

Comparative *In Vitro* Susceptibilities of a New Investigational Macrolide CEM-101 Against Human Mycoplasmas and Ureaplasmas

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Background:

CEM-101 (Cempra Pharmaceuticals, Inc.) is a promising new macrolide in development for treating community acquired macrolide-resistant bacteria as well as macrolide-susceptible bacteria. We performed an *in vitro* study to determine the activity of CEM-101 in comparison to azithromycin (AZI), telithromycin (TEL), doxycycline (DOX), levofloxacin (LEV), clindamycin (CL), and linezolid (LZD) against clinical isolates of 6 human mycoplasma and ureaplasma species. Organisms tested included 38 *Mycoplasma pneumoniae* (MP), 5 *Mycoplasma genitalium* (MG), 13 *Mycoplasma hominis* (MH), 15 *Mycoplasma fermentans* (MF), 10 *Ureaplasma parvum* (UP) and 10 *Ureaplasma urealyticum* (UU).

Methods:

Microbroth dilution was used to determine MICs using 10B broth for ureaplasmas and SP4 broth for mycoplasma species. MBCs were determined for 9 MP isolates.

Results:

MP MICs for CEM-101 ranged from 0.000000063 – 0.5 µg/ml with MIC₉₀ = 0.25, making its activity equivalent to DOX, 2-fold > TEL and LEV, and 32-fold > AZI. LZD was the least active agent tested against MP with MIC₉₀ = 128 µg/ml. Two macrolide-resistant MP with AZI MICs > 32 µg/ml were inhibited by CEM-101 at 0.5 µg/ml. MBCs were ≥ 16-fold greater than MICs for 9 MP indicating the drug is bacteriostatic. All mycoplasmas and ureaplasma isolates were inhibited by CEM-101 at concentrations ≤ 0.5 µg/ml, making it the most potent compound tested overall. Excluding 4 macrolide-resistant MP, no isolate of any species tested had a MIC > 0.063 µg/ml for CEM-101.

Conclusions:

CEM-101 showed excellent activity *in vitro* against human mycoplasmas and ureaplasmas, including macrolide-resistant MP, doxycycline-resistant UP and UU and was more potent than comparator drugs.