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Systems biology approach to study host response to *Y. pestis*

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Abstract

Yersinia pestis, the etiological agent of the plague, induces vascular and pulmonary collapse in the host that is not well characterized. *Y. pestis* is known to have developed processes to overpower the host immune system and cause infection. In this study, a nonhuman primate model was exposed to aerosolized CO92 *Y. pestis,* which has the potential to be used as a biological weapon. To understand the complex interactions between the pathogen and host, we have applied global -omics profiling to determine the basis of infection and to identify host defense strategies and the mechanisms by which they are regulated. The genes, proteins, and metabolites profiles show unique signatures shortly after *Y. pestis* exposure. We identified a modified HIF-1 pathway in monkeys infected with *Y. pestis*. We also identified profiles that have been generated from a few genes over the course of infection that are involved in molecular transport, immune response, and apoptosis. Quantitative Real-Time PCR was utilized to validate the microarray results from blood chemistry profiles. The data from blood chemistry is also discussed. This research was supported through grant # TMTI0029_09_WR_T from the Department of Defense Chemical and Biological Defense program through the Defense Threat Reduction Agency (DTRA).

Biography

Aarti Gautam is a research scientist at US Army Center for Environmental Health Research (USACEHR). She received her Ph.D in Genetics as an exchange student in Texas Tech University. She did her post-doctoral research at International center for Genetic engineering and Biotechnology followed by a research position in a pharmaceutical company in India. Before joining USACEHR, she was working at Tulane University, Louisiana. She has presented her work at many conferences and has published 13 research articles and 2 book chapters.