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Presentation Abstract

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Abstract: **Background:** Plasmids carrying carbapenemase gene, such as $bla_{NDM-1,}$ are an emerging threat to human health and often carry multiple antimicrobial resistance genes. We previously reported the presence of a bla_{NDM-1} carrying plasmid in *K. pneumoniae*. Here, we investigate additional Australian isolates of *E. coli* and *Enterobacter cloacae* harboring bla_{NDM} comparing the genetic structure of bla_{NDM} plasmids from all three species. **Methods:** Genes encoding resistance to β-lactams, aminoglycosides and insertion element (ISCR) types were determined. Plasmids carrying the NDM gene from *K. pneumoniae*, *E. coli* and *E. cloacae* were transformed into *E. coli* Top10 and studied by plasmid cloning, primer walking, plasmid profiling and amplification of the IncA/C plasmid backbone. *E. coli* sequence type (ST) was determined. **Results:** The *E. coli,* typed as ST 443, had a variant of bla_{NDM-1}, bla_{NDM-3}, which differed by one nucleotide mutation. *E. cloacae* possessed bla_{NDM-1}. All three bla_{NDM} plasmids also harbored *rmtC* and *aac-6'-1b*. The replicon type of *E. cloacae* the bla_{NDM-1} plasmid was IncFII. The plasmids of *K. pneumoniae* and *E. coli* were type A/C (IncA/C) and also carried the beta-lactamase bla_{CMY-6}. These two plasmids possessed identical *tra* regions and a high number of the 12 IncA/C markers - plasmid backbone regions - previously described in a variety of human and animal/food Enterobacteriaceae isolates (*K. pneumoniae*=5 regions, *E. coli*=6, *E. cloacae*=0). The plasmid profiles of the two IncA/C plasmids were similar; in contrast, the bla_{NDM-1} plasmid of *E. cloacae* was distinct. The *E. coli*, bla_{NDM-3} plasmid also had ISCR1. In addition, *E. coli* contained a separate plasmid (replicon type FIA and FIB) carrying $bla_{CTX-M-15}$. **Conclusions:** The similarities of two plasmids harbouring NDM genes suggest an affinity for lateral acquisition of this gene by existing bla_{CMY} harboring IncA/C plasmids. This may explain the reported dissemination of the gene through human pathogenic isolates already harboring IncA/C plasmid.