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Supplementary Materials: Structural characterization of the millennial antibacterial (fluoro)quinolones - shaping the fifth generation

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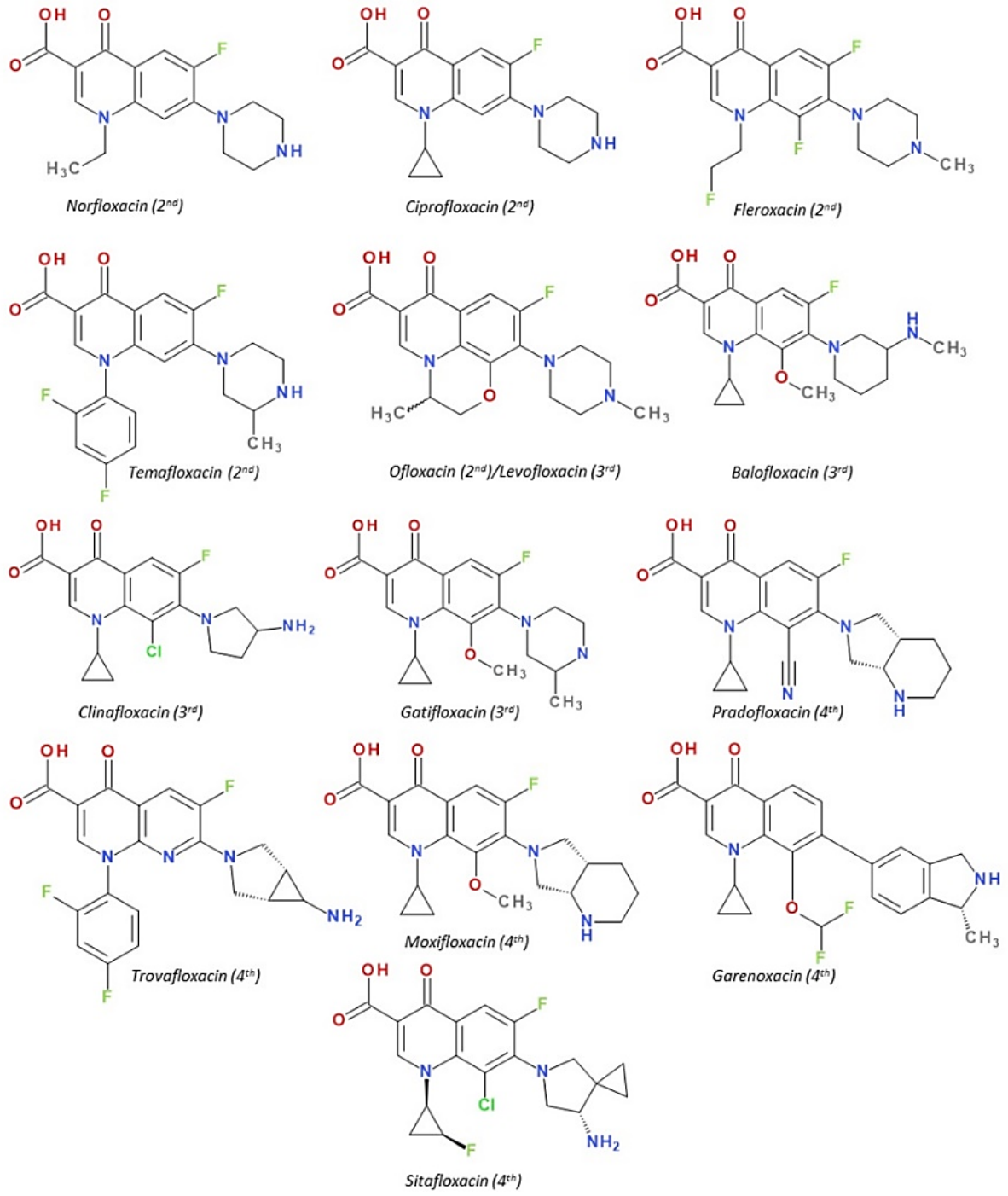

Figure S1. Chemical structures of other FQNs from different generations.

Table S1. Activity spectrum of major QNs approved for use in therapy after 2000.

QNs	Gram-positive pathogens	Gram-negative pathogens	Other pathogens	References
Besifloxacin	***Aerobes*** **-Cocci:** *Staphylococcus aureus and MRSA; Staphylococcus epidermidis (MRSE); Staphylococcus hominis; Staphylococcus lugdunensis; Staphylococcus warneri; Staphylococcus saprophyticus; Staphylococcus haemolyticus; Streptococcus mitis group; Streptococcus oralis; Streptococcus pneumoniae; Streptococcus salivarius; Streptococcus agalactiae; Streptococcus pyogenes; Streptococcus viridans* ***Facultative anaerobes*** **-Cocci:** *Aerococcus viridans* **-Bacilli:** *Propionibacterium acnes* ***Anaerobes*** **-Cocci:** *Enterococcus faecalis; Enterococcus faecium; Peptostreptococcus spp;* -**Bacilli:** *CDC coryneform group G; Corynebacterium pseudodiphtheriticum; Corynebacterium striatum; Listeria monocytogens; Clostridium perfringens*	***Aerobes*** **-Cocci:** *Neisseria meningitidis;* **-Bacilli:** *Legionella pneumophila; Stenotrophomonas maltophilia; Moraxella lacunata; Moraxella catarrhalis; Acinetobacter baumanii; Acinetobacter calcoaceticus; Pseudomonas aeruginosa; Brevundimonas diminuta* ***Facultative anaerobes*** **-Bacilli:** *Haemophilus influenzae; Serratia marcesnes; Citrobacter freundii; Citrobacter koseri; Klebsiela pneumonie; Klebsiella oxytoca; Enterobacter aerogenes; Enterobacter cloacae; Morganella morganii; Proteus miriabilis; Proteus vulgaris; Escherichia coli;* ***Anaerobes*** -**Bacilli:** *Bacteroides fragilis; Fusobacterium spp; Prevotella spp;*	**-Bacilli:** *Mycobacterium chelonae; Mycobacterium fortuitum*	[1–13]
Delafloxacin	***Aerobes*** **-Cocci:** *Staphylococcus aureus* (including MRSA and methicillin-susceptible isolates); *Staphylococcus haemolyticus; Staphylococcus hominis; Staphylococcus lugdunensis; Staphylococcus epidermidis; Streptococcus agalactiae; Streptococcus anginosus spp. (Streptococcus anginosus; Streptococcus intermedius; Streptococcus constellatus); Streptococcus dysgalactiae; Streptococcus pyogenes; Streptococcus pneumoniae* (including isolates resistant to penicillin and macrolides); *Streptococcus mitis group* (including *Streptococcus cristatus; Streptococcus gordonii;*	***Aerobes*** **-Cocci:** *Neisseria gonorrhoeae; Neisseria meningitidis;* **-Bacilli:** *Pseudomonas aeruginosa; Moraxella catarrhalis; Legionella pneumophila; Acinetobacter spp; Stenotrophomonas maltophilia* ***Facultative anaerobes*** **-Bacilli:** *Escherichia coli, Escherichia aerogenes; Escherichia faecalis; Enterobacter cloacae; Salmonella typhimurium; Salmonella aureus; Salmonella epidermidis; Salmonella pneumonia; Salmonella haemolyticus; Klebsiella pneumoniae; Klebsiella oxytoca ; Proteus mirabilis ; Haemophilus influenzae (including β-lactam-resistant isolates); Yersinia pestis* ***Anaerobes***	**-Bacilli:** *Mycobacterium tuberculosis* ***-Aerobe-microaerophiles:*** *Helicobacter pylori* ***-Intracelullar bacteria*** *Chlamydia pneumoniae;* Mycoplasmas *(Mycoplasma pneumoniae)* and ureaplasmas	[14–27]

QNs	Gram-positive pathogens	Gram-negative pathogens	Other pathogens	References
	Streptococcus oralis; Streptococcus mitis; Streptococcus sanguinis) ***Facultative anaerobes*** **-Cocci:** - **-Bacilli:** *Bacillus subtilis; Bacillus cereus; Propionibacterium spp;* ***Anaerobes*** **-Cocci:** *Enterococcus faecalis; Peptostreptococcus spp;* **-Bacilli:** *Clostridium Difficile; Clostridium perfringens*	**-Cocci:** *Veillonella sp.* **-Bacilli:** *Bacterioides Fragilis; Fusobacterium spp; Prevotella spp; Porphyromonas sp;*		
Finafloxacin	***Aerobes*** **-Cocci:** *Staphylococcus aureus* (MRSA, MSSA); *Staphylococcus epidermidis; Streptococcus pneumoniae; Beta-hemolytic streptococci;* **-Bacilli:** *Bacillus anthracis;* ***Facultative anaerobes*** **-Cocci:** - **-Bacilli:** *Propionibacterium Acnes;* ***Anaerobes*** **-Cocci:** *Enterococcus faecalis; Peptostreptococcus anaerobius* **-Bacilli:** *Corynebacterium Amycolatum; Clostridium perfringens; Listeria monocitogens*	***Aerobes*** **-Cocci:** *Legionella pneumophila; Pseudomonas aeruginosa (Ciprofloxacin-resistant and Ciprofloxacin-susceptible Pseudomonas. Aeruginosa); Pseudomonas otitidis; Burkholderia pseudomallei; Burkholderia mallei; Acinetobacter baumannii; Moraxella Catarrhalis; Stenotrophomonas maltophilia;* **-Coccobacilli:** *Francisella tularensis* **-Bacilli:** - ***Facultative anaerobes*** **-Bacilli:** *Escherichia coli; Klebsiella pneumonia; Proteus vulgaris; Proteus mirabilis; Haemophillus influenzae; Enterobacter cloacae; Proteus mirabilis; Providencia spp, Salmonella spp, Serratia marcescens; Yersinia pestis* ***Anaerobes*** **-Cocci:** - **-Bacilli:** *Bacterioides fragilis*	**-Bacilli:** *Mycobacterium tuberculosis* ***-Aerobe-microaero-philes:*** *Helicobacter pylori* ***-Intracelullar bacteria*** *Chlamydia pneumoniae; Mycoplasma pneumoniae*	[17,28–38]
Lascufloxacin	***Aerobes*** **-Cocci:** *Staphylococcus aureus(MRSA, MSSA),*	***Aerobes*** **-Cocci:** *-;* **-Bacilli:** *Moraxella catarrhalis; Legionella pneumophila; Acinetobacter spp*	***-Aerobe-microaerophiles:***	[39–43]

QNs	Gram-positive pathogens	Gram-negative pathogens	Other pathogens	References
	Staphylococcus epidermidis; Staphylococcus saccharolyticus; Streptococcus pyogenes; Streptococcus constellatus ; Streptococcus intermedius; Streptococcus agalactiae; Streptococcus anginosus Streptococcus pneumoniae (penicillin-susceptible and penicillin-resistant *S. pneumoniae)* **-Bacilli:** - ***Facultative anaerobes*** **-Cocci:** - **-Bacilli:** - ***Anaerobes*** **-Cocci:** *Enterococcus faecalis; Peptostreptococcus anaerobius; Finegoldia magna; Peptoniphilus asaccharolyticus* **-Coccobacilli:** *Slackia exigua* **-Bacilli:** *Clostridium clostridioforme; Clostridioides difficile; Clostridium perfringens; Bulleidia extructa; Atopobium parvulum; Actinomyces odontolyticus*	***Facultative anaerobes*** **-Bacilli:** *Klebsiella spp; Escherichia coli; Haemophilus influenzae; Enterobacter spp; Capnocytophaga ochracea;* ***Anaerobes*** **-Cocci:** *Veillonella spp* **-Bacilli:** *Prevotella spp (Prevotella baroniae; Prevotella buccae; Prevotella corporis; Prevotella denticola; Prevotella intermedia; Prevotella melaninogenica; Prevotella oralis; Prevotella oris); Bacteroides fragilis; Bacteroides thetaiotaomicron; Fusobacterium necrophorum; Fusobacterium nucleatum; Porphyromonas asaccharolytica; Porphyromonas gingivalis*	*Campylobacter gracilis; Campylobacter ureolyticus* ***-Intracelullar bacteria*** *Mycoplasma pneumoniae*	
Nadifloxacin/ *Levonadifloxacin	***Aerobes*** **-Cocci:** *Staphylococcus aureus* (MRSA)*; Coagulase-negative staphylococci: Staphylococcus epidermidis; Streptococcus spp;* *Quinolone-resistant *Staphylococcus aureus;* *Macrolide- and penicillin-resistant *Streptococcus pneumoniae; *Streptococcus pyogenes* **-Bacilli:** - ***Facultative anaerobes*** **-Cocci:** - **-Bacilli:** *Propionibacterium spp (P. acnes; P. granulosum)* ***Anaerobes*** **-Cocci:** - -**Bacilli:** -	***Aerobes*** **-Cocci:** - **-Bacilli:** **Moraxella catarrhalis* ***Facultative anaerobes*** **-Bacilli:** **Haemophilus influenzae* ***Anaerobes*** **-Cocci:** - -**Bacilli: -**	-	[44–48]
Nemonoxacin	***Aerobes***	***Aerobes*** **-Cocci:** *Neisseria gonorrhoeae;*	**-Bacilli:** *Mycobacterium tuberculosis*	[17,49–57]

QNs	Gram-positive pathogens	Gram-negative pathogens	Other pathogens	References
	-Cocci: *Staphylococcus aureus* (MSSA and MRSA - ciprofloxacin-susceptible and ciprofloxacin-resistant); *Staphylococcus epidermidis* (Methicillin susceptible *Staphylococcus epidermidis* (MSSE) and methicillin-resistant *S. epidermidis* (MRSE)); *Staphylococcus Capitis; Streptococcus pneumoniae* (Penicillin resistant and fluoroquinolone-resistant *Streptococcus pneumoniae); Streptococcus pyogenes; Streptococcus agalactiae; Viridans group streptococci* **-Bacilli:** *Nocardia spp. (Nocardia brasiliensis ; Nocardia cyriacigeorgica ; Nocardia asteroides ; Nocardia farcinica)* ***Facultative anaerobes*** **-Cocci:** - **-Bacilli:** - ***Anaerobes*** **-Cocci:** *Enterococcus faecium; Enterococcus faecalis* -**Bacilli:** *Clostridium difficile*	**-Bacilli:** *Pseudomonas Aeruginosa; Legionella pneumophila; Moraxella catarrhalis; Stenotrophomonas maltophilia; Acinetobacter Baumannii* ***Facultative anaerobes*** **-Bacilli:** *Klebsiella pneumoniae; Klebsiella oxytoca; Haemophilus influenzae; Haemophillus Parainfluenzae; Enterobacter cloacae; Proteus mirabilis; Citrobacter freundii; Escherichia coli (ciprofloxacin-resistant E. coli, ciprofloxacin-susceptible E. coli)* ***Anaerobes*** **-Cocci:** - **-Bacilli:** -	*(Mycobacterium tuberculosis*, multidrug-resistant and *M. tuberculosis* non-multidrug-resistant) ***-Aerobe-microaerophiles:*** *Helicobacter pylori* ***-Intracelullar bacteria*** *Chlamydia pneumoniae; Chlamydia trachomatis; Mycoplasma pneumoniae*	
Zabofloxacin	***Aerobes*** **-Cocci:** *Staphylococcus aureus* MRSA; Methicillin-resistant coagulase-negative staphylococci; *Streptococcus pneumoniae (*Penicillin-sensitive *S. pneumoniae* and penicillin-resistant *S. pneumoniae); Streptococcus pyogenes* **-Bacilli:** - ***Facultative anaerobes*** **-Cocci:** - **-Bacilli:** - ***Anaerobes*** **-Cocci:** *Enterococcus Faecalis* -**Bacilli:** -	***Aerobes*** **-Cocci:** *Neisseria gonorrhoeae* **-Bacilli:** *Pseudomonas aeruginosa; Moraxella catarrhalis* ***Facultative anaerobes*** **-Bacilli:** *Haemophilus influenzae; Klebsiella pneumoniae; Escherichia coli* ***Anaerobes*** **-Cocci:** - -**Bacilli:** -	-	[17,58–62]

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