLX) is a new FQ Pending approval which has to show a good in vitro and in vivo activity against major pathogens associated with ABSSSLS and CA-RTIS,

**Mechanism of Action**

DLX has show higher antibacterial power than other FQ, maintaining the same inhibitory activity of topoisomerase. It's the greatest strength seems to drive from three structural differences: It does not have a strong base in C7, becoming a weak acid and thus increasing its activity in acidic medium. The chlorine atoms in position C8 acts as an electron-withdrawing group reducing the reactivity of the heterocyclic and stabilining the molecule: and third the aromatic ring attached to N1 increase the molecular surface compared with other quinolone. By eliminating the basic group in C7 present in other FQ, DLX loses the ability to act as zwitterion acquiring a weak acid character.

**Pharmacokinetics**

The half-life ($+\frac{1}{2}$) varies in a range of hours with doses of 300mg up to 17h with higher doses, exhibiting a biexponential decrease in the plasma concentration.

- DLX shows good distribution, Volume of distribution at a steady state of 35L, similar to the total water volume of the body.
- DLX excretion is predominantly rural (65%) and mainly in unchanged form, with < 20% of the initial dose as glucuronide derivatives; recovering 28% of the total dose in feces.
- DLX clearance is reduced in patients with moderate and severe renal impairment.
However: After 14 days of IV treatment with two daily closes, there is no drug accumulation detected and, clearance on day 14 was similar to day one.

- Delafloxacin is unique in that it's antibacterial potency increase as the pH environment becomes more acidic, a characteristic of infection settings.
- Delafloxacin has excellent in vitro activity against MRSA, with an MICqO ranging from 0.12 to 0.5 mg/ml. In a phase -II study of ABSSSIS, Intravenous delafloxacin had comparable cure rates with linezolid but statistically greater cure rates when compared with vancomycin. In second phase II study of complicated skin and skin-structure infection delafloxacin had.

Pharmacokinetic-Pharmacodynamic (PK-PD) Target Attainment Analyses for Delafloxacin to Provide Dose Selection Support for the Treatment of Patients With Community-Acquired Bacterial Pneumonia.

Delafloxacin is an investigational IV and PO quinolone with activity against pathogens commonly associated with CABP, including Streptococcus pneumoniae (SP) and Staphylococcus aureus (SA), including methicillin-resistant isolates. To provide support for a delafloxacin IV to PO dosing regimen to treat patients with CABP, PK-PD target attainment analyses were undertaken.

2. Method

Using parameter estimates from a population PK model [3-compartment; mixed linear plus saturable elimination; 2 parallel first-order absorption processes; creatinine clearance (CLcr) was a predictor of clearance], free-drug plasma concentration-time profiles were generated for 5000 simulated patients with varying CLcr following delafloxacin 300 mg IV q12h for 3 days followed by 450 mg PO q12h for 2 days. AUC0-24 on Days 1 and 4 were calculated. Percent probabilities of PK-PD target attainment by MIC and overall (i.e. weighted over the MIC distributions for SP and SA isolates from the USA and Europe) were determined using median

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free-drug plasma AUC: MIC ratio targets associated with 1- and 2-log10 CFU reductions from baseline from a neutropenic lung infection model for SP (3.36 and 24.5, respectively) and SA (7.92 and 36.2, respectively). The results were stratified by renal function group [normal (CLcr ≥90 mL/minute/1.73 m2) and mild (CLcr 60–89 mL/minute/1.73 m2) or moderate (CLcr 30–59 mL/minute/1.73 m2) renal impairment.

3. Results

Percent probabilities of attaining free-drug plasma AUC: MIC ratio targets associated with a 1-log10 CFU reduction from baseline by MIC on Day 1 by renal group for SP (figure 1) and SA (figure 2) were similar to those on Day 4. Percent probabilities of PK-PD target attainment on either day across renal groups were ≥99.5% for SP at a MIC value of 1 mg/L and ≥96.3% for SA at a MIC value of 0.5 mg/L. Overall
percent probabilities of PK-PD target attainment were ≥93.3%. For free-drug plasma AUC: MIC ratio targets associated with a 2-log10 CFU reduction from baseline, percent probabilities of PK-PD target attainment at a MIC value of 0.12 mg/L on either Day 1 or 4 were ≥99.8 and ≥93.7% for SP and SA, respectively. There are fluoroquinolone antibacterial drug.

Common side effects
1) Nausea
2) Diarrhoea
3) Headache
4) Transaminase deviation
5) Vomiting

Administer baxdela for injection of a dose of 300mg by intravenous injection over 60 minutes every 12 hours of 450 mg baxdela tablet daily every 12 hours for 5 to 14 days total duration.

The drug was discontinued due to a side effect in 0 to 10% of patients therapy was discontinued most commonly due to articular and hypersensitivity.

Gastro intestinal: - common (1 % to 10 %): Nausea, diarrhoea, vomiting, abdominal pain dyspepsia, oral candidias, clostecidium difficile – associated diarrhoea.
Nervous system: - cases of sensory or sensorimotor axonal polyneuropathy resulting in paresthesias, hypoesthesias weakness,
Common – 1 to 10 %– headache.

Drug interaction: - Fluoroquinolones have been associated with disabling and potentially irreversible serious adverse reactions from different body systems that can occur together in the same patient. Commonly seen adverse reactions include tendinitis, tendon rupture, arthralgia, myalgia, peripheral neuropathy, and central nervous system effects (hallucinations, anxiety, depression, insomnia, severe headaches, and confusion). These reactions could occur within hours to weeks after starting a fluoroquinolone.

4. Uses
1) This drug for the treatment of Acute Bacterial Skin and Skin Structure Infections (ABSSSI).
2) FDA also indicated that this drug should be used cautiously because it may cause neuropathy, tendinitis or CNS related problems.
3) This drugs used in Gonorrhea (it is a sexually transmitted disease (STD). It’s caused by infection with the bacterium Neisseria gonorrhoeae.)
4) It is used in kidney failure (renal impairment/in medical condition kidney no longer work).
5) Delafloxacin treat Community-acquired pneumonia (CAP). the most common type of pneumonia, is a leading cause of illness and death worldwide. Over 100 microorganisms can cause CAP, with most cases caused by Streptococcus pneumoniae.
6) It used in meningitis (Meningitis is an inflammation of the meninges. The meninges are the three membranes that cover the brain and spinal cord. Meningitis can occur when fluid surrounding the meninges becomes infected by viral and bacterial infections).

References

[1] Melinta Therapeutics, Inc. A comparative evaluation of the single-dose efficacy of oral delafloxacin versus the single-dose efficacy of an intramuscular injection of ceftriaxone in subjects with uncomplicated urogenital gonorrhea. Available from: https://clinicaltrials.gov/ct2/show/NCT02015637. NML Identifier NCT02015637. Accessed March 15, 2017.

[2] FDA Drug Safety Communication: FDA advises restricting fluoroquinolone antibiotic use for certain uncomplicated infections; warns about disabling side effects than can occur together. Available from: https://www.fda.gov/Drugs/DrugSafety/ucm500143.htm. Accessed March 13, 2017.

[3] Longcor J, Hopkins S, Wikler M, Lawrence L. A phase 2 safety and efficacy study of oral delafloxacin in subjects with acute bacterial exacerbation of chronic bronchitis (ABECB). Presented at: ID Week; 2012; San Diego, CA. Available from: https://idsa.confex.com/idsa/2012/webprogram/Paper37662. Accessed March 15, 2017.

[4] Melinta Therapeutics, Inc. A phase 3, multicenter, randomized, double-blind, comparator-controlled study to evaluate the safety and efficacy of intravenous to oral delafloxacin in adult subjects with community-acquired bacterial pneumonia. Available from: https://clinicaltrials.gov/ct2/show/NCT02679573. NML Identifier: NCT02679573. Accessed March 15, 2017.

[5] Melinta Therapeutics, Inc. A phase 3, multicenter, randomized, double-blind, active controlled study to evaluate the efficacy and safety of delafloxacin compared with vancomycin + aztreonam in patients with acute bacterial skin and skin structure infections. Available from: https://clinicaltrials.gov/ct2/show/NCT01984684. NML Identifier: NCT01984684. Accessed March 15, 2017.

[6] Hoover R, Marbury TC, Preston RA, et al. Clinical pharmacology of delafloxacin in patients with hepatic impairment. *J Clin Pharmacol.* 2016; 57(3):328–335.

[7] WHO. *Guidelines for the Treatment of Neisseria Gonorrhoeae.* Geneva: WHO; 2016. ISBN-13:978-92-4-154969-1.

[8] Röderova M, Halova D, Papousek I, et al. Characteristics of Quinolone Resistance in *Escherichia coli* Isolates from Humans, Animals, and the Environment in the Czech Republic. *Front Microbiol.* 2016; 7:2147.

[9] Tayebi Z, Heidari H, Kazemian H, Ghafoori SM, Boroumandi S, Houri H. Comparison of quinolone and beta-lactam resistance among *Escherichia coli* strains isolated from urinary tract infections. *Infez Med.* 2016; 24(4):326–330.

[10] Kocsis B, Domokos J, Szabo D. Chemical structure and pharmacokinetics of novel quinolone agents represented by avarofloxacin, delafloxacin, finafloxacin, zabofloxacin and nemonoxacin. *Ann Clin Microbiol Antimicrob.* 2016; 15(1):34.

[11] Soge OO, Salipante SJ, No D, Duffy E, Roberts MC. In vitro activity of Delafloxacin against clinical *Neisseria gonorrhoeae* isolates and selection of gonococcal delafloxacin resistance. *Antimicrob Agents Chemother.* 2016; 60(5):3106–3111.
[13] Hoover R, Hunt T, Benedict M, et al. Safety, tolerability and pharmacokinetic properties of intravenous delafloxacin after single and multiple doses in healthy volunteers. *Clin Ther.* 2016; 38(1):53–65.

[14] Hoover R, Hunt T, Benedict M, et al. Single and multiple ascending-dose studies of oral delafloxacin: effects of food, sex and age. *Clin Ther.* 2016; 38(1):39–52.

[15] Fuzi M. Dissimilar fitness associated with resistance to fluoroquinolones influences clonal dynamics of various multiresistant bacteria. *Front Microbiol.* 2016; 7:1017.

[16] Thabit AK, Crandon JL, Nicolau DP. Pharmacodynamic and pharmacokinetic profiling of delafloxacin in a murine lung model against community-acquired respiratory tract pathogens. *Int J Antimicrob Agents.* 2016;48(5):535–541.

[17] Lepak AJ, Andes DR. In vivo pharmacodynamic target assessment of delafloxacin against *Staphylococcus aureus*, Streptococcus pneumoniae and Klebsiella pneumonia in the murine lung infection model. *Antimicrob Agents Chemother.* 2016;60(8):4764–4769.

[18] https://pubchem.ncbi.nlm.nih.gov/compound/abt-492

[19] Bassetti M, Della Siega P, Pecori D, Scarparo C, Righi E. Delafloxacin for the treatment of respiratory and skin infections. *Expert Opin Investig Drugs.* 2015;24(3):433–442.

[20] https://pubchem.ncbi.nlm.nih.gov/compound/abt-492

[21] Unemo M. Current and future antimicrobial treatment of gonorrhoea – the rapidly evolving *Neisseria gonorrhoeae* continues to challenge. *BMC Infectious Diseases.* 2015;15:364

[22] https://www.drugbank.ca/drugs/DB11943

[23] Crandon JL, Nicolau DP. Effects of Urine Matrix and pH on the Potency of Delafloxacin and Ciprofloxacin against Urogenic *Escherichia coli* and Klebsiella pneumoniae. *J Urol.* 2015; 194(2):563–570.

[24] Van Bambeke F. Delafloxacin, a non-zwitterionic fluoroquinolone in Phase III of clinical development: evaluation of its pharmacology, pharmacokinetics, pharmacodynamics and clinical efficacy. *Future Microbiol.* 2015;10(7):1111–1123.

[25] Amin AN, CerCEO EA, Deitelzweig SB, Pile JC, Rosenberg DJ, Sherman BM. Hospitalist perspective on the treatment of skin and soft tissue infections. *Mayo Clin Proc.* 2014;89(10):1436–1451.

[26] Soge OO, Roberts MC, Lenderman C, et al. Evaluation of In vitro activity of delafloxacin against contemporary *Neisseria gonorrhoeae* isolates. Presented at: 54th Interscience Conference on Antimicrobial Agents and Chemotherapy; September 5–9; 2014; CA, USA (Abstract C-1401).

[27] Siala W, Mingeot-Leclercq MP, Tulkens PM, Hallin M, Denis O, Van Bambeke F. Comparison of the antibiotic activities of daptomycin, vancomycin, and the investigational fluoroquinolone delafloxacin against biofilms from *Staphylococcus aureus* clinical isolates. *Antimicrob Agents Chemother.* 2014;58(11):6385–6397

[28] O’Riordan W, Mehra P, Manos P, Kingsley J, Lawrence L, Cammarata S. A randomized phase 2 study comparing two doses of delafloxacin with tigecycline in adults with complicated skin and skin-structure infections. *Int J Infect Dis.* 2014; 30:67–73.

[29] Bauer J, Siala W, Tulkens PM, Van Bambeke F. A combined pharmacodynamic quantitative and qualitative model reveals the potent activity of daptomycin and delafloxacin against *Staphylococcus aureus* biofilms. *Antimicrob Agents Chemother.* 2013; 57(6):2726–2737.

[30] Hoover R, Lawrence L, Smith C, Longcor J. Pharmacokinetics (PK) of delafloxacin in patients with varying degrees of renal impairment. Presented at: 53rd Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC). CO, USA, 10–13 September 2013 (Abstract A-017E).

[31] Remy JM, Tow-keogh CA, McConnell TS, Dalton JM, Devito JA. Activity of delafloxacin against methicillin-resistant *Staphylococcus aureus*: resistance selection and characterization. *J Antimicrob Chemother.* 2012; 64(12):2814–2820.

[32] Lawrence L, Hopkins S, Sahm D, et al. Characterization and In vitro Activity of delafloxacin (DLX) against isolates from a phase 2 study of acute bacterial skin and skin structure infections.
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(Received: Jan 11, 2018 - Accepted: Jan 28, 2018) DOI: 10.5281/zenodo.1162220

(ABSSSI). Presented at: 52nd Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC); September 9–12; 2012; CA, USA (Abstract E-208).

Itani KMF, Merchant S, Lin SJ, Akhras K, Alandete JC, Hatoum HT. Outcomes and management costs in patients hospitalized for skin and skin-structure infections. Am J Infect Control. 2011; 39(1):42–49.

Metha SD, Maclean I, Ndinya-Achola JO, et al. Emergence of quinolone resistance and cephalosporin MIC creep in Neisseria gonorrhoeae Isolates from a cohort of young men in Kisumu, Kenya, 2002 to 2009. Antimicrob Agents Chemother. 2011; 55(8):3882–3888.

Lemaire S, Tulkens PM, Van Bambeke F. Contrasting effects of acidic pH on the extracellular and intracellular activities of the anti-Gram-positive fluoroquinolones moxifloxacin and delafloxacin against S. aureus. Antimicrob Agents Chemother. 2011; 55(2):649–658.

Goldstein EJ, Solomkin JS, Citron DM, Alder JD. Clinical efficacy and correlation of clinical outcomes with in vitro susceptibility for anaerobic bacteria in patients with complicated intra-abdominal infections treated with moxifloxacin. Clin Infect Dis. 2011; 53(11):1074–1080.

Edelsberg J, Taneja C, Zervos M, et al. Trends in US hospital admissions for skin and soft tissue infections. Emerg Infect Dis. 2009; 15(9):1516–1518.

Boucher HW, Talbot GH, Bradley JS, et al. Bad bugs, no drugs: no ESKAPE! An update from the Infectious Diseases Society of America. Clin Infect Dis. 2009; 48(1):1–12.

Nakamura T, Shimizu C, Kasahara M, et al. Monte Carlo simulation for evaluation of the efficacy of carbapenems and new quinolones against ESBL-producing Escherichia coli. J Infect Chemother. 2009; 15(1):13–17.

Burak E, Bortolon E, Molstad D, et al. Pharmacokinetics and pharmacodynamics of delafloxacin in S. aureus murine thigh infection models. CA, USA, 12–15 September 2009 (Poster A1–1941).

Weiss G, Reimmittz P, Hampel B, et al. Moxifloxacin for the treatment of patients with complicated intra-abdominal infections (the AIDA Study). J Chemother. 2009; 21(2):170–180.

Hatoum HT, Akhras KS, Lin SJ. The attributable clinical and economic burden of skin and skin structure infections in hospitalized patients: a matched cohort study. Diagn Microbiol Infect Dis. 2009; 64(3):305–310. Stass H, Rink AD, Delesen H, Kubitz D, Vestweber KH. Pharmacokinetics and peritoneal penetration of moxifloxacin in peritonitis. J Antimicrob Chemother. 2006; 58(3):693–696.

Malangoni MA, Song J, Herrington J, Choudhri S, Pertel P. Randomized controlled trial of moxifloxacin compared with piperacillin–tazobactam and amoxicillin–clavulanate for the treatment of complicated intra-abdominal infections. Ann Surg. 2006; 244(2):2004–2211.

Firsov AA, Alferova IV, Smirnova MV, Lubenko IY, Portnoy YA, Zinner SH. Comparative pharmacodynamics of the new fluoroquinolone ABT492 and Levofloxacin with Streptococcus Pneumoniae in an in vitro dynamic model. Int J Antimicrob Agents. 2005; 25(5):409–413.

Wagenlehner FM, Weidner W, Sörgel F, Nabe KG. The role of antibiotics in chronic bacterial prostatitis. Int J Antimicrob Agents. 2005; 26(1):1–7. Moczygemba LR, Frei CR, Burgess DS. Pharmacodynamic modeling of carbapenems and fluoroquinolones against bacteria that produce extended-spectrum beta-lactamases. Clin Ther. 2004;26(11):1800–1807.

Harnett SJ, Fraise AP, Andrews JM, Jevons G, Brenwald NP, Wise R. Comparative study of the in vitro activity of a new fluoroquinolone, ABT-492. J Antimicrob Chemother. 2004; 53(5):783–792.

ZhaHammerschlag MR, Roblin PM. The in vitro activity of a new fluoroquinolone, ABT-492, against recent clinical isolates of Chlamydia pneumonia. J Antimicrob Chemother. 2004; 54(1):281–282.

Almer LS, Hoffrage JB, Keller EL, Flamm RK, Shortridge VD. In vitro and bactericidal activities of ABT-492, a novel fluoroquinolone, against Gram-positive and Gram-negative organisms. Antimicrob Agents Chemother. 2004; 48(7):2771–2777.

Zinner SH, Vostrov SN, Alferova IV, Lubenko IY, Portnoy YA, Firsov AA. Comparative pharmacodynamics of the new fluoroquinolone ABT492 and ciprofloxacin with Escherichia coli
and *Pseudomonas aeruginosa* in an in vitro dynamic model. *Int J Antimicrob Agents.* 2004; 24(2):173–177.

[50] Firsov AA, Vostrov SN, Lubenko IY, Arzamastsev AP, Portnoy YA, Zinner SH. ABT492 and levofloxacin: comparison of their pharmacodynamics and their abilities to prevent the selection of resistant *Staphylococcus aureus* in an in vitro dynamic model. *J Antimicrob Chemother.* 2004; 54(1):178–186.

[51] Engemann JJ, Carmeli Y, Cosgrove SE, et al. Adverse clinical and economic outcomes attributable to methicillin resistance among patients with *Staphylococcus aureus* surgical site infection. *Clin Infect Dis.* 2003; 36(5):592–598.

[52] Goldstein EJC, Citron DM, Merriam CV, Warren YA, Tyrrell KL, Fernandez HT. In vitro activities of ABT-492, a new fluoroquinolone, against 155 aerobic and 171 anaerobic pathogens isolated from antral sinus puncture specimens from patients with sinusitis. *Antimicrob Agents Chemother.* 2003; 47(9):3008–3011.

[53] Nel GG, Palatnick L, Nichol KA, Low DE, Hoban DJ; CROSS Study Group. Antimicrobial resistance in *Haemophilus influenza* and *Moraxella catarrhalis* respiratory tract isolates: results of the Canadian Respiratory Organism Susceptibility Study, 1997 to 2002. *Antimicrob Agents Chemother.* 2003; 47(6):3008–3011.

[54] Waites KB, Crabb DM, Duffy LB. Comparative in vitro susceptibilities and bactericidal activities of investigational fluoroquinolone ABT-492 and other antimicrobial agents against human mycoplasmas and ureaplasmas. *Antimicrob Agents Chemother.* 2003; 47(12):3973–3975.

[55] Nilius AM, Shen LL, Hensey-Rudolff D, et al. In vitro antibacterial potency and spectrum of ABT-492, a new fluoroquinolone. *Antimicrob Agents Chemother.* 2003; 47(10):3260–3269.

[56] Charalabopoulos K, Karachalios G, Baltogiannis D, Charalabopoulos A, Giannakopoulos X, Sofikitis N. Penetration of antimicrobial agents into the prostate. *Chemotherapy.* 2003; 49(6):269–279.

[57] Doern GV, Heilmann KP, Huynh HK, Rhomberg PR, Coffman SL, Brueggemann AB. Antimicrobial resistance among clinical isolates of *Streptococcus pneumonia* in the United States during 1999–2000, including a comparison of resistance rates since 1994–1995. *Antimicrob Agents Chemother.* 2001;45(6):1721–1729.

[58] Hoban DJ, Doern GV, Fluit AC, et al. Worldwide prevalence of antimicrobial resistance in *Streptococcus pneumonia*, *Haemophilus influenza*, and *Moraxella catarrhalis* in the SENTRY Antimicrobial Surveillance Program, 1997–1999. *Clin Infect Dis.* 2001; 32(Suppl 2):S81–S93.

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