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Title:	Identification and characterization of single-domain antibodies against the surface proteins of methicillin-resistant staphylococcus aureus
Authors:	Kaur, Gurjinder
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Abstract:	Staphylococcus aureus is a leading cause of life-threatening diseases like sepsis, pneumonia, arthritis, and endocarditis in both hospital and community settings. Due to excessive use of antibiotics the bacteria are acquiring resistance to many of the available antibiotics for its treatment. One such strain is methicillin-resistant Staphylococcus aureus (MRSA). Therapeutic monoclonal antibodies and vaccines are being explored as alternative treatment options but their efficacy is found to be limited due to the cross-reactivity of their Fc region with Protein A present on surface of S. aureus. We present here the use of single-domain antibodies (VHH) which do not have any Fc region for targeting the surface proteins of S. aureus. Moreover, high stability, solubility, affinity, specificity and ability to bind hidden epitopes on antigen makes the nanobodies superior than monoclonal antibodies. We identified a nanobody against the Protein A of S. aureus using Fluorescence activated phage sorting over a conventional biopanning technique. Moreover, we optimised the use of flow cytometry staining technique and phage-western which both presents a more confirmatory analysis than phage-ELISA for characterization of nanobody displayed on the phage surface.
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