Host responses to infection

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The immune system is, primarily, designed to protect the host from commensal microbes and invading pathogens. How does it perform this onerous task? What happens to people who either lack or have a compromised immunity? This talk will highlight the cooperation between the two arms of the immune system for better protection: innate (neutrophils, macrophages, dendritic cells etc.) and adaptive (B and T lymphocytes).

Our laboratory has been trying to understand different aspects of immune responses. We use a variety of approaches, e.g. mice model systems with mutations in key immune genes, immune cell isolation & culture, flow cytometry etc, to accomplish these goals. The pathogen of choice is *Salmonella* Typhimurium, a Gram negative intracellular bacterium, which is a well established model of typhoid in mice.

This talk will feature two mice models of infection that have been standardized in our laboratory: thymic atrophy and sepsis. First, the thymus is a primary immune organ responsible for the development and maturation of T lymphocytes. The thymus atrophies with age as well as with stress, treatment with chemotherapeutic drugs, infections etc. We have utilized the *Salmonella* Typhimurium-induced infection model to study changes in different thymic sub-populations and to understand the roles of stress hormones and inflammatory cytokines. Better understanding of the processes involved in thymic atrophy may lead to robust cellular immune responses upon different challenges.

Sepsis is a dysregulated inflammatory disorder, caused by infections and contributes significantly to mortality in hospitals. We have established a *Salmonella* Typhimurium-infection in mice which is characterized by a rapid cytokine burst and neutrophil influx in the peritoneal cavity. The critical roles of nitric oxide, a well known signaling molecule, in the modulation of host responses will be highlighted. Further studies involving better diagnostics, technological breakthroughs and small molecules will play critical roles in ameliorating this disorder.

Overall, this talk will shed light on the complexities involved in the organization and processes of the immune defense network.