Analisis Molekuler Porin OmpF pada Isolat Klinis Escherichia coli dan Pola Kepekaannya Terhadap Antibiotika = Molecular analysis of OmpF porin in the Escherichia coli clinical isolate and its antibiotics susceptibility pattern.

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Abstrak

Porin OmpF merupakan Outer Membrane Protein (OMP) yang berperan dalam transport pasif berbagai senyawa dan sering diasosiasikan dengan sifat resistensi antibiotik. Gen ompF pengkode porin OmpF kerap dipelajari pada spesies Escherichia coli. Kejadian resistensi antibiotik bakteri seperti pada E. coli menjadi salah satu masalah utama dalam dunia kesehatan, sehingga studi mengenai gen ompF pada bakteri E. coli sangat penting dilakukan. Belum adanya laporan mengenai profil gen ompF pada E. coli resistensi di Indonesia menyebabkan perlunya dilakukan penelitian ini. Penelitian ini bertujuan untuk mendapatkan data karakteristik gen ompF yang mengkode porin OmpF pada isolat klinis E. coli serta kepekaannya terhadap antibiotik. Sebanyak 21 sampel E. coli resisten yang diinokulasi di Jakarta, Indonesia dikelompokkan menjadi 3 variabel fenotip. DNA isolat diekstraksi menggunakan kit ekstraksi QIAamp® DNA Mini Kit (50), lalu gen ompF diamplifikasi menggunakan primer spesifik dengan metode PCR konvensional dan dilanjutkan dengan sekuensing. Gen ompF isolat dibandingkan dengan gen ompF strain E. coli ATCC 25922 secara bioinformatik, meliputi mutasi serta pohon filogenetiknya. Diketahui bahwa hampir seluruh sampel E. coli patogen mengalami mutasi pada deret asam nukleat dimana sebagian besar mutasi yang terjadi merupakan silent mutation. Mutasi gen ompF tingkat asam amino terjadi pada nomor 48, 51, 52, 60, 115, 224, 225, 226, 229, 306, dan 307. Namun mutasi-mutasi tersebut tidak mempengaruhi sifat fenotipik resistensi. Analisis pohon filogenetik juga menunjukkan bahwa sampel dengan sifat fenotip yang sama tidak mengelompok menjadi clade yang sama secara garis evolusi.

......Porin OmpF is an Outer Membrane Protein (OMP) that plays role in passive transport of various compounds and is often associated with antibiotic resistance. The ompF gene encoding the OmpF porin is frequently studied in Escherichia coli species. The incidence of bacterial antibiotic resistance like E. coli is one of the main problems in the world of health, so the study of the ompF gene in E. coli is very important. The absence of reports on the ompF gene profile in E. coli resistance in Indonesia has led to the need for this research. This study aims to obtain data on the characteristics of the ompF gene encoding the OmpF porin in clinical isolates of E. coli and its sensitivity to antibiotics. A total of 21 samples of E. coli inoculated in Jakarta, Indonesia were grouped into 3 phenotypic variables. The DNA then was extracted using the QIAamp® DNA Mini Kit (50) extraction kit, then the ompF gene was amplified using specific primers with conventional PCR method and proceeded to sequencing. The ompF gene of the isolates were compared with the ompF gene of the E. coli ATCC 25922 strain bioinformatically, including mutations and its phylogenetic tree. It is known that almost all samples of those E. coli have mutations in the nucleic acid sequences where most of theem are silent mutations. Amino acid level of ompF gene mutations occurred at numbers 48, 51, 52, 60, 115, 224, 225, 226, 229, 306, and 307. However, these mutations did not affect the phenotypic characteristics of resistance. The phylogenetic tree analysis also showed that samples with the same phenotypic traits did not clustered into a same clade evolutionarily