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Genomic search of *Staphylococcus aureus* resistant to methicillin in ear secretions of dogs and cats in Urmia city.

Abstract:

Members of the *Staphylococcus* genus are gram-positive cocci, catalase-positive, facultative anaerobes, non-motile, oxidase-negative, and lack H_2S production. The aim of this study was to genotypically characterize methicillin-resistant *Staphylococcus aureus* (MRSA) isolated from ear swabs of dogs and cats in Urmia City. In this study, 108 samples were randomly collected, including 56 dog samples and 52 cat samples. Samples were taken using a sterile cotton swab from the external ear canal of dogs and cats visiting veterinary clinics, hospitals, and animal shelters in the city between fall 2024 and spring 2025. Isolation of *Staphylococcus aureus* was conducted through culturing and biochemical tests, with the confirmation of the species using the *16S rRNA* gene. PCR was utilized to assess the presence of the methicillin resistance gene (*mecA*) in the isolated strains of *Staphylococcus aureus*. Among the 108 samples collected, 11 (19.64%) tested positive for *Staphylococcus* aureus in dogs, while 7 (13.46%) tested positive in cats. Analysis of the antibiogram revealed that penicillin resistance was highest at 90.9% in dog samples, with vancomycin and cefepime showing the lowest resistance at 9.09%. In cat samples, penicillin resistance was highest at 57.1%, while methicillin and vancomycin showed the lowest resistance at 14.2%. Molecular testing confirmed the *16S rRNA* gene for 11 isolates (19.64%) from dog samples and 7 isolates (13.46%) from cat samples. Among these, 4 isolates (7.14%) from dog samples and 1 isolate (1.91%) from cat samples were found to carry the *mecA* gene, indicating methicillin resistance. The findings of this study highlight the prevalence of methicillin resistance in *Staphylococcus aureus*, despite the comparatively low levels of resistance observed within this specific investigation.

Keywords: Dogs and Cats, Ear, *Staphylococcus aureus*, *mecA* gene, Urmia