

Immunoproteome analysis to distinguish between infection by *Staphylococcus aureus* and *Staphylococcus epidermidis*

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Staphylococcus aureus and *Staphylococcus epidermidis* are prominent causes of nosocomial bacterial infections. *S. epidermidis* expresses less virulence factors than *S. aureus* but is able to cause severe infections associated with medical devices. However, in blood cultures from patients with a systemic infection, *S. epidermidis* is usually regarded as a contaminant. Microbiological diagnosis of *S. epidermidis* remains difficult being marred by low sensitivity.

We intend to probe the specific antibacterial antibody response in patients in order to gain additional information about the nature of the invasive microbial species as well as its pathogenic potential.

To measure the specific immune response to invasive *staphylococci* with high sensitivity and to discriminate between a *S. aureus* and *S. epidermidis* infection, a suspension bead array will be developed containing immunodominant proteins of both *staphylococci*. This will enable the simultaneous quantification of plasma antibody binding to numerous bacterial antigens.

Patients with microbiologically confirmed systemic *S. aureus* or *S. epidermidis* infection were recruited in a prospective clinical trial. Plasma samples of these patients were collected at the day of diagnosis and during the course of infection. Healthy adults served as controls. Plasma antibody binding to extracellular proteins of the causative bacteria were quantified using an automated 1D-immunoblot (Simon®). This revealed weaker antibody binding to the extracellular proteins of *S. epidermidis* in comparison to those of *S. aureus*. Despite the fact that many virulence factors are shared between the two species, 2D-immunoblots showed different patterns of antibody binding. Comparative immunoproteomics is currently being applied to identify the immunodominant proteins of *S. epidermidis*. These will be recombinantly expressed and integrated into a multiplex immunoassay already consisting more than 200 *S. aureus* proteins for validation of their diagnostic sensitivity and specificity.

Taken together, the results of this study corroborate the common notion that *S. aureus* shows a more aggressive behavior than *S. epidermidis*. Immunodominant antigen profiles appear to differ between the two closely related bacterial species.