

Successful isolation and characterization of a unique Indian camelid antibody (ICab) that targets an efflux pump from *Staphylococcus aureus* with high affinity

Development of antimicrobial resistance poses a serious public health threat with the rise of ‘superbugs’ that can push out antibiotics from inside the cell through transporters called efflux pumps and therefore survive despite use of antibiotics. Antibodies that can detect and block these efflux pumps can be very useful in detection of drug resistant bacteria and can enhance the success rate to antibiotic therapy.

ICAR-National Research Centre on Camel, Bikaner in a collaborative research project with the Indian Institute of Science, Bangalore, scientists (Dr. Arvind Penmatsa, Assistant Professor, IISc, Bangalore and Dr. Rakesh Ranjan, Principal Scientists, ICAR-NRCC, Bikaner) have isolated and characterized a unique single-domain antibody from dromedary camel that can bind with high affinity to such efflux pumps in drug-resistant pathogens. In this Indian camelid antibody (ICab), instead of a disulphide in the antigen-binding loop, we observed a Zn site which is unique and important for interactions with the efflux pump. No other camelid antibody has this modification. This success story also got wide coverage on IISc web site (<https://www.iisc.ac.in/efflux-pump-detection-with-a-camel-antibody/>) as well as DBT Wellcome Trust-India website (<https://www.indiaalliance.org/news/368>).

Reference: Isolation and structural characterization of a Zn^{2+} -bound single-domain antibody against NorC, a putative multi-drug efflux transporter in bacteria (<https://www.ncbi.nlm.nih.gov/pubmed/31699895>). Sushant Kumar, Mahendran Ithayaraja, ArunabhAthareya, Rakesh Ranjan and Arvind Penmasta. *Journal of Biological Chemistry* 2020: 295(1)55-58.

