

**COMPARISON OF IN VITRO ANTIBACTERIAL ACTIVITY OF  
MEROPENEM AND GENTAMICIN ENCAPSULATED IN LIPOSOMES**

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The microorganisms developed various ways of resistance to the toxic effect of antibiotics. One of these ways is the lower permeability of the outer membrane of gram- negative bacteria [Putman, M. *et al.* **Microbiol. Mol. Biol. Rev.** 64 (2000) 672; Nikaido, H. **Antimicrob. Agents Chemother.** 33 (1989) 1831].

*Pseudomonas aeruginosa* (gram- negative bacteria) still remains one of the most important agents of bacteremia. This clinically significant opportunistic pathogen is resistant to many antibiotics due to the lower permeability of its outer membrane and only a few antimicrobial agents have the antibacterial activity against this species [Masuda, N. *et al.* **Antimicrob. Agents Chemother.** 39 (1995) 645].

Meropenem (carbapenem) and gentamicin (aminoglycoside) have broad-spectrum antibacterial activity also against *Pseudomonas aeruginosa* strains. The most of carbapenem – resistant and aminoglycoside – resistant strains of *Pseudomonas aeruginosa* show the mechanism associated with the lower permeability of the outer membrane [Mingeot-Leclercq, M.P. *et al.* **Antimicrob. Agents Chemother.** 43 (1999) 727; Fung – Tomc, J.C. *et al.* **Antimicrob. Agents Chemother.** 39 (1995) 394].

Sachetelli and co-workers demonstrated the fusion between *Pseudomonas aeruginosa* cells and fluid liposomes. Tobramycin encapsulated in those liposomes in sub-MIC concentration eradicated *Pseudomonas aeruginosa* in infected mouse [Sachetelli, S. *et al.* **Biochim. Biophys. Acta** 1463 (2000) 254].

In our study we constructed various formulations of the liposomes containing meropenem and gentamicin and examined their antimicrobial activities against *Pseudomonas aeruginosa*, *E. coli* and *Klebsiella pneumoniae* strains. Our goal was to overcome the barrier of the resistance determined by the lower permeability of the bacterial membranes and to verify the efficacy of the same composition of liposomes containing different antibiotics.

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