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MOLECULAR EPIDEMIOLOGY OF MACROLIDE AND/OR TETRACYCLINE RESISTANT STREPTOCOCCUS AGALACTIAE AND STREPTOCOCCUS UBERIS FROM BOVINE MASTITIS

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Objective: To identify macrolide/tetracycline phenotypes and genotypes among Streptococcus agalactiae (Group B Streptococcus, GBS) and S. uberis from bovine subclinical mastitis, relevant for therapeutic policies, and evaluate further molecular features.

Methods: GBS (n=60) and S. uberis (n=30) field isolates from 9 herds in Portugal were characterized by pulsed field gel electrophoresis (PFGE). Resistance to macrolides (erythromycin-E), lincosamides (pirilmycin-PRL), tetracycline-TET, and the constitutive macrolide-lincosamide resistance phenotype (cMLS) was evaluated by disk diffusion. Resistance genes (mefA; ermB; linB; tetO; tetT; tetS; tetQ; tetK; tetW; tetL) were screened by PCR among all isolates. The C5a peptidase and lmb genes, important virulence factors in human GBS localized in a composite transposon, were screened by PCR among the bovine GBS. Capsular serotyping of GBS was performed by agglutination and by PCR-sequencing the capsule gene cluster.

Results: A total of four PFGE clusters comprised 50% of the GBS and four PFGE clusters comprised 53% of the S. uberis. Co-resistance to E and PRL (18%-27%) and to TET (57%-60%) was observed in both species. Resistance to PRL and susceptibility to E (LSA phenotype) was found in 27% of S. uberis isolates. Diverse resistance genotypes were found: ermB/tetOtetK in GBS and ermBltetO or linBltetS in S. uberis. Both C5a peptidase and lmb genes were present in 20% of GBS. Two known molecular serotypes were detected: III-3 (n=1) and V (n=14), and four types (detected among 75% of GBS) showed cpsDEF sequences distinct from those described so far, and most were found to be herd-specific.

Conclusion: A contagious source for both GBS and S. uberis was assessed. Dissemination of antimicrobial-resistance was clonal and by lateral gene transfer. Serotype-specific capsular polysaccharides appear to have evolved in a herd-associated manner. GBS with C5a peptidase and lmb were of capsular serotype V–common in human GBS infection.

297 words

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