

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)

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	i
SUMMARY	ii
1. INTRODUCTION	1
2. LITERATURE REVIEW	3
2.1 The Occurrence of Enteric Bacteria on Poultry	4
2.2 Cross-contamination of Poultry Carcasses During Processing	6
2.3 Bacteriological Sampling of Poultry Carcasses	8
2.4 Retention of Bacteria on Meat Tissues	10
2.5 Attachment of Bacteria to Meat Tissues	12
2.6 Histology and Physiology of Connective Tissue	13
2.7 Absorption of Water by Poultry Tissues	14
2.8 Attachment Mechanisms of the <i>Enterobacteriaceae</i>	16
3. MATERIALS AND METHODS	20
3.1 Cultures	21
3.2 Preparation of Cell Suspensions	22
3.3 Samples	22
3.4 Vero Cell Culture and Maintenance	23
3.5 Chick Kidney Cell Culture and Maintenance	23
3.6 Extraction of Glycosaminoglycans from Chicken Comb	24
3.7 Chemical Analysis of Glycosaminoglycans	25
3.8 Haemagglutination Test	25
3.9 Attachment of Bacteria to Cultured Cells	26
3.10 Attachment of Bacteria to Chicken Muscle Fasciae	27
3.11 Scanning Electron Microscopy	28
3.12 Transmission Electron Microscopy	29

	Page
4. RESULTS	31
4.1 Attachment of Bacteria to Cultured Cells and Human Erythrocytes	32
4.2 Attachment of Bacteria to Chicken Muscle Fascie	32
4.3 Effect of Glycosaminoglycans, Component Saccharides and Tissue Extracts on Attachment of Bacteria to Muscle Fascie	37
4.4 Transmission Electron Microscopy of Bacteria Attached to Chicken Muscle Fascie	43
4.5 Adsorption of Hyaluronic Acid by Bacteria	46
5. DISCUSSION	56
6. BIBLIOGRAPHY	72
7. APPENDICES	88
Appendix 1	89
Appendix 2	92
Appendix 3	99

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S U M M A R Y

This thesis describes an investigation of some factors affecting attachment of salmonellae and *Escherichia coli* to collagen fibres of poultry breast muscle fasciae. 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 fasciae was immersed in water containing cells of the appropriate test culture. Adhesion was dependent on water induced changes in fasciae 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 fasciae. 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.