

Contents

In Memoriam	VII
Acknowledgements	VIII
1. Historical Aspects of Arterial Disease	1
Early Descriptive Findings	1
Development of Animal Models	6
Comparison of Bovine and Human Arterial Lesions	10
General Mechanisms Involved in Lesion Formation	12
Risk Factors in Arterial Disease	17
Terminology of Arterial Disease	20
References	23
2. The Bovine Cardiovascular System	26
Anatomy of Bovine Heart	26
Anatomy of Left Coronary Artery	30
Anatomy of Right Coronary Artery	35
Shared Functions of Coronary Arteries	37
Congenital Cardiovascular Anomalies	38
Diagnostic Features of Consideration	39
References	45
3. Characteristics of Gross Lesions in Bovine Aorta	46
General Factors Impacting on Lesions	46
Evaluation of Bovine Aortic Gross Lesions	49
Species Similarities of Gross Lesions	60
References	60
4. Histological Parameters of the Mesenchyme	62
Morphology of the Mesenchyme	62
Histochemistry of the Matrix	64
Glycosaminoglycans of the Arterial Matrix	65
Intravital Staining of Disaggregated Areas	69
Matrix Components and Tissue Damage	73
References	75
5. Matrix and Glycosaminoglycan Impact on Transport via the Arterial Wall	79
Endothelium and Matrix Ultrastructure	79
Chemical Composition of Large Arteries	81

Age and Arterial Maturation	84
Matrix Transport and Chemical Constituents	86
Implications of the Sexual Cycle on Aortic GAG Content	88
The Sexual Cycle and Coronary GAG Content	90
GAG Patterns and Arterial Disease	98
References	103

6. Lipids and Lipoproteins in Atherosclerosis in Humans and Cows

107

Natural Versus Induced Arterial Lesions	107
Lipidosis and Atherosclerosis	109
Lipid Infiltration in Bovine Arteries	110
Lipoprotein Implications in Atherosclerosis	116
References	116

7. Other Elements Impacting on Glycosaminoglycan Changes and the Integrity of the Arterial Wall

118

The Implication of Edema and Hemorrhage	118
The Effect of Microthrombi	119
Involvement of Platelets	126
The Contribution of Mast Cells	127
References	131

8. Pathogenesis of Atherosclerosis

133

Definition of Intimal Atherosclerotic Sequences	134
Temporal Pattern of Lesion Chemical Complexity	136
Current Hypothesis of Atherosclerosis Etiology	137
Established Risk Factors in Atherosclerosis	145
References	148

9. New Frontiers of Consideration in the Etiology of Atherosclerosis

153

Essential Fatty Acids	153
Prostaglandins: Origin and Activities	155
Thromboxanes: Origin and Activities	157
Leukotrienes: Origin and Activities	157
References	159

10. Biological Processes and Gross Observations

161

Molecular Mechanisms and Microscopic Aberrations	162
Aspects of the Biochemical Lesion	164
Known Chemical Entities	167
Correlates in Bovine and Human Atherosclerosis	169
References	171

Subject Index	173
---------------------	-----