

Case 13

In mid-April 2002, a group of businessmen attended a conference held at The Wyndham Anatole hotel in Dallas, Texas. Two days after attending the conference, the businessmen experienced severe abdominal crampy pain, bloody mucoid diarrhea, and fever. They presented to the local emergency room where physical examination of one of the individuals, L.M., was notable for T 102°F, pulse 120, respiratory rate 22 and BP 160/90 mm Hg. There was severe diffuse abdominal tenderness with guarding and rebound (marked tenderness following release of pressure on the abdomen, often a sign of peritonitis). A surgical consultation was called as the patient was deemed to have a possible surgical abdomen; however, in light of the fact that the presentation appeared to be part of a group outbreak, the surgeon felt that the likeliest diagnosis was food poisoning. All 7 patients received intravenous hydration. A stool culture from two of the 7 patients grew *Salmonella enteritidis*. All patients recovered uneventfully within 10 days. L.M. subsequently visited his local attorney's office.

Questions for Case 13

- (1) Describe the initial events following the ingestion of live *S. enteritidis*. To which cells in the gut do the bacteria initially bind and how does the immune system respond to bacterial invasion.
- (2) *Salmonella* is one of several microbial pathogens that have evolved strategies to evade the host immune system. Other members of this elite club include *Toxoplasma*, *Legionella*, and *Mycobacterium tuberculosis*. Describe the events immediately following interaction of *Salmonella* with host antigen-presenting cells, such as macrophages or dendritic cells. After minutes to hours, what event normally occurs in the APC that helps insure the death of other bacteria more susceptible to killing by the host?
- (3) Many cytokines have been implicated in *Salmonella* immunity. Among these are IL-1 and IL-18. How does signaling via IL-1 and IL-18 differ from classical cytokine signaling?
- (4) Although humoral (antibody-mediated) immunity is important in immunity to *Salmonella*, the development of cytotoxic lymphocytes (CTL) is crucial. Why is this the case?
- (5) Early in the course of a *Salmonella* infection there is a rapid local elaboration of IL-12 and IFN- γ . What are the likely cellular sources of these cytokines?
- (6) Recent experiments indicate that a subset of submucosal dendritic cells in the ileum extend processes in between epithelial cells and sample bacteria in the lumen. A targeted deletion of the chemokine receptor on dendritic cells responsible for elaborating these processes in mice demonstrated increased susceptibility to pathogenic *Salmonella* infections. Provide a plausible explanation for these findings.