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Innate and adoptive immune response to *Chlamydia trachomatis* infection

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The role of intracellular recognition molecules like NODs expressed by cells of the female reproductive tract (e.g. Fallopian tube epithelium) in the response to chlamydial infection, or any STI, remains poorly understood. A suboptimal innate immune response may result in a permissive environment for pathogen colonization, whereas an over-exuberant response will cause excessive inflammation and tissue damage. Modulation of the host response to infection is an attractive alternative or adjuvant approach to antibiotic therapies in treatment of genital tract infections. Genome sequence analysis has revealed that Chlamydia possesses numerous novel genes that might be involved in the manipulation of the host cells. The infected cells often display altered metabolic, immunological and cell biological characteristics, however, at the same time the microbes have to maintain the integrity and viability of host cells before completing their own intracellular replication. To achieve this goal chlamydiae have evolved the ability to both prevent the infected cells from undergoing apoptosis induced by intracellular stress and to protect these cells from recognition and attack by lymphocytes. Analysis of *C. trachomatis* genome had identified more than two dozens of open reading frames encoding proteins with potential proteolytic activity. Some of these proteases may be used to target host cell proteins because some proteins are cleaved and/or degraded in infected cells. The attacked host proteins include transcriptional factors, pro and anti apoptoytic proteins, DNA repairing enzymes, cyclins and cytoskeletal protein. However, survival strategies of Chlamydia at the tissue level and the relevance of these findings in disease pathogenesis have yet to be determined. Since till date a Chlamydia vaccine is unavailable, a better definition of human immune response along with Chlamydial survival strategies needs to remain an important research priority if we are to develop a vaccine against *C. trachomatis* infection that has protective and not deleterious effects.

Biography

Aruna Mittal has been working in the field of Immunology for more than thirty years after obtaining Doctorate degree from Delhi University in 1977. She was awarded 'Shakuntala Amir Chand' Prize for Young Scientists for miniaturizing radiometric assay for M. leprae viability and drug resistance by ICMR in 1984. She worked at Rockefeller University, USA on purification of dendritic cells from peripheral blood and study of antigen presentation in leprosy. She initiated research in female genital chlamydial infections in 1990, subsequent to her DBT overseas Research Associateship at the Center for Disease Control, Atlanta, USA, where she was awarded the title of 'Chlamydia Farmer'. In addition, she is the first one in India who has made considerable efforts to understand mucosal host immune responses locally in persistent and recurrent *C. trachomatis* infection in order to have a mechanistic understanding of immunopathogenesis of *C. trachomatis* infection which will help in vaccine development against Chlamydia. She is the only one in India carrying out extensive research on chlamydial pathogenesis and the first ones worldwide to publish reports on responses of mucosal (cervical) immune responses to chlamydial infection.

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Emerging functions for the *Staphylococcus aureus* RNome: Its relationships with antibiotic resistance, immune evasion and toxic peptide secretion

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Staphylococcus aureus is a serious pathogen for animals and humans, being one of the most frequently isolated bacteria in hospital-associated infections and also causing diseases in the community. To coordinate the expression of its numerous virulence genes for growth, survival and adaptation, *S. aureus* uses various signalling pathways that include two-component regulatory systems, transcription factors, and hundreds of regulatory RNAs (sRNas). Biological roles have only been determined for a handful of these sRNAs, including cis, trans, and cis-trans acting RNAs, some internally encoding small, functional peptides and others possessing dual or multiple functions. Recent investigations from the author's lab have identified as RNA that influence antibiotic resistance in *S. aureus*, a novel sophisticated translational control of an mRNA by two differentially expressed sRNAs that ensures supervision of host immune escape by *S. aureus*, and a novel toxin-antitoxin system producing membrane and secreted toxic peptides destroying host cells and competing bacteria with dissimilar strengths.

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