Title:	ClfA specific-single domain antibody selected from phage display library exhibits anti-bacterial activity against Methicillin-resistant Staphylococcus aureus
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Abstract:	The emergence of multidrug-resistant Staphylococcus aureus, particularly the highly concerning Methicillin-resistant S. aureus (MRSA), necessitates a change in the current treatment strategies. While therapeutic monoclonal antibodies and vaccines have been explored, their effectiveness is often hampered by Fc region mediated interaction with Protein A, a surface protein on S. aureus resulting in immune evasion. We propose a single-domain antibody (VHHs), also known as nanobodies, offering a promising avenue for overcoming the therapeutic challenges posed by MRSA. Derived from camelids, VHHs offer a distinct advantage – they lack the Fc region. Beyond this key benefit, VHHs boast superior biophysical properties compared to traditional antibodies. Their remarkable stability, solubility, affinity, and specificity make them ideally suited for targeting specific surface proteins of S. aureus. Furthermore, VHHs have the unique ability to bind hidden epitopes on antigens, which may be inaccessible to traditional antibodies. This expanded targeting range presents a more effective approach to combating this life-threatening pathogen. This study delves into the potential of VHHs as a novel therapeutic strategy, exploring their unique properties to overcome the limitations of existing treatments and pave the way for a more effective weapon against MRSA infections. We found a VHH/sdAb against Clumping factor A and characterized it by ELISA and Western Blot. Moreover, in-vitro neutralization assays were established with S. aureus to see the neutralization effects of biopanned VHH on S. aureus in blood plasma of mice.
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