

Staphylococcus pseudintermedius

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Introduction

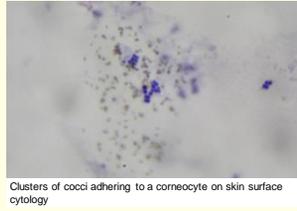
► Companion animals, as humans, have an incredibly large and diverse microbiota. The purpose of this work is to summarize some important characteristics of *S. pseudintermedius*, an important member of this microbiota.

► *S. pseudintermedius* is a both skin and mucous membrane commensal in dogs and cats, causing opportunistic infections in both animals.

► Is a Gram-positive non sporulated cocci that appears as clusters upon microscopical examination.

► This microorganism was initially called *Staphylococcus intermedius* when it was discovered by Hajek in 1976, but after the development of molecular typing techniques it has been differentiated in 3 closely related species referred together to as the *Staphylococcus Intermedius Group* (SIG):

- *S. intermedius*
- *S. pseudintermedius*
- *S. delphini*



Clusters of cocci adhering to a corneocyte on skin surface cytology

Gortel K. Vet Clin North Am Small Anim Pract. 2013

► *S. pseudintermedius* is the most prevalent Coagulase Positive Staphylococci inhabitant of cats and dogs, and the carriage rates ranges between:



46 – 92 %

5 – 45 %



► Under certain conditions *S. pseudintermedius* may cause some diseases.

Pyoderma

► It's a type of dermatitis mainly caused by *S. pseudintermedius*, and a common problem in clinical practice.

► It's classified as primary or secondary (depending on whether an underlying or associated disease is identified) and depending on the depth of the infection:

- Surface pyodermas or pseudopyodermas
- Superficial pyodermas
- Deep pyodermas



Gortel K. Vet Clin North Am Small Anim Pract. 2013



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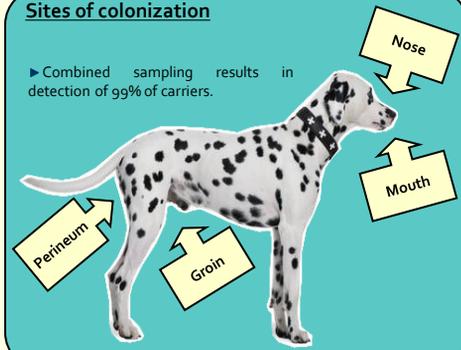


Bakazu V. REDVET. 2012

► The depth of the disease will have an impact on its severity and, therefore, in the treatment and prognosis.

Sites of colonization

► Combined sampling results in detection of 99% of carriers.



http://www.peticic.es/sites/default/files/library/dermata_nazas_de_perros.jpg

Emergence of MRSP

► Since 2006, MRSP has increased and emerged as a significant animal health problem in veterinary medicine.

► Meticillin resistance is mediated by the *mecA* gene, located within a mobile genetic element called SCCmec which can contain resistance genes to other antibiotics.



It was on a short-cut through the hospital kitchens that Albert was first approached by a member of the Antibiotic Resistance.

<http://bipopy.files.wordpress.com/2008/04/antibiotic-resistance.jpg?w=450&h=382>

► Use of antimicrobials in pet animals has increased substantially in most industrialized countries.

► MRSP clones are not shared between Europe and North America, suggesting that the *mecA* gene has been acquired several times by different *S. pseudintermedius*.

- Europe → ST71
- North America → ST68

► The treatment of infections with MRSP is a new challenge in veterinary medicine because of the very limited therapeutic options.

S. pseudintermedius as a Zoonotic Agent

► The first case of human infection with *S. pseudintermedius* from a dog bite was described over 20 years ago.

► Since then, human infections with this microorganism have been reported occasionally, often directly related to close contact with a pet dog.

► *S. pseudintermedius* can also cause infection in healthy individuals even without exposure to animals.

- Direct inoculation of this pathogen into the skin and soft tissues causes skin abscesses.



Figure 1. Two abscesses in the forearm (one 2 × 3 cm and the other 2 × 2 cm) that developed two days after intravenous cocaine use.

Katesida T. Int J Infect Dis. 2010

► Transmission of MRSP via hospital staff, pet owners and/or the environment can occur.

Infection and Resistance Control

► Superficial skin infections caused by *S. pseudintermedius* can be effectively treated with topical antimicrobial agents, preventing the exposure of microorganisms to antibiotics and reducing the probability of acquiring resistance.

► Control measures to reduce the risk of transmission of *S. pseudintermedius*.

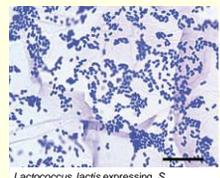
In veterinary Hospitals	In Households
Environment Cleaning and Disinfection	Avoid contact with infected sites
Personal Protective Equipment	Restrict contact with mucous membranes
Hand Hygiene	Hand hygiene
Animal Cohorting and Hospital Design	

S. pseudintermedius vaccine potential

► Surface-exposed proteins are likely to interact with the host immune system.

► Identification of these proteins results in the identification of vaccine candidates.

► The cell-wall-anchored proteins SpsD and SpsO can mediate bacterial binding to canine corneocytes and represent potential therapeutic targets for the prevention and treatment of canine staphylococcal pyoderma.



Bannoeh J. Vet Dermatol. 2012

Conclusions

► *Staphylococcus pseudintermedius* is an important pathogen of companion animals like dogs and cats.

► Knowledge of sites of colonization is important to detect carriers and prevent underestimation on its prevalence.

► There has been a sudden emergence of MRSP in dogs and cats and it constitutes a prominent risk to animal health.

► Human infections have been reported several times, even without exposure to animals, so clinicians should be aware of the potential risk that it can be to human health.

► Transmission and resistance control is necessary to reduce the emergence of multi-resistant clones and to prevent zoonotic infections.

► Identification of more virulence factors will provide new tactics to prevent and treat infections caused by *S. pseudintermedius*.

References

Ross Fitzgerald J. The staphylococcus intermedius group of bacterial pathogens: Species re-classification, pathogenesis and the emergence of methicillin resistance. Vet Dermatol. 2008;20(5-6):490-495

Bannoeh J, Guardabassi L. Staphylococcus pseudintermedius in the dog: Taxonomy, diagnostics, ecology, epidemiology and pathogenicity. Vet Dermatol. 2012;23(4):253-66. e51-2.

Rosser Jr. E.J. Chapter 38 - pyoderma. In: Saunders manual of small animal practice (third edition). Saint Louis: W.B. Saunders; 2006:420-428. 10.1016/B072-160422-650040-1.