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In Vitro Evaluation of a Semisynthetic Derivative of Gentamicin B (SCH 21420)

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The activities of Sch 21420 and amikacin were compared in vitro against 448 clinical bacterial isolates and against 82 gentamicin-resistant isolates of gram-negative bacilli. At 1 μg/ml, Sch 21420 was more active than amikacin against most *Enterobacteriaceae* but less active against *Pseudomonas aeruginosa*. Activity of these antibiotics against gentamicin-resistant organisms varied according to the species examined.

Sch 21420 is a semisynthetic derivative of gentamicin B (T. L. Nagabhushan, H. Tsai, and P. J. L. Daniels, Program Abstr. Intersci. Conf. Antimicrob. Agents Chemother. 17th, New York, N.Y., Abstr. no. 249, 1977) that is similar in its activity to amikacin (K. P. Fu and H. C. Neu, Program Abstr. Intersci. Conf. Antimicrob. Agents Chemother. 17th, New York, N.Y., Abstr. no. 250, 1977). The purpose of this study was to compare the activities of Sch 21420 and amikacin against a large number of clinical bacterial isolates. Both antibiotics, moreover, were tested against a variety of isolates of gentamicin-resistant gram-negative bacilli. The minimal inhibitory concentration of each agent was determined by the agar dilution method as described in detail elsewhere (1).

The results of testing the activities of Sch 21420 and amikacin against 448 clinical isolates are shown in Table 1. Sch 21420 was more active at low concentrations (0.5 to 1.0 μg/ml) than amikacin against all of the *Enterobacteriaceae* tested except for *Proteus* (*Morganella*) *morganii* and *Providencia stuartii*. Amikacin was slightly more active at 1 μg/ml than Sch 21420 against *Pseudomonas aeruginosa*.

Sch 21420 and amikacin were compared against 80 isolates of gentamicin-resistant (MIC

TABLE 1. *Activity of aminoglycosides against clinical isolates*

Organism	No. of strains	MIC_{75} (μg/ml)[a]		MIC_{100} (μg/ml)[b]	
		Sch 21420	Amikacin	Sch 21420	Amikacin
Escherichia coli	38	1	1	4	4
Klebsiella pneumoniae	30	1	1	1	2
Enterobacter	46	1	2	8	8
Citrobacter	37	0.5	1	16	16
Serratia marcescens	14	1	2	>128	2
Salmonella enteritidis	19	2	2	2	4
Shigella	15	4	4	8	8
Proteus mirabilis	31	4	2	16	8
P. vulgaris	14	1	1	2	2
P. morganii	17	4	2	8	8
P. rettgeri	9	1	2	2	2
Providencia stuartii	13	1	1	4	4
Pseudomonas aeruginosa	41	4	2	8	8
P. maltophilia	22	>128	>128	>128	>128
Acinetobacter calcoaceticus	18	1	1	4	8
Staphylococcus aureus	36	1	2	2	2
S. epidermidis	26	0.25	0.25	4	4
Streptococcus, group D	22	>128	>128	>128	>128

[a] MIC_{75}, Lowest concentration inhibiting ≥75% of the strains tested.
[b] MIC_{100}, Lowest concentration inhibiting 100% of the strains tested.

> 4 μg/ml) gram-negative bacilli. Both agents were equally active against 30 of 47 strains of *P. aeruginosa* at concentrations ranging from 2 to 64 μg of each agent per ml; however, amikacin was more active by one $\log_2$ dilution against all but one of the other 17 strains. Of 18 *Proteeae*, which included 3 *P. mirabilis*, 1 *P. vulgaris*, 11 *P. rettgeri*, and 3 *P. stuartii*, Sch 21420 was as active as or one $\log_2$ dilution less active than amikacin in five and nine instances, respectively. Of the 18 gentamicin-resistant *Proteeae*, 14 were inhibited by ≤16 μg of either Sch 21420 or amikacin per ml. With 15 gentamicin-resistant *Enterobacteriaceae*, Sch 21420 was more active than amikacin in all instances by at least one $\log_2$ dilution and in five instances by at least two $\log_2$ dilutions. All but two of these strains were inhibited by ≤16 μg of Sch 21420 per ml.

In conclusion, Sch 21420 was found to be more active than amikacin against most *Enterobacteriaceae*, and less active than amikacin against *P. aeruginosa*. Against gentamicin-resistant gram-negative bacilli, the relative activities of the two antibiotics varied by species.

LITERATURE CITED

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