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Abstract (oral session)

Characterisation of an IncFII-type NDM-1 encoding plasmid from an Escherichia coli ST131

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Objectives: NDM-1-mediated resistance to carbapenems in Enterobacteriaceae has been now reported worldwide. Our study was initiated by the isolation of a multidrug-resistant E. coli strain GUE that had been community-acquired in India. The aim of our work was to characterize the features of an IncFII-type plasmid, with a special focus on NDM-1 and its associated genetic structure. Methods: The complete sequencing work flow was performed using the Illumina Genome Analyzer IIx system (Illumina Inc., San Diego, CA). Then, the assemblies were carried out using Velvet2 assembler in order to produce contigs from Illumina GAIIx reads. PCR-gap closure was performed to final assembly of plasmid. Results: BLAST analysis of the complete nucleotide sequence performed in comparison with the reference IncFII plasmid pC15-1a bearing the blaCTX-M-15 extended-spectrum beta-lactamase gene confirmed that pGUE-NDM belonged to IncFII-type plasmid and showed a significant synteny between the two scaffolds, with the exception of regions containing accessory genes. The blaNDM-1 gene was localized in a multidrug resistance (MDR) region of 20,181 bp. This region was bracketed by two copies of insertion seqeunce IS26 in opposite orientations, creating an IS26-made composite transposon. In order to get further insights into the blaNDM-1 gene successful dissemination, a comparison of the genetic structures previously identified with that identified in plasmid pGUE was performed. It appeared that a common module was always identified. This module was composed of the ISAba125 fragment containing the -35 promoter region, the blaNDM-1 gene, the bleomycin resistance gene, and a truncated phosphoribosylanthranilate isomerase. Conclusion: Our study characterized an IncFII plasmid which backbone is known to be successful considering that it currently represents the major vehicle for dissemination of the blaCTX-M-15 gene. The functional part of the scaffold corresponded to that of other identified IncF plasmids. The originality was linked to the way the blaNDM-1 containing module had been acquired, resulting from a series of recombination events involving insertion sequence IS26.