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ePoster Viewing

Resistance mechanisms

Low-level OmpF porin-encoding gene expression in OXA-48 carbapenemase-producing *Enterobacter cloacae* ST-89

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Background: Nowadays, utility of carbapenems, drugs considered as “last-line” agents in therapy of infections caused by MDR pathogens is constantly decreasing. Resistance to carbapenems are reported worldwide, including enzymatic and non-enzymatic mechanisms. We aimed to investigate the level of OmpF porin-encoding gene expression level in OXA-48 carbapenemase-producing *Enterobacter cloacae* relative to carbapenem-susceptible clinical strain.

Material/methods: Broth microdilution susceptibility testing and multilocus sequence typing (MLST) was performed in both carbapenem-resistant and carbapenem-susceptible *E. cloacae* strain. Quantitative Real-Time PCR was used to investigate level of OmpF porin-encoding gene in tested strains. Total RNA was reverse transcribed with use of SuperScript-IV® enzyme, and first strand cDNA was used for further analysis. Determination of gene expression level in carbapenem-resistant *E. cloacae* ST-89 was performed relative to carbapenem-susceptible *E. cloacae* ST-335. Relative difference in OmpF gene expression level was determined with use of Pfaffl efficiency calibrated 2^{-ΔΔC_q} method with subsequent analysis of *rpoB* housekeeping gene used as internal control.

Results: *E. cloacae* ST-89 was found to be resistant to ertapenem, doripenem, ceftazidime, cefepime, cefotaxime, ceftriaxone, and intermediately susceptible to meropenem and imipenem (MIC 4 mg/L), while *E. cloacae* ST-335 was susceptible for all tested agents. Analysis of gene expression revealed deficiency of porin-encoding gene in carbapenem-resistant strain. Expression level of OmpF porin-encoding gene was 0,298-fold lower in carbapenem-resistant *E. cloacae* ST-89 compared to carbapenem-susceptible strain (3,35-fold higher OmpF transcript level in *E. cloacae* ST-335).

Conclusions: Here we report the *E. cloacae* ST89 strain with multiple mechanisms of resistance to carbapenems. Gene expression analysis revealed contribution of decreased OmpF porin-encoding gene expression level in carbapenem-resistant *E. cloacae* ST-89 expressing acquired OXA-48 carbapenemase. The accumulation and interplay between various mechanisms of antimicrobial resistance may consequently lead to virtually untreatable infections.