THE DEVELOPMENT IN MICE OF LOCAL INTESTINAL IMMUNITY TO ENTEROBACTERICEAE

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A thesis submitted for the degree of Doctor of Philosophy.
January 25, 1984

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ADDENDUM EFFECT OF SALMONELLA C5 OUTER MEMBRANE PROTEIN (OMP) ANTIGEN ON SALMONELLA FED MICE

SUMMARY

The development of immunity to Salmonella at the local mucous surface of the small intestine has been investigated. After oral administration an avirulent Salmonella typhimurium/Escherichia. coli hybrid 885 infected the Peyer's patches and grew for 3-4 days before declining in numbers. The primary infected mice were subsequently protected from challenge by a virulent Salmonella strain. Passive transfer of high titre specific antiserum failed to protect. Administration of cyclophosphamide inhibited the antibacterial activity of the spleen but not that of the Peyer's patches. It was deduced that Peyer's patches have already been primed against common enterobacterial antigens in the natural state due to their proximity to the bacterial flora of the gut.

The decreasing number of bacteria in the Peyer's patches 4 - 5 days following primary oral infection coincided with increasing numbers of macrophages in the Peyer's patches of infected mice. The elimination of Salmonella 885 required activated macrophages whereas Escherichia coli 492 and Vibrio cholerae 569B were susceptible to normal macrophages.

Salmonella 885 were found to be extracellular in relation to the Peyer's patch cells. Nonetheless there was a loose association between the bacteria and some of the cells, the proportion of this

increased after infection from 6% to 50%. This bacteria/cell association was found to occur with a 1:1 ratio throughout the period of bacterial multiplication indicating that bacteria could move from one cell to another. Nonetheless the association with cells was sufficient to allow the bacteria to move through the Peyer's patches with the cell traffic and to be transported towards the incoming macrophages which could then kill the bacteria. Macrophages could be recovered from Peyer's patches at varying times after oral infection and when these cells were used in vitro to measure bactericidal effects, it was found that at the time when large numbers of macrophages entered the Peyer's patches, these cells were already activated and possessed superior antibacterial powers.

The traffic of cells through these lymphoid follicles is seen as a key element in both the dissemination of T lymphocytes able to express delayed type hypersensitivity and in the carriage of organisms towards activated macrophages.