SALMONELLA INFECTION IN MICE

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These studies evaluated the ability of several vaccines to protect mice against infection with *Salmonella typhimurium* C5. They not only revealed information on the efficacy of the vaccines examined, but also on fundamental features of host immunity to this infection. The main findings were as follows:

(a) *Salmonella enteritidis* llRX established a carrier state in (C57BL/6JO × BALB/cJO)F1 mice, stimulating their reticuloendothelial system and elevating levels of serum antibody specific for *Salmonella typhimurium* C5.

(b) Mice infected with *Salmonella enteritidis* llRX were moderately resistant to *Salmonella typhimurium* C5.

(c) The injection of *Salmonella typhimurium* C5 polysaccharide into *Salmonella enteritidis* llRX-infected mice reduced the level of specific antibody, and abrogated their ability to control and eliminate a *Salmonella typhimurium* C5 challenge.

(d) In contrast, the acquisition of specific antibody, by either active immunization or passive transfer, enhanced the resistance of *Salmonella enteritidis* llRX-infected mice to typhoid.

(e) *In vitro*, *Salmonella typhimurium* C5 organisms could adhere to and were destroyed by activated macrophages harvested from *Salmonella enteritidis* llRX-infected mice. This required the presence of specific antibody.

(f) Although mice immunized with *Listeria monocytogenes* acquired an activated reticuloendothelial system and
resistance to a homologous challenge, they remained effectively unable to control a Salmonella infection.

(g) An extract of Coxiella burnetii stimulated the reticuloendothelial system and induced immunity to Listeria monocytogenes and transplanted tumours. However, it conferred resistance to challenge with Salmonella typhimurium C5 only in mice which had acquired elevated levels of specific antibody.

(h) Dextran sulphate, which stimulated both humoral and cellular immune responses, protected mice against infection with Salmonella typhimurium C5

It is apparent from these observations that the generation of both humoral and cellular immune responses is necessary for resistance to Salmonella typhimurium. In fact, the expression of cell-mediated antibacterial immunity appeared to be limited by the availability of specific antibody. The implication is that activated macrophages, like normal macrophages, require opsonins to phagocytose and kill typhoid bacilli. These results are discussed in relation to the current knowledge of immunity to intracellular bacterial parasites.