Evaluating the effect of *Staphylococcus epidermidis* proteases on *Staphylococcus aureus* biofilm formation

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Staphylococcus epidermidis and *Staphylococcus aureus* are two of the most common bacteria isolated from human skin, and both species can behave as pathogens with devastating patient outcomes. The success of these infections is in part due to their proficiency at forming biofilms. *S. epidermidis* (SE) assists in *S. aureus* (SA) biofilm formation, but the complex interactions that lead to these outcomes are not completely understood. Previous work has shown that SE accumulation associated protein (Aap) and its ortholog in SA, *S. aureus* surface protein G (SasG), are important for biofilm formation. SA SasG expression is repressed by the global regulator, MgrA. Prior work has shown that SasG is upregulated in a *ΔmgrA* mutant. Aap and SasG are surface-associated adhesins that must be proteolytically cleaved in order to be activated. We recently showed that three proteases from *Pseudomonas aeruginosa,* another commonly co-isolated pathogen, can cleave SasG in SA *ΔmgrA* bacteria to induce biofilm formation. SE produces the proteases Esp (serine protease), SepA (metalloprotease), and Ecp (cysteine protease). Of these, SepA has been shown to cleave Aap. We therefore used crystal violet-based assays to ask if SepA could affect SA biofilm formation. We found that spent media from a clinical strain of SE increased biofilm formation in a SA *ΔmgrA* mutant. This increase was even more prominent in spent media from isogenic SE *ΔsepA* bacteria. Conversely, SA biofilm was drastically reduced when SepA was overexpressed. Together, our work shows that the SE protease SepA may inhibit SA biofilms. Future experiments involve understanding the mechanisms of biofilm inhibition and potential roles for Ecp and Esp in SasG-mediated biofilm formation.