

**TITLE:** *qnrVC* AND CARBAPENEMASE-ENCODING GENES ASSOCIATION IN GRAM-NEGATIVE BACTERIA ISOLATED FROM RIO DE JANEIRO COASTAL WATERS

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*qnr* are plasmid-mediated quinolone resistance (PMQR) genes, which encoding proteins act by protecting the target enzymes from fluoroquinolones action, moderately reducing the susceptibility to this class of antimicrobials. In a previous study, we identified 22 isolates carrying *qnrVC* gene family among 111 gram-negative carbapenemase-producing bacteria isolated from coastal waters of beaches located in Rio de Janeiro city. *qnrVC* was detected in *Enterobacter spp.* (17), *Klebsiella pneumoniae* (3) and *Pseudomonas spp.* (2). Such dissemination of *qnrVC* in different bacterial genera in the same environment is unprecedented in the scientific literature. Thus, this project aims to study the diversity and genetic background of *qnrVC* detected in isolates recovered from Rio de Janeiro coastal waters. For this purpose, *qnrVC* variants were identified by PCR and sequencing. Representatives of the bacterial collection diversity were recognized by PFGE typing. Representatives of clonal profiles were submitted to complementary characterization, including potential of gene spreading by conjugation, and PCR for identification of plasmid incompatibility groups (Inc), co-transference of carbapenemase encoding genes, and presence of class 1 integron. Besides that, 3 *Enterobacter spp.* were submitted to whole genome sequence (WGS). *qnrVC1* was detected in 18 samples (15 *Enterobacter spp.* and 3 *K. pneumoniae*), *qnrVC4* in 2 *Enterobacter spp.* and *qnrVC6* in both *Pseudomonas spp.* PFGE revealed 12 clonal profiles of *Enterobacter spp.* and one of *K. pneumoniae*. Transconjugants were obtained from 5 *Enterobacter spp.*, in which *qnrVC* was transferred along with *bla<sub>KPC</sub>*, but not from *K. pneumoniae* and *Pseudomonas spp.* Of 29 Inc groups researched, five were identified on *Enterobacter spp.* donor and transconjugant strains (F, FIA, FIIA, ColRNA e U); six on *K. pneumoniae* (F, FIA, FIIA, L/M, K and ColRNA) and six on *Pseudomonas spp.* (F, FIB, FIIA, Q1, Q2, and R). *intI1* was detected in both *Pseudomonas spp.*, suggesting the presence of class 1 integron in these samples. WGS analysis evidenced different genetic contexts surrounding *qnrVC* genes compared to those previously described, and on isolate 221 *qnrVC* and *bla<sub>KPC</sub>* were detected on the same contig. Results indicate that the *Enterobacter* genus carries and may disseminate *qnrVC* and *bla<sub>KPC</sub>* in aquatic environment. Also, our data suggest that these genes are located in plasmids, inserted in new not conserved genetic contexts.

**Keywords:** *qnrVC*, carbapenemases, *Enterobacter*, coastal water, genetic context

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