

Pseudomonas aeruginosa Peka Meropenem : Analisis Perubahan Fenotip dan Genetik Sesudah Paparan Meropenem Secara In Vitro. = Meropenem-Sensitive Pseudomonas aeruginosa: Analysis of Phenotypic and Genetic Changes After In Vitro Exposure to Meropenem.

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Abstrak

Latar Belakang: *Pseudomonas aeruginosa*, resisten terhadap obat, menyebabkan infeksi kesehatan.

Resistensi terhadap terapi pilihan meropenem merupakan ancaman serius. Penelitian ini bertujuan untuk menganalisis perubahan konsentrasi hambat minimum meropenem (KHM), perubahan ekspresi gen ampC, mexA, dan oprD, serta korelasi antara KHM dengan ekspresi gen ampC, mexA, dan oprD sesudah paparan meropenem.

Metode: Digunakan sepuluh isolat *P. aeruginosa* dari Departemen Mikrobiologi Klinik Fakultas Kedokteran Universitas Indonesia. Sesudah bakteri terbukti peka terhadap meropenem secara fenotip, gen resistensi intrinsik dideteksi menggunakan PCR. Sesudah paparan meropenem pada hari ke 5 dan 12 dilakukan uji kepekaan dengan metode gradien konsentrasi dan deteksi RNA menggunakan real-time RT-PCR.

Hasil: Semua isolat *P. aeruginosa* yang peka secara fenotip terhadap meropenem mempunyai gen ampC, mexA, dan oprD. Peningkatan KHM, peningkatan ekspresi gen ampC dan mexA, dan penurunan ekspresi gen oprD diamati sesudah paparan meropenem. Terdapat korelasi yang sangat kuat dan signifikan ($p < 0,05$) antara KHM dan ekspresi gen oprD sesudah hari ke-12 paparan meropenem.

Kesimpulan: Meskipun tidak terdapat perbedaan yang signifikan pada ekspresi gen KHM dan ampC, mexA, dan oprD antara hari ke-5 dan hari ke-12, namun terdapat korelasi yang sangat kuat dan signifikan antara ekspresi gen KHM dan oprD pada hari ke-12 ($p < 0,05$). Hal ini menunjukkan bahwa penurunan ekspresi gen oprD berpotensi meningkatkan resistensi meropenem pada *P. aeruginosa*.

.....Background: *Pseudomonas aeruginosa*, drug-resistant, causes health infections. Resistance to the preferred therapy meropenem is a serious threat. This study aimed to analyze changes in meropenem minimum inhibitory concentration (MIC), changes in ampC, mexA, and oprD gene expression, and the correlation between MIC and ampC, mexA, and oprD gene expression after meropenem exposure.

Methods: Ten isolates of *P. aeruginosa* from the Clinical Microbiology Department, Faculty of Medicine, Universitas Indonesia were used. After the bacteria were shown to be sensitive to meropenem phenotypically, intrinsic resistance genes were detected using PCR. After meropenem exposure on Days 5 and 12, sensitivity testing was carried out with the concentration gradient method and RNA was detected using real-time RT-PCR.

Results: All *P. aeruginosa* isolates that were phenotypically sensitive to meropenem had the ampC, mexA, and oprD genes. An increase in MIC, an increase in ampC and mexA gene expression, and a decrease in oprD gene expression were observed after meropenem exposure. There was a very strong and significant correlation ($p < 0.05$) between MIC and oprD gene expression after Day 12 of meropenem exposure.

Conclusion: Although there were no significant differences in MIC and ampC, mexA, and oprD gene expression between Day 5 and Day 12, there was a very strong and significant correlation between MIC and

oprD gene expression on Day 12 (p 0.05). This indicates that decreasing oprD gene expression has the potential to increase meropenem resistance in *Pseudomonas aeruginosa*.