Pretreatment of mice with streptomycin provides a Salmonella enterica serovar Typhimurium colitis model that allows analysis of both pathogen and host.

Abstract:

Salmonella enterica subspecies 1 serovar Typhimurium is a principal cause of human enterocolitis. For unknown reasons, in mice serovar Typhimurium does not provoke intestinal inflammation but rather targets the gut-associated lymphatic tissues and causes a systemic typhoid-like infection. The lack of a suitable murine model has limited the analysis of the pathogenetic mechanisms of intestinal salmonellosis. We describe here how streptomycin-pretreated mice provide a mouse model for serovar Typhimurium colitis. Serovar Typhimurium colitis in streptomycin-pretreated mice resembles many aspects of the human infection, including epithelial ulceration, edema, induction of intercellular adhesion molecule 1, and massive infiltration of PMN/CD18(+) cells. This pathology is strongly dependent on protein translocation via the serovar Typhimurium SPI1 type III secretion system. Using a lymphtoxin beta-receptor knockout mouse strain that lacks all lymph nodes and organized gut-associated lymphatic tissues, we demonstrate that Peyer’s patches and mesenteric lymph nodes are dispensable for the initiation of murine serovar Typhimurium colitis. Our results demonstrate that streptomycin-pretreated mice offer a unique infection model that allows for
the first time to use mutants of both the pathogen and the host to study the molecular mechanisms of enteric salmonellosis.