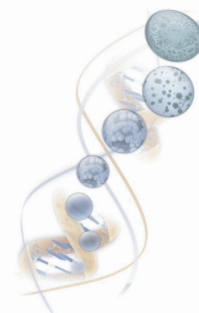


Detection and Differentiation of the most prevalent Carbapenemase Genes.

Among gram-negative bacteria carbapenemase-producing species represent an increasing threat worldwide. Especially within the *Enterobacteriaceae* group widespread affiliates like *E. coli* and *Klebsiella pneumoniae* show a tremendous variety of resistance-mediating carbapenemase genes. But even in other species like *Pseudomonas aeruginosa* or *Acinetobacter baumannii* variable carbapenem resistances can be found.

From an epidemiologic point of view distinct molecular entities additionally differ from country to country. Thus the KPC enzymes - meanwhile relevant to several *Enterobacteriaceae* - emerge predominantly e.g. overall in the USA and in a remarkable quantity in Brasil, China, Israel, Italy and Greece. Indeed the *Klebsiella pneumoniae* carbapenemase KPC, as well as the Verona integron-encoded metallo- β -lactamase (VIM), New Delhi metallo- β -lactamase (NDM) and OXA-48 number among the most important carbapenemases in a global perspective. Worth mentioning that OXA-48 followed by KPC and VIM-1 is most commonly identified in Germany accompanied by a steady rise of NDM-1 in recent years.



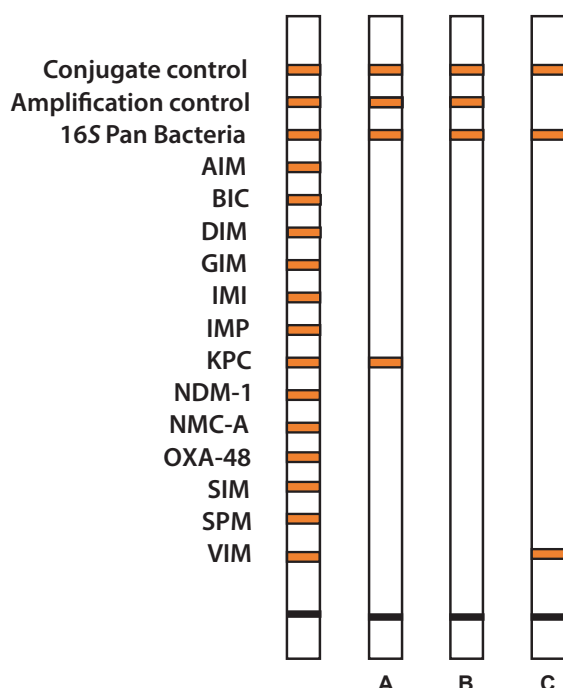
Carbapenemases are classified with three distinct groups. By use of the AID Line-Probe-Assay following carbapenemases can be detected and differentiated in a reliable manner:

Penicillinases (Class A): KPC, IMI, NMC-A, BIC

Metallo- β -Lactamases (Class B): IMP, VIM, NDM, AIM, DIM, GIM, SIM, SPM

Oxacillinases (Class D): OXA-48

- Our tests are being developed to enable an initial screening of the most common carbapenemases on one single hybridization strip.
- Specific detection of up to 13 different carbapenem resistances plus function controls, i.e. conjugate control, amplification control and bacterial 16S rDNA band control.
- Suitable specimens: bronchial lavage, sputum, smear tests, bacterial cultures



Sample data interpretation:

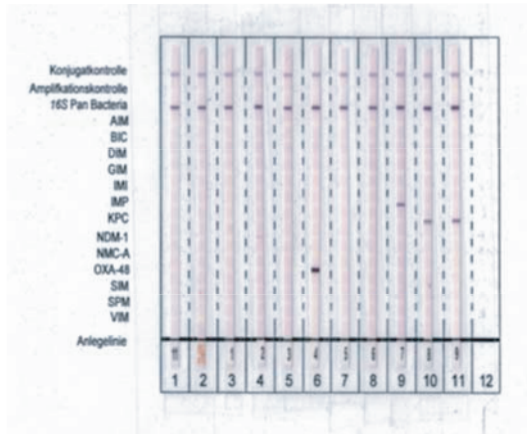
Probe A: 16S Pan Bacteria control and KPC carbapenemase gene have been fully developed -> probed pathogen appears to be positive with regard to the investigated carbapenem resistance.

Probe B: 16S Pan Bacteria control has been fully developed only -> probed pathogen shows no sign of carbapenem resistance.

Probe C: 16S Pan Bacteria control and VIM carbapenemase gene have been fully developed -> probed pathogen appears to be positive with regard to the investigated carbapenem resistance. Due to the bacterial culture derived specimen the amplification control is lacking in this case.

AID Carbapenemase line probe assay

Clinical strains isolated in the routine diagnostic laboratory



Conclusions / final remarks

- Carbapenemase producing Enterobacteriaceae are increasing
- There is a high need for fast and accurate screening
- Recently, a few commercial multi-plex PCR tests have been developed
- We have developed in collaboration with AID Diagnostika a AID Carbapenemase Line Probe Assay, which is able to detect 13 different carbapenemase genes
- The AID Carbapenemase Line Probe Assay is highly specific, easy to use and implemented in the routine diagnostic laboratory

"Presentation REMMDI 2015, Bloemberg"

Technical data

Suitable specimens: bronchial lavage, sputum, smear tests, bacterial cultures

Time to result: Approx. 5 hours

Methodology

Reverse hybridization:
Hybridization strips included in the AID test kit will be incubated with amplified DNA probes of your specimen. After a following stringent wash step specifically bound biotinylated sequences will be tagged with a streptavidin-enzyme-conjugate. Visualization on the test strip runs simply by addition of substrate.

Documentation and analysis using the AID Scanning System.

All-in-one solution for an automated process, starting from DNA isolation up to the detection and interpretation of your results.

Literature:

Epidemiologisches Bulletin: Nr. 43, 27. Okt. 2014 Robert Koch-Institut
Bericht des Nationalen Referenzzentrum für gramnegative Krankenhaus-erreger (1. Januar 2013 bis 31. Dezember 2013; p421-425

Epidemiologisches Bulletin: Nr. 19, 13. Mai 2013 Robert Koch-Institut
Zur aktuellen Situation bei Carbapenemase-bildenden gramnegativen Bakterien; Bericht des Nationalen Referenzzentrum für gramnegative Krankenhaus-erreger ; p168-171

Lupo A. et al. (2013): Non-phenotypic tests to detect and characterize antibiotic resistance mechanisms in Enterobacteriaceae; Diagn. Microbiol. Infect. Dis. 77(3); p.179-194

Lynch, J. P. et al. (2013): Evolution of antimicrobial resistance among Enterobacteriaceae (focus on extended spectrum beta-lactamases and carbapenemases); Expert Opin. Pharmacother. 14(2), p 199-210

Additional literature is available on request from AID!

PCR-Infektions-Kits

Order-No.	Product
RDB2290	Carbapenemasen
RDB2135	CAP Bakterien $\epsilon\epsilon_{123}$
RDB2140	CAP Viren
RDB2145	CAP Resistenz
RDB2200	Bordetella pertussis
RDB2147	MRSA combi
RDB2180	ESBL
RDB2185	TB-Modul Isoniazid, Rifampicin
RDB2184	TB Modul Aminoglykosid
RDB2187	TB Modul Fluorochinolone

All PCR Kits are available in two sizes. For low-throughput we offer 12 tests per kit and for high-throughput 60 test per kit!

**For more information about our products,
please visit our website:**

www.aid-diagnostika.com

