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BOOK OF ABSTRACTS

6TH MEETING
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Co-mobilization of quaternary ammonium compounds and antibiotic resistance genes among bacteria - a matter of concern?

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Diverse environmental stressors (e.g. biocides) can participate in the selection and maintenance of antibiotic resistant (AB^R) strains and/or genetic elements. Quaternary ammonium compounds (QACs) are heavily used in hospitals, industry and household products. Our goal was to assess the spread of known QACs resistance genes occurring in Gram positive/Gram negative bacteria among *Enterococcus* spp from several sources, and to evaluate if the genetic elements linked to their mobilization also carry AB^R genes.

We analyzed 120 *E. faecalis*, 176 *E. faecium* and 104 *Enterococcus* spp from hospitalized (82) or healthy humans (45), piggeries environment/swine (197), aquacultures/trout (29) and sewage (47) (Portugal; 1997-2012). Susceptibility to AB was studied by disk diffusion/agar dilution and to benzalkonium chloride (BC) by microdilution methods. Genes codifying resistance to AB (*van*A, *tet*M, *tet*L, *tetS, erm*B, *aac(6')-Ie-aph(2'')-Ia, aadE, blaZ*) or QACs (*qac*A/B, *2 qac*H sequences, *qac*EΔ1, *qac*GI, *smr*) and the link of *IS1216* to *qac* genes were searched by PCR. Mating assays, MLST and analysis of the plasmid carrying *qac* genes (S1-PFGE, rep/rel typing, hybridization) were done.

A ST17 *E. faecium* strain (ampicillin, tetracycline, erythromycin, HLR-gentamicin/streptomycin resistant; BZ MIC=8mg/L) from hospital sewage carried the *qac*H gene previously identified in *Staphylococcus* spp and *E. faecalis* V583 (GenBank Y16945.1, AE016833.1). This gene was located in a 50kb plasmid also carrying a partial fragment of CTn*6000* containing *tet*(S) as well as *tet*M, *aac(6')-Ie-aph(2'')-Ia*, *aad*E and *rep*-pRE25 genes. Two copies of IS*1216* flanked a 3000bp region including *qacH*. This *qac*H plasmid was transferred to *E. faecium* BM4105RF using different AB as selective agents and transconjugants (n=4) were resistant to tetracycline, HLR-gentamicin, HLR-streptomycin (n=4) and erythromycin (n=2). Plasmids of variable size contained other AB^R genes (*erm*B and *aadE*-30-60kb).

This is the first description of *qac*H in *E. faecium* which seems to be located in a composite IS*1216* transposon . The use of both biocides and AB might favour the spread and /or persistence of genetic elements carrying genes coding for resistance to several selective agents often used in different settings. The results also demonstrate the high genome plasticity of *E. faecium* clones to acquire different adaptive traits.