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BACKGROUND AND OBJECTIVES

Staphylococcus aureus is an important human pathogen which also can colonize and infect a wide range of animal species including wildlife¹. The *mecC* gene represents an emerging mechanism in methicillin resistant *S. aureus* (MRSA)², that has been recently detected in different animal species¹, but few data do exist in relation with game animals. This fact could have implications in public health, as well as be a vehicle to enter in the human food chain.

The objective of this study was to analyze the prevalence of *S. aureus* in nasal samples of game animals and to characterize detected isolates.

METHODOLOGY

Sampling: Nasal samples of 71 game animals [wild rabbit (*Oryctolagus cuniculus*), 38; wild boar (*Sus scrofa*), 17; deer (*Cervus elaphus*), 9; mouflon (*Ovis orientalis musimon*), 4; hare (*Lepus granatensis*), 2; and ibex (*Capra pyrenaica*), 1] were obtained after hunting process.

Microbial isolation and identification: Samples were inoculated in BHI with 6,5% NaCl and 24h after, seeded on Manitol-Salt-Agar and Oxacillin-Resistance-Screening-Agar-Base (supplemented with 2 mg/ml oxacillin) plates for *S. aureus* and MRSA recovery, respectively. *S. aureus* isolates were identified by MALDI-TOF.

Antibiotic susceptibility profile: Susceptibility testing for 12 antimicrobials was performed by diffusion-disk according to EUCAST³ and detection of resistance genes *mecA*, *mecC*, *erm(A)*, *erm(B)*, *erm(C)* and *erm(T)* by PCR^{2,4}.

Molecular typing: The *spa*-type was performed for all *S. aureus* isolates⁵.

Virulence genes and Immune Evasion Cluster genes (IEC): The detection of *pvl*, *tst*, *eta* and *etb* virulence genes was performed by PCR^{5,4}. The presence of *scn* gene, which allow to classify in a IEC-type were checked⁶.

RESULTS

S. aureus isolates were detected in 29.6% of game animals (58.8% in wild boars; 44% in deers; 7.9% in wild rabbits; all mouflons and none hare or ibex).

Three of them were MRSA (14,3%) and 18 were methicillin susceptible (MSSA) (85,7%). The MRSA isolates correspond to the three isolates recovered from wild rabbits samples, and carried the *mecC* gene. These strains were typed as *spa* t843, associated to CC130, and they lacked *scn* and virulence genes (Table 1). On the other hand, three MSSA isolates of wild boars and one of a deer were *spa*-type t1535, associated to the lineage CC130. The remaining MSSA isolates were typed into other 9 different *spa* types associated to clonal complexes CC5, CC425 and CC522. None of MSSA recovered harbored the *scn* gene and most of them lacked the virulence genes tested (except one *S. aureus* isolate of wild boar which harbored the *tst* gene). Three erythromycin resistant strains carried the *erm(C)* gene (Table 1).

CONCLUSIONS

1. MRSA carrying the *mecC* gene have been detected in wild rabbits, what could have implications in public health like a vehicle to the human food chain.
2. Wild boars, mouflons and deers are frequently colonized by MSSA.

References:

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4. Lozano C, et al. Comp Immunol Microbiol Infect Dis 2011; 34: e1-7.
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Table 1. Characteristics of the *S. aureus* isolates recovered from game animals.

Strain	Origin	<i>spa</i>	CC ^a	Resistance phenotype ^b	Resistance genes	Virulence genes
C8483	Wild rabbit	t843	CC130	PEN-FOX	<i>mecC</i>	-
C8488	Wild rabbit	t843	CC130	PEN-CIPRO ^l	<i>mecC</i>	-
C8500	Wild rabbit	t843	CC130	PEN-FOX-ERI ^l	<i>mecC</i>	-
C8646	Wild boar	t1535	CC130	susceptible	-	-
C8607	Wild boar	t1535	CC130	susceptible	-	-
C8608	Wild boar	t1535	CC130	susceptible	-	-
C8610	Wild boar	t11230	singleton	susceptible	-	-
C8611	Wild boar	t1534	CC522	susceptible	-	<i>tst</i>
C8613	Wild boar	t6386	CC425	susceptible	-	-
C8491	Wild boar	t3750	singleton	susceptible	-	-
C8496	Wild boar	t3750	singleton	susceptible	-	-
C8493	Wild boar	t7174	CC5	susceptible	-	-
C8614	Wild boar	t3750	singleton	ERI ^l	-	-
C8506	Mouflon	t11233	singleton	susceptible	-	-
C8508	Mouflon	t6056	-	FOX-ERI ^l	-	-
C8513	Mouflon	t6056	-	susceptible	-	-
C8510	Mouflon	t6056	-	ERI ^l	<i>erm(C)</i>	-
C6771	Deer	t1535	CC130	PEN-ERI ^l	<i>erm(C)</i>	-
C8516	Deer	untyped	-	ERI ^l	<i>erm(C)</i>	-
C8609	Deer	t11225	CC425	susceptible	-	-
C6770	Deer	t1125	CC5	susceptible	-	-

^aCC, clonal complex; presumptive according to *spa*-type. ^b PEN, penicillin; ERI, erythromycin; FOX, cefoxitin; l, intermediate