

Preface

Atherosclerosis and its complications are the major cause of morbidity and mortality in both developed and developing nations. There is an urgent need to understand the pathogenesis and progression of atherosclerosis, and to develop a strategy to prevent an epidemic episode. Crucial advances in our understanding of the pathogenesis of atherosclerosis and its complications have been achieved in recent years. This text, "Biochemistry of Atherosclerosis", is a compilation of contributions from world-renowned scientists, who are at the forefront of atherosclerosis research. This compendium will be highly valuable for individuals in the healthcare field and in basic research as it covers a variety of research topics on the onset, progression, and management of atherosclerosis. Each contribution deals in detail with the biochemical processes involved and provides in-depth information in specific areas.

Atherosclerosis comes from the Greek words; "athero" meaning gruel or paste and "sclerosis" meaning hardness. Atherosclerosis begins with damage to the artery caused by elevated levels of cholesterol and triglycerides in the blood, as well as high blood pressure. Several other factors are also associated with the onset and progression of atherosclerosis, i.e. hyperglycemia, hyperhomocysteinemia, disruption of the immune system, glycation end products, and infectious agents. The first two sections of this book are dedicated to the association of hyperlipidaemia, diabetes, and hypertension with atherosclerosis. Section I addresses recent advances in the regulation of lipid and cholesterol metabolism, and how various biochemical pathways are involved in the development and progression of atherosclerosis. Many of these chapters cover recent research that employed transgenic and genetically altered mice. Section II concentrates on diabetes and hypertension. Type 2 diabetes, associated with insulin resistance and obesity, is on a rapid rise in the North American population, not only in the adults but also in children. The risk of heart disease in people with diabetes is two to four times higher than in the nondiabetic population. This section highlights recent advances in these areas.

Homocysteine is an amino acid that is found in the blood; elevated circulating levels are related to a higher risk of heart disease. Section III deals with the regulation of homocysteine metabolism and the factors that influence

vi Preface

this regulation. Section IV is directed towards other factors that are associated with the onset and progression of atherosclerosis, i.e., immune function, infection, and endothelial dysfunction. Immunological responses and infectious agents also play an important role in transplant arteriopathy, which is a major cause of death in long-term survivors after heart transplantation. This additional information provides an excellent bridge between an understanding of the regulation of metabolic pathways and the clinical implications. The complications of atherosclerosis become acute when the plaque ruptures and blocks blood flow (thrombosis). Stability of the plaque is maintained to a large extent by the composition of the plaque. New insights are provided in this section on the significance of inflammation to the vulnerability of plaque to rupture. Lastly, with the rapid increase in the risk of atherosclerosis and associated risk factors, emphasis needs to be placed on the prevention of atherosclerosis. Thus, the last section addresses dietary and lifestyle interventions as prevention and management strategies for atherosclerosis.

I sincerely appreciate the support from authors in helping to bring together this book. This compendium provides a breadth of knowledge as well as new insights into all aspects of atherosclerosis. These contributions from around the world indicate that heart disease is a worldwide problem. It is clear from these contributions that we need to further our understanding of the onset, progression, and management of atherosclerosis.

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