

Brief Communication

Staphylococcus pseudintermedius for CAMP-test

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Received December 21, 2013; Accepted February 28, 2014; Epub March 15, 2014; Published April 1, 2014

Abstract: CAMP test reliably detects *Listeria monocytogenes* (*Lm*) and *Streptococcus agalactiae* (group B streptococcus, GBS); it is traditionally performed streaking the tested isolate perpendicularly to *Staphylococcus aureus* (*Sa*), provided that reference *Sa* strains (that produce β -hemolysin) are used. In a zone of β -hemolysin activity, in fact, GBS and *Lm* form typical arrow-shaped hemolytic areas. While *Sa* production of the toxin is strain-dependent, however, that of *Staphylococcus pseudintermedius* (*Sp*), a pet-owner colonizer and an emerging human pathogen, is constitutive, then observed in all clinical isolates. Therefore, *Sp* may indeed represent a valid alternative to perform the assay.

Keywords: *Staphylococcus pseudintermedius*, β -hemolysin, CAMP-test, *Listeria monocytogenes*, GBS

CAMP test is one of the most affordable, easy-to-perform methods that may be used in clinical laboratories to identify *Listeria monocytogenes* (*Lm*) and *Streptococcus agalactiae* (group B streptococcus, GBS) from clinical samples [1, 2]. The term “CAMP” comes from the initials of authors (Christie, Atkins, and Munch-Petersen) who first studied this assay as well as the particular phenomenon it is based on; we mean that test positivity is typically indicated by formation of an arrow-shaped hemolysis (‘arrowhead’) where GBS and *Lm* grow in a zone of *Staphylococcus aureus* (*Sa*) β -hemolysin activity perpendicularly to *Sa* and without touching [1-3].

While *Sa* β -hemolysin synthesis is strain-dependent (then only producing strains may be used for CAMP test), *Staphylococcus pseudintermedius* (*Sp*), a coagulase-positive pet-owner colonizer and an emerging human pathogen, constitutively produces the toxin [3], that is therefore found in all isolates. Hence, any clinical *Sp* may indeed represent a valid alternative to reference *Sa* strains. Accordingly, **Figure 1** reports a positive test carried out using the *Sp* strain DSM 25713 [3], along with a nonhemolytic GBS (identified with Liofilchem® Chromatic StrepB and Strepto B latex kit, along with the GenXpert technology (Cepheid, US.) and *Lm*

(identified with the Liofilchem® O.A. *Listeria* Agar (**Figure 2**), as well as molecularly). The test was performed on the Liofilchem® Tryptic Soy agar medium (TSS), that is based on a sheep blood composition, and read after 24 h incubation, at 36±1°C, under microaerophilic conditions.

CAMP test is a diagnostic tool that reliably and quickly provides presumptive identification of GBS and *Lm*. Arrowheads promptly develop when bacterial inocula are in an early stage of growth and the sheep blood plate is prewarmed to 37°C [1, 2]. Although, traditionally, only *Sa* is used (provided that reference strains producing β -hemolysin are previously obtained), we highlight that, indeed, any *Sp* clinical isolate represents a reliable alternative; production of β -hemolysin (that is strain-dependent in *Sa*) is in fact intrinsic in *Sp*, and almost pathognomonic.

Acknowledgements

We thank Liofilchem®, Roseto degli Abruzzi (Italy), for providing TSS, Strepto B latex kit, and O.A. *Listeria* Agar.

Disclosure of conflict of interest

None.

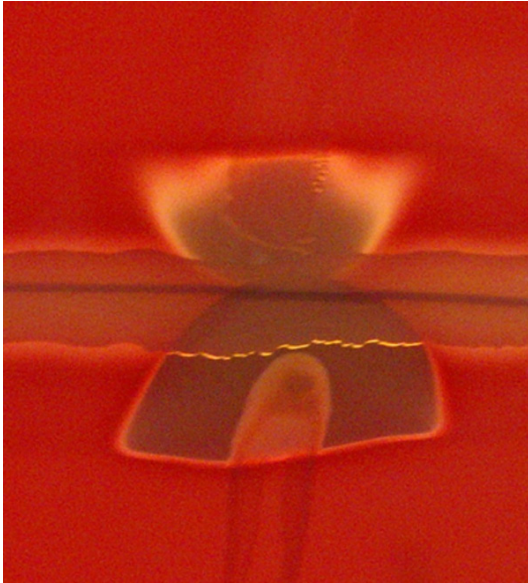


Figure 1. positive CAMP test: top, *L. monocytogenes* inoculum - bottom, GBS (nonhemolytic variant) inoculum - middle (horizontal inoculum) *S. pseudintermedius* inoculum. The test is performed on Tryptic Soy agar (TSS, Liofilchem®).

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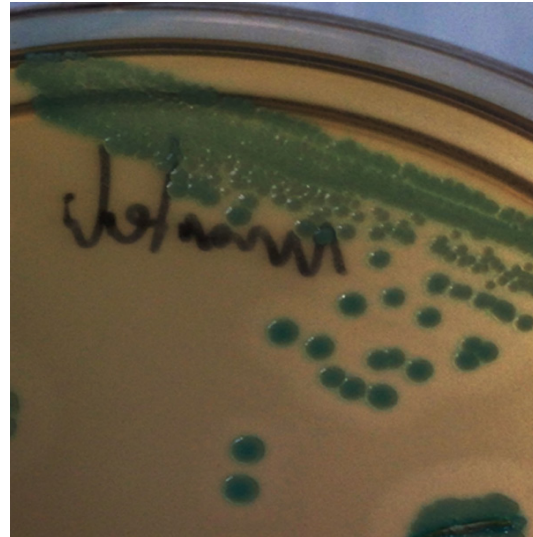


Figure 2. *L. monocytogenes* grown on Liofilchem® O.A. *Listeria* Agar (typical halos are visible around blue-green colonies).

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