

Specificity of the OXA-48 immunochromatographic K-SeT for the detection of OXA-48 like in *Shewanella* spp.

Pierre Bogaerts¹, Stéphanie Evrard¹, Gaëlle Cuzon², Te-Din Huang¹, Thierry Naas² and Yuri Glupczynski¹

¹ Reference Laboratory for monitoring of antimicrobial resistance in Gram-negative bacteria CHU UCL Namur, Yvoir, Belgium

² Bacteriology-Hygiene unit, Hôpital de Bicêtre, Associated French National Reference center for Antibiotic resistance: CPE, Paris, France

ePoster EV0462

Introduction and Purpose

Carbapenemase-producing Enterobacteriaceae (CPE) represent a growing health concern worldwide. In this context, their timely and accurate detection constitute one of the priority core action. With Coris Bioconcept, we recently developed and evaluated an immunochromatographic assay (ICAs, OXA-48 K-SeT® Coris Bioconcept, Gembloux, Belgium) for direct and rapid detection of OXA-48-like-producing Enterobacteriaceae from culture (1). Chromosome-encoded beta-lactamases of *Shewanella* spp have been recognized as progenitors of *bla*_{OXA-48-like} genes and some of these species may transiently colonize the intestinal tract, and occasionally also be responsible of infections in humans (2). We therefore aimed to challenge the specificity of the OXA-48 K-SeT against *Shewanella* spp isolates.

Methods

Culture: 15 environmental and clinical isolates of *Shewanella* spp (*S. algae* [n=6], *S. putrefaciens* [n=6], *S. xianemensis* [n=1], *S. oinodensis*, [n=1] and *Alishewanella fetalis* [n=1]) were grown on TSA sheep blood agar for 24 hours at 35° C.

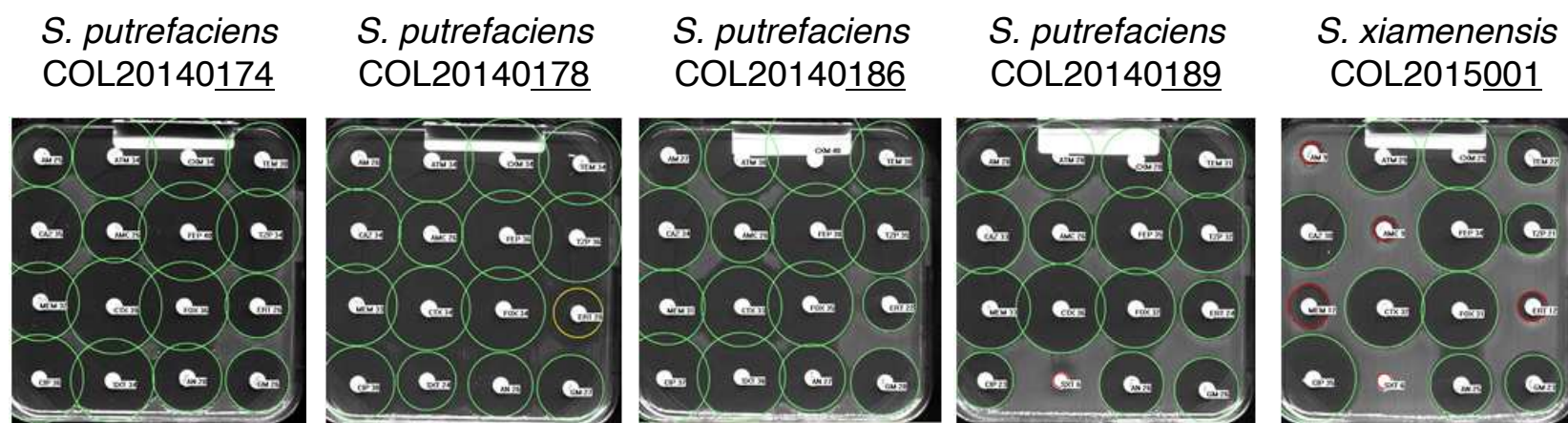
Antibiograms: The antimicrobial susceptibility testing was performed by disc diffusion method on Mueller Hinton agar.

Molecular testing:The presence of *bla*_{OXA-48} was detected according to in house ISO15189 end-point PCR, eazyplex SuperBug Basic and followed by PCR sequencing.

Immunochromatographic assays: All isolates were tested with the OXA-48 K-SeT® according to the manufacturer's protocol.

Results

Figure 1. Disc diffusion antibiogram of OXA-48 positive *Shewanella* spp.



AM: amoxicillin, ATM: aztreonam, CXM: cefuroxime, TEM: temocillin, CAZ: ceftazidime, AMC: amoxi/clav, FEP: cefepime, TZP: piperacillin/tazobactam, MEM: meropenem, CTX: cefotaxime, FOX: ceftoxitin, ERT: ertapenem, CIP: ciprofloxacin, SXT: TMP/Sulfa, AN: amikacin, GM: gentamicin

- 10 out of the *Shewanella* /*Alishewanella* spp. isolates were susceptible to most antimicrobial classes including carbapenems (results not shown)
- 4 *Shewanella putrefaciens* isolates (174, 178, 186, 189) expressed decreased susceptibility to ETP yet they remained susceptible to most penicillins including AM, AMC and TEM (Fig. 1)
- 1 *S. xiamenensis* 2015001 showed resistance to AM, AMC and to carbapenems (ETP, MEM) but remained susceptible to TEM and TZP (Fig. 1)

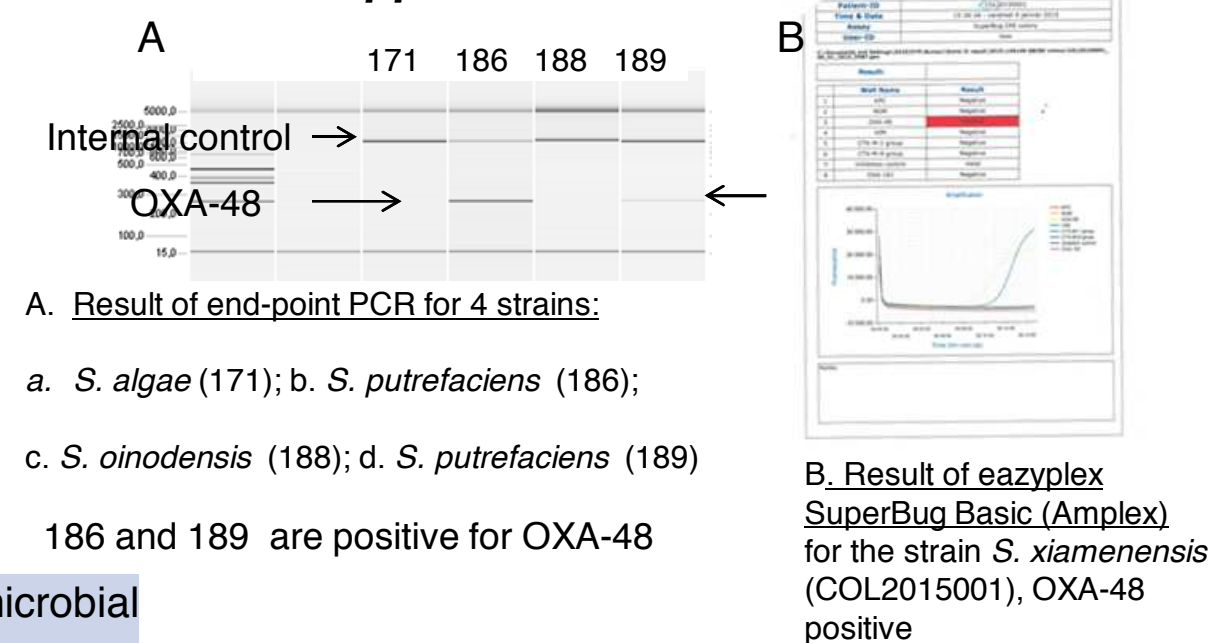
Figure 3. Immunochromatographic assays for the detection of OXA-48-like



- 1 *S. xiamenensis* and 4 *S. putrefaciens* out of the 15 strains yielded a positive OXA-48 results by PCR and OXA-48K-SeT® (red square) (Figure 1, 2, 3)
- Sequencing revealed 4 OXA-48 *S. putrefaciens* and 1 OXA-181 *S. xianamensis*
- The 10 other strains were negative by OXA-48 K-SeT and end-point PCR

For some *Shewanella* spp. isolates a concordance is found between presence of OXA-48/OXA-181 coding genes by PCR and detection of the OXA-48 like protein by the ICA even though these strains mostly remain fully susceptible to penicillins (including temocillin) and to carbapenems

Figure 2. Example of molecular testing of some *Shewanella* spp.



- A. Result of end-point PCR for 4 strains:
a. *S. algae* (171); b. *S. putrefaciens* (186);
c. *S. oinodensis* (188); d. *S. putrefaciens* (189)
186 and 189 are positive for OXA-48

Conclusions

In certain *Shewanella* spp. isolates (all of these yielding a PCR positive for *bla*_{OXA-48}), an OXA-48 like protein is detected with the OXA-48 K-SeT ICA. Based on these observations, it is advised to exclude testing of *Shewanella* spp by the OXA-48 K-SeT, also taking into account that this group of organisms does not belong to Enterobacteriaceae and is not relevant when screening CPE by culture methods (absence of growth of *Shewanella* spp on selective carbapenem-containing media).

References

1. Glupczynski Y and al. Evaluation of two new commercial immunochromatographic assays for the rapid detection of OXA-48 and KPC carbapenemases from cultured bacteria, J Antimicrob Chemother, 2016 Jan 28.pii: dkv472
2. Antonelli A and al. Intestinal carriage of *Shewanella xiamenensis* simulating carriage of OXA-48-producing Enterobacteriaceae, Diagn Microbiol Infect Dis, 2015 May; 82(1): 1-3

Mailing address:

Pierre Bogaerts
Laboratory of Microbiology
CHU UCL Namur - Site Godinne
1 Avenue Dr. G. Thérèse, 5530 Yvoir, Belgium
E-mail: pierre.bogaerts@uclouvain.be