Abstract 5105

Immunochemical detection of quorum-sensing autoinducers, an innovative strategy to diagnose infections by identifying *Staphylococcus aureus* strains

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Background: *Staphylococcus aureus* is one the most commonly isolated microorganisms in both healthcare-associated and community-acquired infections. Most common routine diagnostic methods rely on culture based techniques which can take up to 72h in order to obtain conclusive results. Many bacterial identification alternatives have emerged as potential alternatives of the gold standard culture plate techniques. Particularly, bacterial Quorum Sensing (QS) has attracted the attention as potential diagnostic and therapeutic target. This communication system is based on the release and sensing of low molecular weight chemical signals, called autoinducers (AIs). They control its own biosynthesis and the genetic expression of virulence factors and survival mechanisms. In *S. aureus* these molecules correspond to cyclic thiolactone peptides (AIPs), encoded by a specific locus, responsible of the phenotypic variability between the different strains.

Materials/methods: antibodies against the AIP-4 of *S. aureus* have been produced after appropriate hapten design and synthesis followed by preparation of the immunogen. A competitive indirect microplate-based ELISA has been developed and implemented to the analysis of biological samples. Clinical isolates from patients proven to be infected by *agr-IV* strains of *S. aureus* have been cultured and the profile of AIP-4 secreted to the media has been investigated.

Results: the microplate-based ELISA developed with the antibodies produced has shown a limit of detection below the AIP-4 concentration levels in culture broth samples. Quantifiable AIP-4 levels can be detected only after two hours of culture of clinical isolates obtained from patients infected with this pathogen. Culture samples from different *agr* strains did not show significant immunoreactivity, indicating the potential of the technology to discriminate between the different *agr* strains.

Conclusions: The specific quantification of this QS molecule could provide valuable information regarding the strain type and disease status. The diagnostic tool here presented may significantly contribute to improve diagnostic efficiency and current therapeutic strategies. Immunochemical techniques might be able to fulfill the requirements and demanding challenges of the infectious diseases diagnostic field through the study of QS.

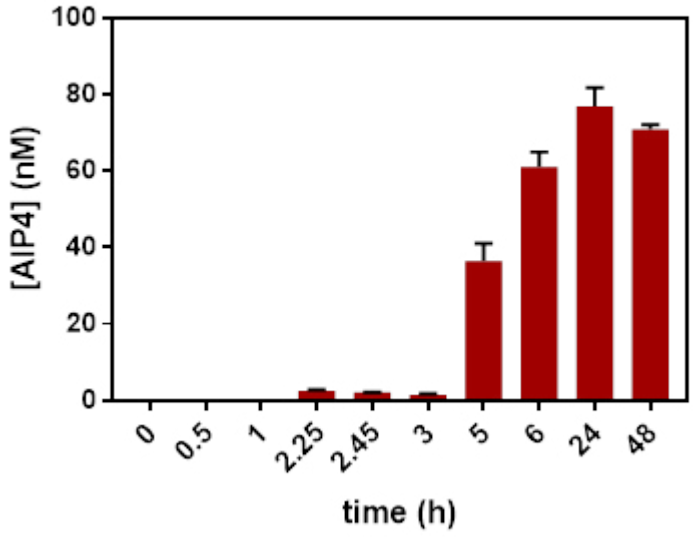

Fig 1. AIP-IV concentration in culture growth samples from a clinical isolate of *S. aureus*.

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