In Vitro Activities of Quinupristin-Dalfopristin and the Streptogramin RPR 106972 against *Mycoplasma pneumoniae*

Koichi Izumikawa, Yoichi Hirakata, Toshiyuki Yamaguchi, Ryoji Yoshida, Hironori Tanaka, Hiromu Takemura, Shigefumi Maesaki, Kazunori Tomono, Mitsuo Kaku, Kin-Ichi Izumikawa, Shimeru Kamihira and Shigeru Kohno


Updated information and services can be found at:
http://aac.asm.org/content/42/3/698

**REFERENCES**

This article cites 12 articles, 10 of which can be accessed free at:
http://aac.asm.org/content/42/3/698#ref-list-1

**CONTENT ALERTS**

Receive: RSS Feeds, eTOCs, free email alerts (when new articles cite this article), [more »](http://aac.asm.org/content/42/3/698#ref-list-1)
In Vitro Activities of Quinupristin-Dalfopristin and the Streptogramin RPR 106972 against Mycoplasma pneumoniae

KOICHI IZUMIKAWA,1* YOICHI HIRAKATA,1 TOSHIYUKI YAMAGUCHI,1 RYOJI YOSHIDA,2 HIRONORI TANAKA,2 HIROMU TAKEMURA,3 SHIGEFUMI MAESAKI,2 KAZUNORI TOMONO,2 MITSUO KAKU,3 KIN-ICHI IZUMIKAWA,4 SHIMERU KAMIHIRA,1 AND SHIGERU KOHNO2

Department of Laboratory Medicine1 and Second Department of Internal Medicine,2 Nagasaki University School of Medicine, Nagasaki 852, Department of Microbiology, St. Marianna University School of Medicine, Kawasaki 211,3 and Izumikawa Hospital, Nagasaki 859-15,4 Japan

Received 4 August 1997/Returned for modification 22 October 1997/Accepted 15 December 1997

The in vitro activities of quinupristin-dalfopristin and streptogramin RPR 106972 were determined with 44 strains of Mycoplasma pneumoniae and compared to those of macrolides, minocycline, and quinolones. All isolates tested were highly susceptible to macrolides and to quinupristin-dalfopristin (MIC at which 90% of the isolates are inhibited [MIC90], 0.0625 μg/ml), followed by RPR 106972 (MIC90, 0.5 μg/ml), quinolones, and minocycline.

Mycoplasma pneumoniae is recognized as a common pathogen in community-acquired pneumonia. Macrolides and minocycline are agents of first choice in treatment of M. pneumoniae infections, but some strains are resistant to these agents (7). Quinupristin-dalfopristin and RPR 106972 are injectable and oral streptogramins, respectively, composed of two synergistic components and developed for multi-drug-resistant gram-positive bacteria (10). In this study, we have investigated the in vitro activities of the streptogramins against M. pneumoniae in comparison with those of minocycline, macrolides, and quinolones.

A total of 41 clinical isolates of M. pneumoniae obtained in Nagasaki University School of Medicine Hospital and affiliated medical facilities and 3 standard strains (M. pneumoniae FH, Mac, and M129, which were kindly supplied by M. F. Barile [Food and Drug Administration, Bethesda, Md.]) were used. Antimycoplasmal susceptibility tests were performed by the broth microdilution method (5, 6, 8, 13, 14). Briefly, M. pneumoniae isolates were grown to a concentration of 10^8 CFU/ml in modified Chanock broth medium (4) consisting of 7 parts horse serum, 1 part 25% fresh yeast extract, 1% glucose, and 0.002% phenol red adjusted to pH 7.8 with 1 N sodium hydroxide. Organisms were inoculated in microtiter plates containing antimycoplasmal agents in the medium described above at a final concentration of 10^5 CFU/ml. The plates were sealed with a plate sealer and incubated at 37°C under atmospheric conditions.

All plates were examined once daily, and when the color of the medium of the drug-free control changed from red to yellow, the minimal concentration of drug preventing the color change was defined as the MIC (5, 6, 8, 13, 14). Staphylococcus aureus ATCC 29213 was used as a quality control for potential interactions between antibiotics, medium components, and pH. MICs of potent antibiotics for M. pneumoniae, including minocycline (Lederle, Ltd., Tokyo, Japan), erythromycin (Dainippon, Ltd., Osaka, Japan), clarithromycin (Dynabot, Ltd., Tokyo, Japan), azithromycin (Pfizer, Ltd., Tokyo, Japan), ofloxacin (Dai-ichi Pharmaceutical, Ltd., Tokyo, Japan), sparflaxacin (Dainippon), quinupristin-dalfopristin (Rhone-Poulenc Rorer, Ltd., Tokyo, Japan) and RPR 106972 (Rhone-Poulenc Rorer), were determined.

The comparative MIC range, MIC at which 50% of the isolates are inhibited (MIC50), and MIC90, are shown in Table 1. Macrolides, especially azithromycin, were potent against M. pneumoniae isolates, followed by quinupristin-dalfopristin, sparflaxacin, and RPR 106972. The in vitro activities of streptogramins were lower than those of macrolides, but higher than those of ofloxacin and minocycline. There was no correlation between MICs of erythromycin and quinupristin-dalfopristin (r = 0.173) or between those of erythromycin and RPR 106972 (r = 0.013).

Streptogramin antibiotics have been developed for the treatment of multi-drug-resistant gram-positive bacterial infections and consist of two molecules which are group A streptogramins (macrolactones) and group B streptogramins (cyclic hexadepsipeptides) (10). Both group A and group B streptogramins are bacteriostatic alone, but bactericidal in combination (12). They act synergistically against not only multi-drug-resistant gramp-
positive strains but also other respiratory pathogens, including Moraxella catarrhalis, Streptococcus pneumoniae, S. pyogenes, and Legionella pneumophila, and are somewhat less active against Haemophilus influenzae (1–3, 9, 11). The most characteristic aspect of this class of drug is that there is no cross-resistance with macrolides or lincosamides, although these drugs also inhibit protein synthesis at the ribosomal level (10).

In our study, there was no correlation between MICs of streptogramins and erythromycin, although erythromycin-resistant strains have not yet been tested. In conclusion, our results suggest that streptogramins have the possibility of being used for community-acquired M. pneumoniae infections in addition to multi-drug-resistant bacterial infections.

REFERENCES