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Carbapenemase producing multidrug resistance in India: Detection of NDM-4 producer

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The emerging trend of multi-drug resistance is becoming a major threat to community acquired and nosocomial infections, worldwide. The latest MBL, named NDM-1 (New Delhi metallo beta lactamse) has been identified as novel class of carbapenemase found in enterobacteriaceae, first isolated from Swedish patient of Indian origin. This study was designed to detect new variants of bla_{NDM-1} in Indian environment. A new variant, bla_{NDM-4} was detected in *E. coli* isolated from Swedge of an India hospital in November 2013. NDM-4 differs by a single amino acid substitution (Met154Leu) from NDM-1. Kinetic data showed that NDM-4 hydrolyzed imipenem more than that of NDM-1 [k_{cat}/K_m (μ M⁻¹s⁻¹) ratio for NDM-4/NDM-1 for imipenem was 2.20]. Further, the MICs of imipenem and ertapenem were also found higher for *E. coli* expressing NDM-4 than that expressing NDM-1, suggesting that the Leu154 residue is involved in the higher carbapenemase activity. The strain was found highly resistant to Imipenem, meropenem, aztreonam, ceftazidime, cefotaxime, cefoxitin, ticarcillin/clavulanic acid, imipenem/clastatin. PCR-based replicon typing method (PBRT) revealed incompatibility group of Inc K for bla_{NDM-4} carrying plasmid. The strains were also analyzed for their surrounding genetic environment for the presence of insertion sequences known to be associated with the bla_{NDM-4} gene in *Enterobacteriaceae*. Primers (targeting the ISA*ba125* identified a complete ISA*ba125* at upstream of the bla_{NDM-4} gene in AK1 strain

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