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A molecular study on pseudomonas clinical isolates causing nosocomial infections in Alexandria and Damanhour, Egypt

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Pseudomonas aeruginosa is an important health care-associated opportunistic pathogen of critically ill patients. It is notorious for its multi-drug resistance which renders treatment difficult and sometimes unachievable. The intrinsic resistance of *Pseudomonas aeruginosa* owes much to multidrug efflux pumps which belong to the RND superfamily. The objective of the study was to investigate the antimicrobial resistance profiles and molecular resistance mechanisms of *Pseudomonas* nosocomial isolates obtained in Alexandria and Damanhour area and to test the efficacy of antibiotic combinations against selected isolates. 83 clinical isolates were identified, using standard microbiological techniques and resistance pattern of 17 antibiotics was evaluated using the standard disc agar diffusion technique. Most of these isolates were highly resistant to β-lactam antibiotics such as Aztreonam, Piperacillin, Piperacillin/Tazobactam, Ceftazidime and Cefepime, as well as Ofloxacin and Netilmicin. Polymyxin B and Colistin were the most effective agents. Most of the tested isolates showed multidrug resistance, revealing 17 different resistance patterns. The effect of MexAB-OprM and MexXY-OprM efflux pumps overexpression was examined using the quantitative RT-PCR technique. Two- 786 folds increase in the expression of the *mex*A gene and two- 2385 folds increase in the expression of the *mex*X gene were observed. The effect of combining Amikacin, Imipenem, Levofloxacin and Cefepime with Colistin was investigated using the checkerboard technique. The combination of Colistin with each of Imipenem, Amikacin or Levofloxacin produced synergistic effect on most of the resistant isolates. Also, indifference was shown in some of the isolates.

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