

**EV0431**

**ePoster Viewing**

**Resistance mechanisms**

## Evaluation of the RAPIDEC® CARBA NP test for the detection of carbapenemases in Gram-negative bacteria

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**Background:** The emergence and rapid dissemination of diverse carbapenemases in Russian hospitals is a major threat for the national health care system. A number of phenotypic and molecular methods have been developed for carbapenemase detection. The aim of the study was to evaluate the performance of the RAPIDEC® CARBA NP test on clinical isolates of Gram-negative bacteria producing main carbapenemases.

**Material/methods:** Non-duplicate clinical isolates of *Enterobacteriaceae*, *Acinetobacter spp.* and *Pseudomonas aeruginosa* characterized phenotypically and genetically for the presence of *bla*<sub>NDM</sub>, *bla*<sub>KPC</sub>, *bla*<sub>OXA-40-like</sub>, *bla*<sub>OXA-23-like</sub>, *bla*<sub>VIM</sub>, and *bla*<sub>OXA-48</sub> were included in the study. The RAPIDEC® CARBA NP assay was applied to cultures grown overnight on Mueller Hinton E agar (bioMérieux) according to the manufacturer's protocol. Reactions were read after 30 and 120 minutes of incubation. *K. pneumoniae* ST 340 harbouring *bla*<sub>NDM-1</sub> gene, the presence of which was confirmed by PCR and Sanger sequencing, was used for positive reaction's control. *K. pneumoniae* ATCC 700603 was used as a negative reaction's control.

**Results:** The testing results with Quality Control strains were successful. The results of RAPIDEC® CARBA NP test with carbapenemase-producing isolates are presented in a Table below. All of the NDM-, KPC-producing isolates and 7 of 9 VIM-producing isolates gave positive results already after 30 min of incubation. All isolates, producing OXA-type carbapenemases and 2 isolates, producing VIM-type carbapenemases, demonstrated negative results after 30 min of incubation and positive results after 120 min. The sensitivity of the RAPIDEC® CARBA NP test after 30 min and 120 min of incubation were 65,4% and 100,0%, respectively. The specificity of the RAPIDEC® CARBA NP test after 30 min and 120 min of incubation were equal and composed 100.0%.

**Conclusions:** RAPIDEC® Carba NP is suitable for quick and easy evaluation of the carbapenemases activity in Gram-negative bacteria and diagnosis/screening of carbapenemase-producing infected patients. Incubation period of no less than 120 min is the essential condition for the RAPIDEC® Carba NP test results' reading; otherwise false-negative results with OXA-type and VIM-type carbapenemases producers are very probable.

Carbapenemases	Species (n)	MIC (mg/l) range		Results at 30'		Results at 120'	
		Meropenem	Imipenem	+ <sup>1</sup>	- <sup>2</sup>	+	-
OXA-48	<i>Enterobacteriaceae</i> (11)	1-32	2-16	0	11	11	0
NDM-1	<i>Enterobacteriaceae</i> (13) <i>A. nosocomialis</i> (2)	8->64	4->64	15	0	15	0
KPC-2	<i>Enterobacteriaceae</i> (10)	8->64	4->64	10	0	10	0

VIM-type	<i>Enterobacteriaceae</i> (2) <i>P. aeruginosa</i> (7)	1-8	0.5-16	7	2	9	0
OXA-40, OXA-23	<i>A. baumannii</i> (7)	2-16	2-8	0	7	7	0
	<i>Enterobacteriaceae</i> (29)	0.015-0.12	0.015-0.06	0	29	0	29
None	<i>A. baumannii</i> (10)	0.06-0.25	0.06-0.25	0	10	0	10
	<i>P. aeruginosa</i> (8)	0.06-0.25	0.06-0.25	0	8	0	8

<sup>1</sup> (+) - positive result, the colour changed from red to yellow

<sup>2</sup> (-) – negative result, the colour didn't change