



Molecular detection and sequencing of Carbapenemase-Encoding Genes in Clinical strains of *Pseudomonas aeruginosa*.

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Abstract:

In 2017 the World Health Organization (WHO) classified carbapenem resistant *Pseudomonas* among the most critical multidrug-resistant bacteria for urgent attention. In this study verigene-nanosphere microarray based assay and multiplex PCR were tested for detection of carbapenem encoding genes. Carbapenemase encoding gene sequencing of parent strain and its UV mutant followed by nucleotide sequence alignments were also conducted. Bacterial resistance to carbapenem was tested after induced plasmid curing by sodium dodecyl sulfate (SDS) and heat treatment. A set of genes including IMP, VIM and SME was detected in one reaction by multiplex PCR. Verigene-nanosphere detected 3, 0, 0 among 5, 4, 11 and previously determined positive strains for VIM, IMP, KPC genes respectively. Carbapenem resistance was preserved after treating CRPA strain by heat or SDS. The nucleotide sequence alignments of VIM, IMP and KPC genes showed relatedness to many gram negative species. VIM gene was lost in UV mutant and IMP and KPC genes were preserved but 1-2% sequence modification was occurred without change in resistance to imipenem and meropenem. In conclusion the developed multiplex PCR detected successfully a set of carbapenem encoding genes, while microarray based verigene-nanosphere failed to detect most of the genes under the current experimental conditions. Nucleotide alignments of VIM, IMP and KPC genes revealed that these gene sequences are distributed among species of gram negative bacteria. IMP and KPC genes were preserved in UV mutant with no damage, repaired damage or little modification of nucleotide sequence and meanwhile carbapenem resistance was preserved.

Biography:

Ayman Kamal El Essawy received his PhD in Microbiology at Ain Shams University, Egypt and a Diploma in Hospital Infection Control at Claude Bernard-Lyone 1 University, France and a Diploma in Biostatistics at Ain Shams University, Egypt. He is a Fellow of Microbiology at Ain Shams University, Egypt. He worked at Al Azhar University and American Naval Medical Research Unit No.3 (NAMRU-3) and Ain Shams University Genetic



Engineering/Biotechnology Center, Egypt. He is Head of laboratory and infection control at Magrabi Hospitals, KSA. He is publishing in the field of microbiology and molecular microbiology. He is particularly interested in the study of bacterial resistance to antibiotics.

Publication of speakers:

1. **AK El Essawy** et al; Prevalence and impact of carbapenemase encoding genes in clinical isolates of carbapenem-resistant *Pseudomonas aeruginosa*.
2. **AK El Essawy** et al; Molecular characterization of a marine klebsiella isolate by 16s ribosomal rna gene sequence and optimization of its exopolysaccharide production
3. **AK El Essawy** et al; Molecular characterization of a marine klebsiella isolate by 16s ribosomal rna gene sequence and optimization of its exopolysaccharide production
4. **AK El Essawy** et al; Antimicrobial, anticoagulation, fibrinolytic and prebiotic activities of exopolysaccharide produced by marine klebsiella sp.
5. **AK El Essawy** et al; The role of cell wall thickness and van genes in clinical isolates of vancomycin resistant *Staphylococcus aureus*

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