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P1450 Detection of genes related with adhesion and biofilm formation among bacteraemic methicillin-resistant Staphylococcus aureus (MRSA) clones

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Background: Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the most frequent causes of nosocomial infections that may cause persistent infections due to biofilm formation. Understanding the mechanisms underlying biofilm formation is the key to the future development of new therapeutic strategies. Consequently, our objective was to correlate the presence of specific biofilm-associated genes with the biofilm formation phenotype in endemic and sporadic MRSA clones.

Materials/methods: In this study, 87 MRSA clinical isolates from bacteraemic patients were included. The collection included isolates of the endemic clones in Spain since 2000 as well as representative isolates of sporadic clones from the same period. Genetic analysis by DNA-microarray (*S. aureus* Genotyping Kit 2.0, Alere Technologies) was used to detect the genes associated with adhesion and biofilm formation. The capability to form biofilm was assessed by static growth on 96-well plates and crystal violet staining. Finally, GraphPad Prism 5 software was used to establish a correlation between genotype and biofilm phenotype.

Results: analysis revealed that all the strains, in spite of their genetic background carried *ica* genes; whereas each clonal complex (CC) showed its own combination of adhesion factors and biofilm-associated genes. These results suggest that MRSA isolates followed an *ica*-independent pathway, and could justify the differences in biofilm formation of each clonal complex. In addition, the isolates belonging to endemic MRSA clones (CC5, CC8, and CC22) formed significant stronger biofilms than sporadic clones (CC1, CC30, CC45, CC88, CC126 and CC398). Finally, the correlation between genotype and phenotype showed that the presence of fibrinogen binding protein gene (*fib*) and *S.*

aureus surface protein G gene (*sasG*) increased biofilm development, while bone sialo-binding protein gene (*bbp*) was inversely associated with biofilm formation.

Conclusions: Biofilm formation would be an important virulence factor for endemic MRSA clones to become successful and frequent pathogens.