P1810

Evaluation of the RESIST-1 MCR Multi test for the identification of bacteria carrying mobilized colistin resistance mediated by MCR-1, 2 and 6

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Introduction

Colistin resistance mediated by MCR genes is a growing global concern, particularly due to its plasmid-borne nature, that facilitates rapid spread among bacteria in humans and animals. MCR-1 remains the most prevalent and so studied variant, detected in 4 to 16% of commensal *E.coli,* mostly in livestock. MCR-1 high homologous MCR-2 and MCR-6 are less common but have been identified in animal reservoirs, especially in Asia and Europe. However, their lower prevalence may reflect underreporting surveillance (1).

Since colistin is a last-resort antibiotic used to treat multidrug-resistant Gram-negative infections, the MCR detection could allow to prevent therapeutic failures and help to limit its dissemination.

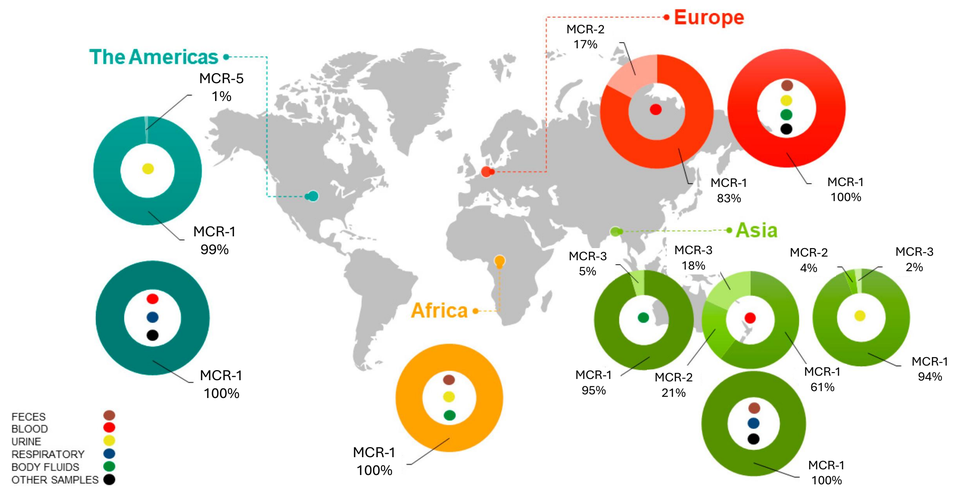

Figure 1. Global distribution of plasmid-mediated colistin resistance genes (*mcr-1 to mcr-9*) (1)

Methods

The RESIST-1 MCR Multi test is an immunochromatographic lateral flow assay. A nitrocellulose membrane is sensitized with an antibody directed against one epitope of the MCR protein and another antibody, conjugated to colloidal gold particles, is directed against a second epitope of the MCR. The gold conjugate is dried on an absorbent pad and resolubilized following to the passive diffusion of buffer containing 3 resuspended colonies of target bacteria. The result is visible within 15 minutes in the form of red lines on the strip.

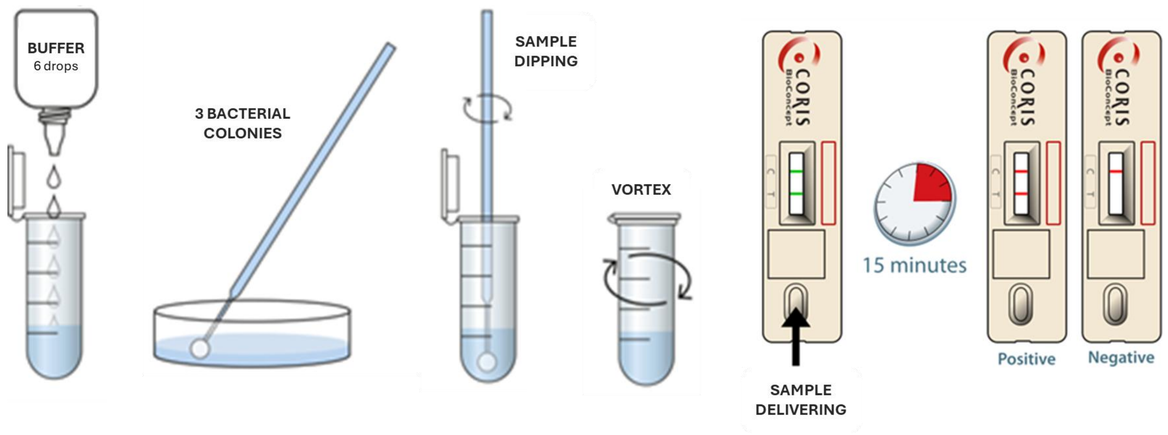

Figure 2. Procedure for specimen preparation and interpretation of results

Results

RESIST-1 MCR Multi test performance was assessed using bacterial strains (25) and recombinant proteins. All strains harboring MCR-1 (8) or MCR-2 (2) genes were correctly identified and no cross-reactivity could be demonstrated with the 15 strains negative for MCR resistance (several species and enzyme resistances tested) (Table 1). Furthermore, bacterial extracts from *E.coli* transformed by plasmids producing MCR variants were also used for analytical performance evaluation. So that, MCR-1, MCR-2 and MCR-6 were detected within the same concentration range, while MCR-3 -5, -8 et -9 were also identified but at higher concentration range.

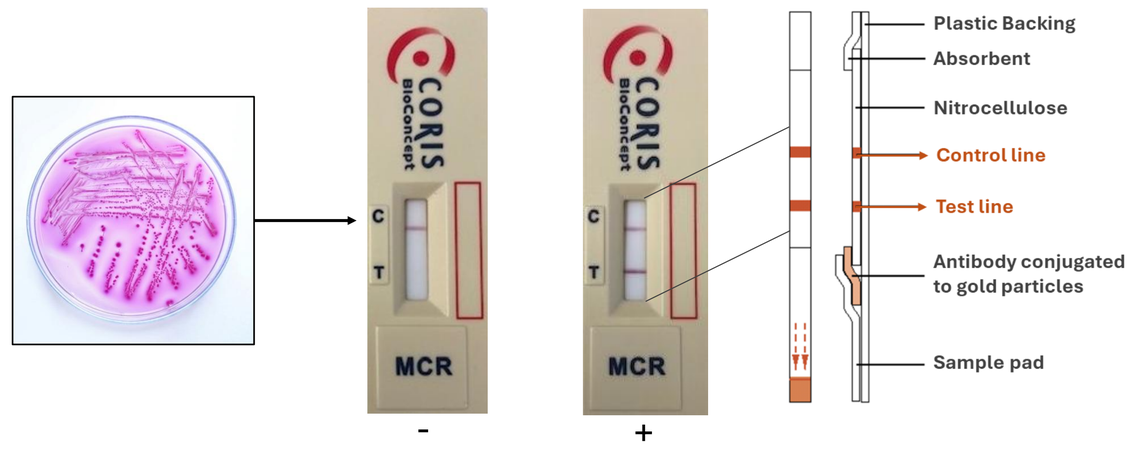

Figure 3. Representative images of RESIST-1 MCR Multi immunochromatographic test showing negative (**-**) and positive (**+**) results

Species	Resist I	Resist II	Resist III	RESIST-1 MCR Multi Result
Escherichia coli	MCR-1.1	/	/	+
Escherichia coli	MCR-1.1	/	/	+
Escherichia coli	MCR-1.1	/	/	+
Escherichia coli	MCR-1.32	/	/	+
Escherichia coli	MCR-1.1	/	/	+
Escherichia coli	MCR-1.1	/	/	+
Escherichia coli	MCR-1.1	/	/	+
Escherichia coli	MCR-2	/	/	+
Escherichia coli	MCR-1	OXA-48	KPC	+
Escherichia coli	MCR-2	/	/	+
Escherichia coli	CTX-M-2	AmpC	/	-
Enterobacter cloacae	CTX-M-2	IMP-6	/	-
Enterobacter aerogenes	OXA-48	/	/	-
Pseudomonas aeruginosa	IMP-19	/	/	-
Escherichia coli	SHV-12	/	/	-
Enterobacter aerogenes	AmpC	/	/	-
Citrobacter freundii	CTX-M-55	AmpC	NDM-1	-
Enterobacter cloacae	AmpC	/	/	-
Escherichia coli	AmpC	OXA-181	/	-
Klebsiella oxytoca	AmpC	SHV-12	NDM-1	-
Klebsiella pneumoniae	AmpC	CTX-M-15	/	-
Klebsiella pneumoniae	AmpC	SHV-12	/	-
Proteus mirabilis	AmpC	/	/	-
Shigella sonnei	/	/	/	-
Serratia marcescens	/	/	/	-

Table 1. Results for the 25 strains evaluated with the RESIST-1 MCR Multi test

Conclusion

The highlight of this RESIST-1 MCR Multi test is to propose antigen rapid test capable of detecting within 15 minutes mobilized colistin resistance mediated by MCR (MCR-1, MCR-2 and MCR-6)

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(1) Bastidas-Caldes C, de Waard JH, Salgado MS, Villacís MJ, Coral-Almeida M, Yamamoto Y, Calvopiña M. Worldwide Prevalence of *mcr*-mediated Colistin-Resistance *Escherichia coli* in Isolates of Clinical Samples, Healthy Humans, and Livestock: A Systematic Review and Meta-Analysis. Pathogens. 2022 Jun 8;11(6):659. doi: 10.3390/pathogens11060659. PMID: 35745513; PMCID: PMC9230117.

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