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Letter to the Editor

Staphylococcus pseudintermedius heterogeneously expresses the *mecA* gene

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Dear Editor,

Feng's work, recently published on *Veterinary Microbiology*, focuses on the spread of meticillin resistance among *Staphylococcus pseudintermedius* strains from pets (Feng et al., 2012). Interestingly, authors report that, despite the oxacillin resistance breakpoint of ≥0.5 mg/mL, several *mecA* gene-positive *S. pseudintermedius* isolates show sensitivity to both oxacillin and cefoxitin. Also, Feng states that the underlying mechanism for such a behaviour still remains unknown and requires further investigation; in this ambit, however, we would like to share with readers a few unpublished messages from our personal experience.

When studying the activity of betalactams against a *mecA* gene-positive, nasal *S. pseudintermedius* strain collected in our laboratory from a dog owner, we observed (at 24 h incubation) a clear oxacillin resistance (absence of any inhibition zone [IZ] around the oxacillin disc), while cefoxitin activity (in term of IZ diameter) was in the susceptibility range (Fig. 1) (according to EUCAST 2012 interpretive criteria for human *Staphylococcus aureus*). Results by Vitek2 (bioMérieux, France) were in agreement. At 48 h incubation, however, microcolonies were observed in the cefoxitin IZ (Fig. 1) and, after subcultivation, they showed the absence of any IZ around the oxacillin and cefoxitin discs. The *mecA* gene was then heterogeneously expressed (heteroresistance, HR), leading to concomitant resistance to oxacillin and sensitivity to cefoxitin.

HR means the concomitant existence of drug-susceptible and drug-resistant organisms within a single microbial strain; it may go undetected when phenotype-based sensitivity tests are performed and, we believe, it might partly explain the recovering of cefoxitin sensitivity

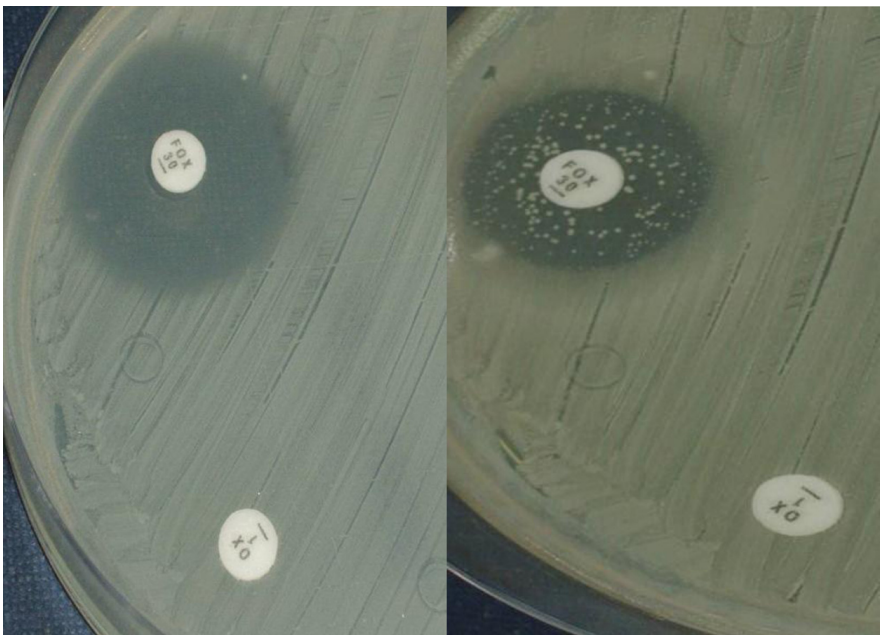

Fig. 1. *Left panel*, cefoxitin (FOX) susceptibility and oxacillin (OX) resistance, at 24 h incubation. *Right panel*, microcolonies in the cefoxitin halo at 48 h incubation (Mueller-Hinton II agar and antibiotic discs provided by Liofilchem®, Roseto degli Abruzzi, Italy).

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(in vitro) in an oxacillin resistant organism. HR frequency is about one subclone in every 10^5–10^6 colonies, but it may vary depending on the species. This phenomenon allows bacteria to grow under antibiotic exposure before the major part of the population displays the resistance trait; the mechanism behind this behaviour is unknown, and HR may be misrecognized by agar disc tests and phenotypical automated methods (i.e. Vitek2) (Savini et al., 2009).

Vice versa, instead, latex tests for PBP (penicillin-binding protein) 2a (that have been developed to screen *S. aureus* for meticillin resistance) can result in falsely positive reaction when applied to *S. (pseud)intermedius*; in fact, the latter may contain a *mecA* homologue encoding a PBP2a-like protein that cross-reacts with the PBP2a latex agglutination assay, although it cannot confer meticillin resistance (Pottumarthy et al., 2004).

To conclude, *S. pseudintermedius* may behave as a nasal colonizer in pet (mostly dogs) owners; it has rarely caused human diseases and, nowadays, it is mainly a veterinary pathogen; meticillin resistance is disseminating among strains of this species (Savini et al., 2013), although phenotype-based antibiotic susceptibility testing may under- or overestimate it (i.e. agar disc tests and PBP2a latex agglutination assays, respectively); hence, *mecA* gene detection through molecular tools is indispensable and should be made more and more available both in human and veterinary microbiology services.

Conflict of interests

None to declare.

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