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NOTES

Antimicrobial Activity of CS-940, a New Trifluorinated Quinolone

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The antimicrobial activity of CS-940, a new trifluorinated quinolone drug, was tested against 761 clinical isolates. CS-940 activity against members of the family *Enterobacteriaceae* was most similar to that of ciprofloxacin and ofloxacin, with a range of MICs inhibiting 90% of isolates tested (MIC_{90}s) of 0.015 to 16 μg/ml (median MIC_{90}, 0.06 μg/ml). CS-940 had greater activity than ciprofloxacin or ofloxacin when they were tested against *Acinetobacter* spp. (MIC_{90}s, 0.03 μg/ml) and *Stenotrophomonas* (*Xanthomonas*) *maltophilia* (MIC_{90}s, 2 μg/ml). CS-940 demonstrated a high degree of potency against *Haemophilus influenzae*, *Moraxella catarrhalis*, and *Neisseria* spp. (MIC_{90}s, ≤0.06 μg/ml). CS-940 was two- to eightfold more active than ciprofloxacin or ofloxacin against oxacillin-susceptible *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Staphylococcus haemolyticus*, and coagulase-negative *Staphylococcus* spp. CS-940 was also very active against *Streptococcus* spp. and enterococci, for which MIC_{90}s were ≤ 2 μg/ml; for *Enterococcus faecium*, however, the MIC_{90} was 4 μg/ml. CS-940 was generally less active than a comparison investigational fluoroquinolone, clinafloxacin. This compound appears promising by in vitro test analysis and warrants further in vivo trials.

The fluoroquinolones are important antimicrobial agents for the effective treatment of patients afflicted with serious infections, especially when they can replace some expensive and/or toxic parenteral agents (3). These compounds have been observed to be efficiently absorbed orally, have long serum elimination half-lives, have good tissue distributions, and have a broad range of activities against aerobic pathogens (3). The compounds may be considered first-line agents for the treatment of complicated urinary tract infections, for some exacerbations of *Pseudomonas aeruginosa* respiratory tract infections in patients with cystic fibrosis, and for many osteomyelitis infections caused by gram-positive or gram-negative bacteria (3).

However, as use of the fluoroquinolones has increased, so too has the emergence of resistant isolates (3, 4). This resistance pattern has generally been most prevalent among staphylococci, acinetobacters, and *P. aeruginosa* isolates. Cross-resistance among the fluoroquinolones appeared common, likely because of mutations in their target proteins (DNA gyrase) and/or decreased drug permeation into the bacterial cell (3). This increase in resistance to the fluoroquinolone drugs emphasizes the importance of the continued development of new structural candidates.

CS-940 is a novel trifluorinated quinolone (Fig. 1) in the initial phases of investigation (2, 10, 11). In addition to the 6-fluorine generally found on currently available quinolones (3), CS-940 contains a difluormethoxy group at the 8 position (10). In animals, the pharmacokinetic behavior of CS-940 was similar to those of current therapeutic fluoroquinolones, with acceptable oral absorption (>80%), a plasma elimination half-life of 2.6 to 7.5 h (species dependent), and good distribution to the liver, kidneys, and lungs (2). Initial susceptibility studies have documented that CS-940 has a broad antimicrobial spectrum in vitro and in vivo, with potential effectiveness against some ciprofloxacin-resistant *Staphylococcus aureus* strains (10, 11).

In the present study, the in vitro antimicrobial activity of CS-940 was tested by broth microdilution and agar dilution methods against 751 clinical isolates (see Tables 1 and 2 for details about the species) collected at the University of Iowa Hospitals and Clinics (Iowa City, Iowa) since 1993. These results were compared with those for three investigational or clinically available fluoroquinolones (ciprofloxacin, ofloxacin, clinafloxacin) as well as two broad-spectrum parenteral β-lactam antimicrobial agents (cefotaxime, piperacillin-tazobactam).

Ciprofloxacin and cefotaxime were purchased from Sigma Chemical Co. (St. Louis, Mo.). The remaining antibiotics were provided as follows: clinafloxacin (1) by Parke-Davis/Warner Lambert (Ann Arbor, Mich.), ofloxacin by Ortho-McNeil Pharmaceuticals (Raritan, N.J.), piperacillin-tazobactam (6) by

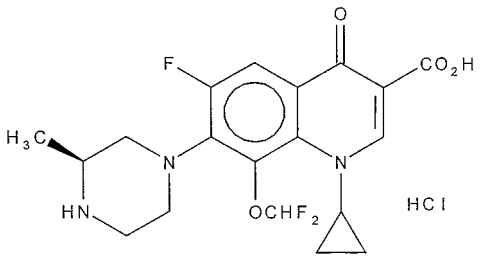

FIG. 1. Chemical structure of CS-940, 1-cyclopropyl-6-fluoro-8-difluoromethoxy-1,4-dihydro-7-[(3*S*)-methyl-1-piperazinyl]-4-oxo-3-quinolinecarboxylic acid hydrochloride.

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TABLE 1. In vitro activity of CS-940 in comparison with those of other drugs against 239 gram-positive bacteria

Organism (no. tested)	Antimicrobial agent	MIC (μg/ml)			% Susceptible[a]
		50%	90%	Range	
Enterococcus faecalis (20)	CS-940	0.5	1	0.25–16	(90)[b]
	Ciprofloxacin	1	2	0.5–>8	80
	Clinafloxacin	0.12	0.25	0.06–4	(90)
	Ofloxacin	2	8	1–>16	80
Enterococcus faecium (10)	CS-940	2	4	0.12–8	(50)
	Ciprofloxacin	2	4	0.25–4	40
	Clinafloxacin	0.25	0.5	0.03–0.5	(100)
	Ofloxacin	2	4	1–8	50
Enterococcus spp. (10)[c]	CS-940	0.5	2	0.06–>16	(90)
	Ciprofloxacin	0.12	1	0.03–8	70
	Clinafloxacin	1	2	0.12–8	(70)
	Ofloxacin	2	4	0.25–>16	80
Staphylococcus aureus					
Oxacillin-resistant (10)	CS-940	0.5	8	0.03–8	(60)
	Ciprofloxacin	8	>8	0.06–>8	30
	Clinafloxacin	0.25	1	0.25–1	(100)
	Ofloxacin	4	>16	0.12–>16	40
Oxacillin-susceptible (20)	CS-940	0.06	0.06	0.03–0.12	(100)
	Ciprofloxacin	0.25	0.5	0.12–2	95
	Clinafloxacin	0.015	0.03	0.008–0.25	(100)
	Ofloxacin	0.25	0.25	0.12–1	100
Staphylococcus epidermidis (20)	CS-940	0.12	2	0.06–4	(95)
	Ciprofloxacin	0.25	2	0.12–4	95
	Clinafloxacin	0.015	0.12	0.008–0.5	(100)
	Ofloxacin	0.25	2	0.12–8	90
	Oxacillin	≤2	>2	≤2–>2	65
Staphylococcus haemolyticus (10)	CS-940	0.06	0.12	0.06–4	(90)
	Ciprofloxacin	0.12	0.5	0.06–8	90
	Clinafloxacin	0.015	0.03	0.008–0.12	(100)
	Ofloxacin	0.12	0.5	0.12–4	90
	Oxacillin	≤2	≤2	≤2	100
Coagulase-negative *Staphylococcus* spp. (20)[d]	CS-940	0.12	0.5	0.03–8	(95)
	Ciprofloxacin	0.25	0.5	0.06–>8	90
	Clinafloxacin	0.015	0.06	0.008–0.5	(100)
	Ofloxacin	0.25	1	0.06–16	90
	Oxacillin	≤2	≤2	≤2–>2	90
Bacillus cereus (6)	CS-940	0.03		0.03–0.06	(100)
	Ciprofloxacin	0.03		0.03–0.06	100
	Clinafloxacin	0.008		0.008	(100)
	Ofloxacin	0.12		0.12	100
Corynebacterium jeikeium (12)	CS-940	0.25	16	0.12–16	(58)
	Ciprofloxacin	0.5	>8	0.12–>8	58
	Ofloxacin	0.5	>16	0.5–>16	58
Streptococcus					
Group A (20)	CS-940	0.25	0.25	0.12–0.5	(100)
	Ciprofloxacin	0.5	0.5	0.25–2	95
	Ofloxacin	1	1	0.5–2	100
Group B (20)	CS-940	0.25	0.25	0.12–0.25	(100)
	Ciprofloxacin	0.5	0.5	0.5–1	100
	Ofloxacin	1	1	1	100

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TABLE 1—*Continued*

Organism (no. tested)	Antimicrobial agent	MIC (μg/ml)			% Susceptible[a]
		50%	90%	Range	
Groups C and G (11)	CS-940	0.25	0.25	0.12–0.25	(100)
	Ciprofloxacin	0.5	0.5	0.25–0.5	100
	Ofloxacin	1	1	0.5–1	100
Streptococcus pneumoniae (30)[e]	CS-940	0.25	0.25	0.12–0.25	(100)
	Ciprofloxacin	1	2	0.5–4	83
	Ofloxacin	2	2	1–4	97
Clostridium spp. (10)[f]	CS-940	1	1	0.5–2	(100)
	Ciprofloxacin	0.5	1	0.12–2	90
Peptostreptococcus spp. (10)	CS-940	0.5	2	0.25–2	(100)
	Ciprofloxacin	2	>8	1–>8	40

[a] Susceptible according to NCCLS. The criteria used for CS-940 were those indicated for ofloxacin supported by preliminary pharmacokinetics (2). The criteria used for clinafloxacin were the same as those used for ciprofloxacin (4). Oxacillin-resistant staphylococcal strains susceptibility criteria for beta-lactams follow the recommendations of NCCLS found in document M7-A3 (6).
[b] The percent susceptible data for CS-940 and clinafloxacin are given in parentheses to indicate tentative interpretative criteria.
[c] Includes two strains each of *E. durans*, *E. gallinarum*, and *E. raffinosis* and one strain each of *E. avium*, *E. casseliflavus*, *E. hirae*, and *E. mundtii.*
[d] Includes five strains each of *S. simulans*, *S. hominis*, and *S. saprophyticus*; two strains of *S. warnerii*; and one strain each of *S. auricularis*, *S. sciuri*, and *S. capitis.*
[e] Includes six strains that are intermediate or resistant to penicillin (MICs, ≥0.12 μg/ml).
[f] Includes seven strains of *C. perfringens*, two strains of *C. septicum*, and one strain of *C. tertium.*

Lederle Laboratories (Wayne, N.J.), and CS-940 by Sankyo Co., Ltd. (Tokyo, Japan).

Prepared Media Microbiologic, Inc. (Tualatin, Oreg.), produced and ensured the quality of the microdilution trays containing the drugs diluted in cation-adjusted Mueller-Hinton broth. The trays were stored at ≤60°C until used. Broth microdilution assays were performed according to the recommendations of the National Committee for Clinical Laboratory Standards (NCCLS) (7). Fastidious organisms were tested by the agar dilution method with medium modifications (Haemophilus test medium, blood-supplemented Mueller-Hinton, brucella blood agar) and the procedures outlined by NCCLS (7–9). The test results were interpreted by NCCLS criteria (9) or those recently proposed in peer-reviewed publications (5).

Table 1 contains the antimicrobial activity results for CS-940 and the five comparison drugs tested against 239 gram-positive bacteria. Among the *Enterococcus* spp., CS-940 (MICs at which 90% of isolates tested are inhibited [MIC_{90}s], 1 to 4 μg/ml) was slightly more effective than ciprofloxacin and ofloxacin, but it was less potent than clinafloxacin, especially against *Enterococcus faecium*. Likewise, for the oxacillin-resistant *S. aureus* isolates, CS-940 was more active than ofloxacin or ciprofloxacin. The oxacillin-susceptible strains were highly susceptible (MICs, ≤ 0.12 μg/ml) to CS-940. *Staphylococcus haemolyticus*, *Staphylococcus epidermidis*, and the additional coagulase-negative *Staphylococcus* spp. tested (see Table 1, footnote *d*) were generally less susceptible to these drugs, and the rank order of potency was clinafloxacin > CS-940 > ciprofloxacin = ofloxacin. CS-940 was two- to fourfold more potent than ciprofloxacin and ofloxacin against *Streptococcus* groups A, B, C, and G. CS-940 (MIC_{90}, 0.25 μg/ml) was markedly more potent than the other fluoroquinolones tested (MIC_{90}s, 2 μg/ml) for the *Streptococcus pneumoniae* strains tested. All pneumococcal strains resistant to ciprofloxacin or ofloxacin were susceptible to CS-940 (MICs, 0.25 μg/ml). Two strains of *Listeria monocytogenes* were also inhibited by CS-940 (MICs, ≤ 2 μg/ml; data not shown).

The results for CS-940 antimicrobial activity against 520 gram-negative organisms are listed in Table 2. A limited number of fluoroquinolone-resistant members of the family *Enterobacteriaceae* (four strains of *Providencia rettgeri* and two strains of *Serratia marcescens*) were tested, thus affording a true comparison of potency (MIC only) and not cross-susceptibility or cross-resistance. The activity of CS-940 against *Citrobacter freundii* and *Enterobacter* spp. (many of which were resistant to the beta-lactams tested) was similar to those of ofloxacin and ciprofloxacin (MIC_{90}s, ≤ 0.5 μg/ml). Among the other enteric organisms, CS-940 was most active against *Citrobacter koseri*, *Escherichia coli*, *Salmonella enteritidis*, and *Shigella* spp., for which MIC_{90}s were ≤0.03 μg/ml. Clinafloxacin and CS-940 were the most active compounds tested against *Acinetobacter* spp. (MIC_{90}s, 0.03 μg/ml) and *Stenotrophomonas* (*Xanthomonas*) *maltophilia* (MIC_{90}s, ≤2 μg/ml). This potency was four- to eightfold greater than that of ciprofloxacin or ofloxacin. CS-940 also demonstrated good activity against fastidious species such as *Haemophilus influenzae*, *Moraxella catarrhalis*, and *Neisseria gonorrhoeae* (MIC_{90}s, ≤0.06 μg/ml), with activity nearly identical to that of ciprofloxacin.

All aerobic gram-negative organisms were susceptible to CS-940 with the exception of a few strains of *P. rettgeri*, *S. marcescens*, *P. aeruginosa*, *S. maltophilia*, and several strains of infrequently isolated gram-negative organisms. There was a large degree of fluoroquinolone cross-resistance among these organisms, but clinafloxacin generally remained the most active compound (data not shown).

Anaerobic species such as those in the *Bacteroides fragilis* group (MIC_{90}, 2 μg/ml), *Prevotella* spp. (MIC_{90}, 8 μg/ml), *Clostridium* spp. (MIC_{90}, 1 μg/ml), and peptostreptococci (MIC_{90}, 2 μg/ml) were consistently more susceptible to CS-940 (50 to 100% at MICs of ≤2 μg/ml) than to ciprofloxacin.

CS-940 is a novel trifluorinated quinolone (2, 10, 11) that was evaluated against 761 clinical isolates. CS-940 exhibited an

TABLE 2. In vitro activity of CS-940 in comparison with those of other drugs against 520 gram-negative bacteria

Organism (no. tested)	Antimicrobial agent	MIC (μg/ml)			% Susceptible[a]
		50%	90%	Range	
Citrobacter koseri (10)	CS-940	0.015	0.03	0.008–0.03	(100)[b]
	Ciprofloxacin	0.008	0.015	0.008–0.03	100
	Clinafloxacin	≤0.004	≤0.004	≤0.004–0.008	(100)
	Ofloxacin	0.03	0.06	0.03–0.12	100
Citrobacter freundii (20)	CS-940	0.06	0.5	0.015–0.5	(100)
	Ciprofloxacin	0.015	0.06	0.008–0.12	100
	Clinafloxacin	0.015	0.06	≤0.004–0.06	(100)
	Ofloxacin	0.12	0.25	0.03–0.5	100
	Cefotaxime	2	>32	≤1–>32	60
	Piperacillin-tazobactam	2	64	≤1–128	65
Enterobacter aerogenes (20)	CS-940	0.03	0.06	0.015–0.5	(100)
	Ciprofloxacin	0.015	0.03	0.008–0.12	100
	Clinafloxacin	0.008	0.015	≤0.004–0.06	(100)
	Ofloxacin	0.06	0.12	0.03–0.5	100
Enterobacter agglomerans (10)	CS-940	0.12	0.12	0.015–0.25	(100)
	Ciprofloxacin	0.03	0.06	0.008–0.12	100
	Clinafloxacin	≤0.004	0.015	≤0.004–0.03	(100)
	Ofloxacin	0.06	0.123	0.03–0.25	100
Enterobacter cloacae (20)	CS-940	0.03	0.06	0.015–0.25	(100)
	Ciprofloxacin	0.015	0.03	0.008–0.06	100
	Clinafloxacin	≤0.004	0.015	≤0.004–0.06	(100)
	Ofloxacin	0.06	0.12	≤0.008–0.25	100
Escherichia coli (20)	CS-940	0.03	0.03	≤0.008–0.03	(100)
	Ciprofloxacin	0.015	0.03	0.008–0.06	100
	Clinafloxacin	≤0.004	0.008	≤0.004–0.008	(100)
	Ofloxacin	0.06	0.06	0.015–0.12	100
Klebsiella oxytoca (10)	CS-940	0.03	0.06	0.03–0.06	(100)
	Ciprofloxacin	0.015	0.015	0.015–0.03	100
	Clinafloxacin	0.015	0.015	0.008–0.015	(100)
	Ofloxacin	0.12	0.12	0.06–0.12	100
Klebsiella pneumoniae (20)	CS-940	0.06	0.12	0.03–0.12	(100)
	Ciprofloxacin	0.03	0.06	0.015–0.12	100
	Clinafloxacin	0.015	0.03	0.008–0.03	(100)
	Ofloxacin	0.12	0.25	0.06–0.25	100
Morganella morganii (20)	CS-940	0.012	0.5	0.06–1	(100)
	Ciprofloxacin	0.015	0.015	0.008–0.06	100
	Clinafloxacin	0.008	0.015	≤0.004–0.12	(100)
	Ofloxacin	0.06	0.12	0.06–0.5	100
Proteus mirabilis (20)	CS-940	0.12	0.25	0.03–0.25	(100)
	Ciprofloxacin	0.03	0.03	0.015–0.06	100
	Clinafloxacin	0.015	0.03	0.008–0.03	(100)
	Ofloxacin	0.12	0.12	0.03–0.25	100
Proteus vulgaris (10)	CS-940	0.12	0.25	0.06–0.5	(100)
	Ciprofloxacin	0.015	0.03	0.015–0.06	100
	Clinafloxacin	0.015	0.015	0.008–0.03	(100)
	Ofloxacin	0.06	0.12	0.03–0.25	100
Providencia stuartii (10)	CS-940	0.12	0.5	0.06–0.5	(100)
	Ciprofloxacin	0.06	0.12	0.015–0.25	100
	Clinafloxacin	0.03	0.06	0.008–0.12	(100)
	Ofloxacin	0.5	1	0.12–1	100

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TABLE 2—*Continued*

Organism (no. tested)	Antimicrobial agent	MIC (μg/ml)			% Susceptible[a]
		50%	90%	Range	
Providencia rettgeri (10)	CS-940	0.5	16	0.03–>16	(60)
	Ciprofloxacin	0.03	4	0.015–>8	60
	Clinafloxacin	0.03	0.5	0.008–8	(90)
	Ofloxacin	0.25	4	0.06–>16	60
Salmonella enteritidis (10)	CS-940	0.03	0.03	0.03–0.06	(100)
	Ciprofloxacin	0.015	0.03	0.015–0.06	100
	Clinafloxacin	0.008	0.015	≤0.004–0.015	(100)
	Ofloxacin	0.12	0.12	0.06–0.12	100
Serratia marcescens (20)	CS-940	0.5	4	0.06–16	(85)
	Ciprofloxacin	0.12	1	0.03–8	90
	Clinafloxacin	0.06	0.5	0.015–4	(95)
	Ofloxacin	0.25	2	0.12–8	90
Shigella spp. (10)[c]	CS-940	0.015	0.015	0.015–0.03	(100)
	Ciprofloxacin	0.008	0.015	0.008–0.015	100
	Clinafloxacin	≤0.004	≤0.004	≤0.004–0.008	(100)
	Ofloxacin	0.03	0.06	0.03–0.06	100
Yersinia enterocolitica (10)	CS-940	0.015	0.06	0.015–0.06	(100)
	Ciprofloxacin	0.015	0.03	0.015–0.03	100
	Clinafloxacin	≤0.004	0.008	≤0.004–0.015	(100)
	Ofloxacin	0.06	0.12	0.03–0.12	100
Other members of the family *Enterobacteriaceae* (11)[d]	CS-940	0.03	0.06	0.03–0.12	(100)
	Ciprofloxacin	0.015	0.03	0.015–0.03	100
	Clinafloxacin	≤0.004	0.008	0.008–0.12	(100)
	Ofloxacin	0.06	0.12	0.03–0.12	100
Acinetobacter spp. (10)	CS-940	0.015	0.03	≤0.008–0.12	(100)
	Ciprofloxacin	0.25	0.5	0.008–1	100
	Clinafloxacin	0.015	0.03	0.008–0.12	(100)
	Ofloxacin	0.12	0.25	0.015–0.5	100
Pseudomonas aeruginosa (30)	CS-940	0.25	2	0.25–4	(93)
	Ciprofloxacin	0.12	0.5	0.06–4	97
	Clinafloxacin	0.06	0.25	0.03–1	(100)
	Ofloxacin	1	4	0.5–16	87
Stenotrophomonas maltophilia (10)	CS-940	0.25	2	0.03–>16	(90)
	Ciprofloxacin	1	8	0.25–>8	50
	Clinafloxacin	0.12	0.5	0.03–4	(90)
	Ofloxacin	1	8	0.12–>16	80
Other gram-negative species (9)[e]	CS-940	1		0.015–>16	(55)
	Ciprofloxacin	0.5		≤0.004–>8	55
	Clinafloxacin	0.25		≤0.004–4	(89)
	Ofloxacin	1		0.015–16	44
Moraxella catarrhalis					
β-Lactamase negative (20)	CS-940	0.015	0.03	0.015–0.03	(100)
	Ciprofloxacin	0.03	0.03	0.015–0.03	100
	Clinafloxacin	0.008	0.008	≤0.004–0.008	(100)
	Ofloxacin	0.06	0.06	0.03–0.06	100
β-Lactamase positive (20)[f]	CS-940	0.015	0.03	≤0.008–0.03	(100)
	Ciprofloxacin	0.03	0.03	0.015–0.06	100
	Clinafloxacin	0.008	0.008	≤0.004–0.008	(100)
	Ofloxacin	0.06	0.06	0.03–0.06	100
Haemophilus influenzae					
β-Lactamase negative (20)	CS-940	0.008	0.015	0.008–0.03	(100)
	Ciprofloxacin	0.015	0.015	0.008–0.03	100

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TABLE 2—*Continued*

Organism (no. tested)	Antimicrobial agent	MIC (μg/ml)			% Susceptible[a]
		50%	90%	Range	
β-Lactamase negative, ampicillin resistant (10)	CS-940	0.015	0.06	0.015–0.06	(100)
	Ciprofloxacin	0.015	0.03	0.008–0.03	100
β-Lactamase positive (20)	CS-940	0.015	0.03	0.008–0.03	(100)
	Ciprofloxacin	0.015	0.015	0.008–0.03	100
Neisseria gonorrhoeae					
β-Lactamase negative, penicillin susceptible (20)[g]	CS-940	0.015	0.015	0.008–0.015	(100)
	Ciprofloxacin	0.015	0.015	0.004–0.03	100
β-Lactamase negative, penicillin resistant (10)[h]	CS-940	0.015	0.03	0.015–0.06	(100)
	Ciprofloxacin	0.015	0.03	0.015–0.06	100
β-Lactamase positive, penicillin resistant (20)[i]	CS-940	0.008	0.015	0.002–0.06	(100)
	Ciprofloxacin	0.004	0.015	0.004–0.12	95
Neisseria spp. (20)[j]	CS-940	0.015	0.06	0.004–0.06	(100)
	Ciprofloxacin	0.008	0.015	0.004–0.015	100
Prevotella spp. (10)	CS-940	1	8	0.5–16	50
	Ciprofloxacin	>8	>8	1–>8	10
Bacteroides fragilis group (30)[k]	CS-940	1	2	0.5–16	90
	Ciprofloxacin	4	>8	2–>8	0

[a] See footnote *a* of Table 1.
[b] See footnote *b* of Table 1.
[c] Includes five strains each of *S. sonnei* and *S. flexneri.*
[d] Includes two strains each of *Hafnia alvei*, *Enterobacter sakazakii*, *Enterobacter taylorae*, *Salmonella typhi*, and *Serratia liquefaciens* and one strain of *Klebsiella ozaenae.*
[e] Includes two strains each of *Achromobacter xylosoxidans*, *Aeromonas hydrophilia*, *Pseudomonas cepacia*, and *Pseudomonas fluorescens* and one strain of a *Flavobacterium* species.
[f] Includes 10 strains each of BRO-1 and BRO-2 enzyme-producing strains.
[g] Includes two tetracycline-resistant and one spectinomycin-resistant strains.
[h] Includes seven tetracycline-resistant strains.
[i] Includes three tetracycline-resistant and four spectinomycin-resistant strains.
[j] Includes 4 strains each of *N. subflava* and *N. sicca*, 2 strains of *N. mucosa*, and 10 strains of *N. meningitidis.*
[k] Previously known as pigmented *Bacteroides* species and includes five strains each of *B. bivia* and *B. disiens.*

antimicrobial spectrum that generally was equal to or slightly superior to those of ofloxacin and ciprofloxacin. These results suggest that CS-940 may have the potential for use against some ciprofloxacin-resistant strains, particularly among anaerobic organisms, *S. pneumoniae*, and staphylococci. The present investigation also indicates that further studies should be initiated to characterize the pharmacokinetic and toxicologic properties of CS-940 in humans.

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