ADHESION OF SALMONELLA SPECIES AND ESCHERICHIA COLI TO COLLAGEN FIBRES OF CHICKEN CONNECTIVE TISSUE

BY

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NOTES

Symbols, units and their abbreviations, text references, citations, and the layout of the bibliography, have been written in accordance with Board, R.G. and Carr, J.C. (1974) A guide to contributors. Journal of Applied Bacteriology 40: 1-22, wherever possible.

The terms ligand and adhesin have been used to describe the adhesive structure located on the bacterial cell, and the term receptor to describe the adhesive structure located on the substrate to which bacteria adhere.

The following abbreviations SEM and TEM, are used in this thesis in the following contexts:

SEM: scanning electron microscop(e), (y), or (ic)

TEM: transmission electron microscop(e), (y), or (ic)

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SUMMARY

This thesis describes an investigation of some factors affecting attachment of salmonellae and *Escherichia coli* to collagen fibres of poultry breast muscle fascie. Direct microscopic techniques were used in conjunction with standard microbiological methods as a means of examining the attachment process.

All strains of salmonellae tested, fimbriate *Escherichia coli* and a strain of *Campylobacter coli* adhered to collagen when muscle fascie was immersed in water containing cells of the appropriate test culture. Adhesion was dependent on water induced changes in fascie structure and was inhibited or reversed by addition of sodium chloride to the suspending medium. Capsular glycocalyx also prevented attachment of these bacteria to collagen fibres.

TEM studies indicated attached cells were held to the collagen by acidic mucopolysaccharides (or glycosaminoglycans) associated with the intercollagen fibre matrix of fascie. Subsequent studies showed hyaluronic acid (a predominant glycosaminoglycan associated with collagenous tissue) could inhibit attachment of selected strains of *Salmonella* and *E. coli*, but this inhibition could be reversed by hyaluronidase. Chondroitin-sulphate, a related glycosaminoglycan, only inhibited attachment of *E. coli* strains. This evidence implicated hyaluronate as a key factor in the attachment process.

Since only fimbriate *E. coli* could bind significant amounts of hyaluronic acid, it is suggested these bacteria may bind directly to tissue glycosaminoglycans. Salmonellae, however, apparently require an additional bridging compound (possibly a protein) to mediate adhesion to collagen fibres.