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Cross talk between oxidative stress and virulence optimizes multiple environmental transitions in *Vibrio cholerae*

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Bacterial pathogens must display versatility in gene expression to adapt to changing surroundings especially to changes in the redox potential and the presence of redox-active compounds in the local microenvironment. For example, a key part of the life cycle of *Vibrio cholerae,* the causative agent of cholera, is the transition between oxygen rich aquatic reservoirs to the oxygen limiting environment of the human gastrointestinal tract and combating reactive oxygen species (ROS) generated by the host immune system. Here using Tn-seq, we show that these two pathways oxidative stress resistance and virulence is linked in *V. cholerae* by two transcription factors, OhrR and AphB. We found that both OhrR and AphB bind to and regulate the promoters of the critical virulence activator *tcpP* and ROS resistance gene *ohrA*. In shifting between high-oxygen and low-oxygen environments, these proteins exhibit different kinetics of conformational change and binding at both promoters so as to optimize the expression of both genes. This cross talk was critical both for colonizing the host and for bacterial survival upon exit into the environment. Our results suggest that regulation of bacterial virulence is closely intertwined with oxidative stress responses.

Biography

Jay Zhu has obtained his PhD degree from Cornell University and completed Postdoctoral studies from Harvard Medical School. He is an Associate Professor of Microbiology at Perelman School of Medicine, University of Pennsylvania. He has published more than 75 papers in reputed journals and has been serving on Editorial Broad of several Microbiology journals.

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