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P-069 - UNVEILING THE CONTRIBUTION OF ARS OPERON FOR ARSENIC TOLERANCE AMONG CLINICALLY-RELEVANT SALMONELLA SEROTYPES/CLONES

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Abstract

Arsenic environmental contamination by anthropogenic activities, including in animal-farming management (e.g. coccidiostats/pesticides/waste), may represent a long-term selective pressure driving the selection of multidrug-resistant (MDR) emergent *Salmonella* serotypes/clones. Diverse arsenic tolerance (AsT) mechanisms were described, although dispersion and association with a tolerance phenotype remains unknown in *Salmonella*. Our objective was to study the occurrence of genes coding for arsenical efflux pumps and their implications in tolerance phenotypes in diverse *Salmonella* serotypes and clones, including emergent MDR and/or copper/silver tolerant ones. 283 *Salmonella* isolates (2000-2016; humans/foods/animal/environment) from 57 serotypes (including the most frequent: Enteritidis/n=16; Typhimurium/n=49; 4,[5],12:i:-/n=63; Rissen/n=15) were selected based in PFGE-types and/or STs obtained by MLST and different profiles of antibiotic-resistance or metal-tolerance (Cu/Ag/Hg/Te)^{1,2}. Screening of arsenic tolerance genes, *arsB* and *acr3* (both coding for arsenical pump membrane proteins) was performed by PCR/sequencing. MIC_{Na₂HAsO₄} were determined in aerobic and anaerobic atmospheres by the agar dilution method.

Results & Conclusions

A high frequency of AsT genes was found (149/283-53%) involving diverse serotypes (30/57-52%): *arsB* (24%-n=69; 8 serotypes) or *acr3* (29%-n=82; 24 serotypes). The *arsB* was almost restricted to the emergent pig-associated MDR "European clone" of S.4,[5],12:i:- (n=36/37-97%) and S.Typhimurium (n=25/25-100%). The *acr3* was highly dispersed, including in two emerging pig-associated serotypes S.Rissen (n=15/15-100%) and S.Derby (n=19/19-100%). Phenotypic assays showed higher MIC_{Na₂HAsO₄} in isolates carrying *arsB* (MIC₅₀>128mM) or *acr3* (MIC₅₀=8mM) than those without these genes (MIC₅₀=2mM) in both aerobic/anaerobic conditions. AsT isolates also carried frequently (n=106/149-71%; "European clone" and Rissen plus 9 serotypes) copper, silver ± mercury, tellurium tolerance genes. Occurrence of AsT, particularly among emergent MDR and copper/silver tolerant pig-associated *Salmonella* clones circulating in Europe, might contribute for their adaptation to food-animal farm environments contaminated with diverse metals and oxygen levels.

References & Acknowledgments

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