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Membrane proteome plays important role in the carbapenem resistance of *Acinetobacter baumannii*

Vishvanath Tiwari

Central University of Rajasthan, India

Acinetobacter baumannii, a nosocomial pathogen, has emerged as a threat to soldiers, wounded during military operations in Iraq and Afghanistan as well as isolated from natural resources. Increased resistance of *A. baumannii* even to the latest generation of β -lactams like carbapenem is cause of major concern. Clinical strains of *A. baumannii* were collected from tertiary care hospital and grouped into various resistant levels. Differential membrane proteomics of carbapenem resistant strain and ATCC 'control' strain established overproduction of carbapenem hydrolyzing β -lactamase and proteins associated with metabolism. Overproduction of these enzymes are achieved by enhanced transcription, translation and folding. Furthermore, the carbapenem resistant strain down regulates outer membrane proteins, which results in decreased uptake of antibiotics. Iso-electric focusing and in-gel nitrocefin assay of proteins from these strains showed that each of them has more than one type of β -lactamase. One of the responsible β -lactamase genes (OXA-51) was cloned, heterologously expressed and purified to homogeneity. The purified OXA-51 is characterized by 30% α -helix, 27% β -sheets. Its secondary structure was characterized to be pH-resistant and thermostable. Together, these features play a vital role in retaining the function of OXA-51 even under stress conditions. OXA-51 also hydrolyses its natural substrate oxacillin and imipenem. Bioinformatics studies on the modelled OXA-51 showed that OXA-51 interact with the imipenem, a carbapenem. The results obtained from this study will provide an important platform to understand the complex nature of carbapenem resistance in *Acinetobacter baumannii* using techniques like proteomic, biophysical and bioinformatics.

Biography

Vishvanath Tiwari has completed his PhD at the age of 27 years from All India Institute of Medical Sciences (AIIMS), New Delhi, India. Presently, He is HoD/Coordinator of Department of Biochemistry at Central University of Rajasthan, India. He has published more than 20 papers in reputed journals and serving as an Associate Editor, Editorial Board Member and Reviewer of journals of international repute like Journal of Integrated OMICS, Journal of Proteomics and Bioinformatics, Journal of the American Chemical Society etc. His areas of interest include Membrane and differential Proteomics (PloS One, 2012; J Proteome Res, 2010; J IntOmics, 2011; J Proteomics Bioinform, 2013), Biochemical & Biophysical studies of the proteins (Microbial Pathogen 2012; JBiomolStrDyn, 2014) and In-silico protein-drug interactions (JMolModel, 2012, JBSD, 2013).

vishvanath@curaj.ac.in