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O0814 Rapid detection of polymyxin resistance in Acinetobacter spp. using MALDI-TOF mass spectrometry based test: the MALDIXin test

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Background: Polymyxins are now considered a last-resort treatment for infections caused by multidrug-resistant Gram-negative bacteria. Polymyxin resistance arises through modifications of lipid A, such as the addition of phosphoethanolamine (pETN) and /or 4-amino-L-arabinose (L-Ara4N). In *Acinetobacter baumannii*, resistance to polymyxins is caused by mutations in *pmrA* and *pmrB* genes. These mutations result in a constitutive activation of the PmrAB two-component system, which in turn upregulates the expression of an EptA-like phosphoethanolamine transferase that catalyses the addition of pEtN to the lipid A. Unlike *Enterobacteriaceae*, *A. baumannii* lacks all the genes required for L-Ara4N biosynthesis.

Materials/methods: Very recently, we have developed a cost-effective tool based on MALDI-TOF mass-spectrometry, the MALDIxin test, that aims to detect polymyxin resistance directly on intact *Escherichia coli* isolates in less than 15 min. From the resulting spectra, peaks corresponding to intact lipid A and modified lipid A were analysed manually. The MALDIxin test has been tested on 8 well-characterized *A. baumannii* clinical isolates (4 polymyxin susceptible and 4 polymyxin resistant strains resulting from PmrAB mutations).

Results: In polymyxin susceptible *A. baumannii*, the mass spectrum is dominated by 2 set of peaks centred at *m*/*z* 1728.1 and *m*/*z* 1910.3. In all polymyxin resistant strains, the mass spectrum is dominated by 2 set of peaks centred at *m*/*z* 1935.3 and *m*/*z* 2033.3, corresponding to the +25 *m*/*z* and +123 *m*/*z* shifts of mass unit of the native bis-phosphorylated hepta-acyl lipid A at *m*/*z* 1910.3. These peaks were assigned to PEtN-modified-mono-phosphorylated hepta-acyl lipid A with acyl chain of 12 carbons in length (*m*/*z* 1935.3) and PEtN-modified-bis-phosphorylated hepta-acyl lipid A with acyl chain of 12 carbons in length (*m*/*z* 2033.3). These two modifications were in line with those observed in MCR-producing *E. coli*, which is in accordance with a resistance mechanism involving a phophoethanolamine transferase (here EptA in *Acinetobacter* spp.).

Conclusions: This rapid and cost-effective technique offers a reliable tool for identification of polymyxin resistance in *Acinetobacter* spp. and therefore a very useful tool for preventing their spread.