

Two unexpected phenomena in macrolide-resistant *Mycoplasma pneumoniae* infection in Japan and the unique biological characteristics of *Mycoplasma pneumoniae*

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To the editor: In a recent issue of the *Journal of Infection and Chemotherapy*, Miyashita et al. [1] reported on two adult patients with pneumonia caused by macrolide-resistant (*mr*) *Mycoplasma pneumoniae*. Concerning this, two rather unexpected phenomena have been observed in Japan, considering the prevalence of approximately 40% of *mr M. pneumoniae* in pediatric patients in this country.

One phenomenon is that excessive morbidity, such as frequent progression to respiratory failure, has not been reported in association with *mr M. pneumoniae* infection. Because the pathogenesis of *M. pneumoniae* pneumonia is host immune mediated, it can be understood that the drug resistance of *M. pneumoniae* in itself does not directly lead to clinical severity. The other aspect is, as Miyashita et al. argued, that *mr M. pneumoniae* pneumonia has seldom been seen in adults in Japan. This author believes that these two phenomena must be derived in common from some unique biological characteristics of *M. pneumoniae*, as depicted in Fig. 1.

First, extrinsic genes such as plasmids do not function within *M. pneumoniae* cells [2]. As a consequence, the resistant mechanism of *M. pneumoniae* is exclusively a point mutation in the domain V of 23S rRNA. Second, *M. pneumoniae* has only one operon for constructing ribosomes [3]. As a consequence, drug-resistant strains of *M. pneumoniae* that harbor a point mutation within their rRNA genes are exclusively mutants of ribosomes. Therefore, drug-resistant strains of *M. pneumoniae* must suffer from less efficient protein synthesis. *Mycoplasma pneumoniae* is fundamentally a fastidious, slowly growing

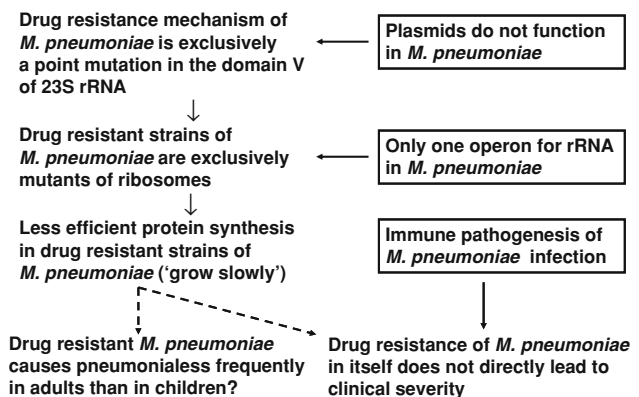


Fig. 1 A diagram depicting two unexpected phenomena observed in *mr Mycoplasma pneumoniae* infection with their possible mechanisms deduced from the unique biological characteristics of *M. pneumoniae*

organism. Taking these points together, it can be speculated that *mr* strains of *M. pneumoniae* in many instances must be eradicated from the respiratory tract before propagating into sufficient amounts to develop pneumonia in adults, who are far more active immunologically than children.

Bacteriostatic antimicrobial agents such as tetracyclines have a disadvantage in that shedding of *M. pneumoniae* persists for several weeks even after clinical recovery from pneumonia. Therefore, patients treated with those drugs can transmit the organism during that period. Mechanisms of resistance to quinolones are point mutations, and wild-type strains of quinolone-resistant *M. pneumoniae* must emerge with high probability when these drugs are used far more frequently than today to treat *M. pneumoniae* pneumonia. In conclusion, this author believes that there is no urgent need to alter the concept that macrolides are the first-line drugs of choice for the treatment of *M. pneumoniae* pneumonia in adults as well as in children.

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