

# Preface

Over the last 30 years, the development of molecular biology has revolutionized our understanding of the biochemistry underlying biology and medicine. As yet, there is no introductory text that relates this revolution to topics of major interest to dentistry. Because of increasing demands to make biochemistry useful by translating its findings into better treatments for problems in medicine, the dental field needs a similar textbook. The primary aim of this book is to integrate general biochemistry into topics that specifically pertain to dental health and disease. First and second year dental students have completed a general biochemistry course, but have, at best, a sketchy idea of how the material in that course relates to dentistry. In a traditional dental curriculum, the topics of this book are covered in physiology, nutrition, anatomy, histology, microbiology or immunology. This book was written to enable dental students to integrate their general biochemistry within these topics of dental interest. It was considered neither desirable nor practical to fill the text with references, except for the figures and tables.

The formal discipline of dentistry was initially developed in the late 19th century to treat dental caries, but it quickly spread to treat all diseases that affect the oral cavity. Dental treatments have progressed enormously over the last 40 years, as have treatments for many other diseases. The most powerful new dental treatments have come from water fluoridation, better oral hygiene measures, new mechanical or replacement materials, and the adoption of drugs developed for non-dental diseases. Nevertheless, these measures are not universally effective and improvements can be made in many areas.

The most widespread and commonly treated dental diseases, dental caries and periodontal disease, are chronic conditions caused by interactions between the host and oral bacteria that are still only partially understood in detail. A second aim of this book is therefore to point out the current knowledge for a future generation to build upon. While I hope the descriptions of dental caries and fluoride are pretty standard, describing a modern and coherent view of periodontal disease was a problem. This is a field with which I began my PhD and am still active. Unfortunately, almost every researcher in this field has their own view of how chronic periodontitis begins and some may choose to disagree strongly with parts of Chapters 13 and 14. In these chapters, I have attempted to describe a *coherent biochemical view* of the development and progression of the various chronic and aggressive periodontal diseases. A draft version of these chapters was reviewed by a colleague, Dr. Thomas Van Dyke, newly appointed Vice President of Clinical Research and Chair, Department of Periodontology, at The Forsyth Institute,

Boston. Tom gave me valuable insights on how to draft these chapters, but the end product is mine.

I am indebted to the Oklahoma College of Dentistry Faculty, Dean Steven Young and Dr. Kenneth Coy, for encouraging me to develop this book, which is based on my lectures to first-year dental students during their second semester. I very much thank Dr. Celeste Wirsig, Associate Professor, Dept of Cell Biology, University of Oklahoma Health Sciences Center (OUHSC), for reading and re-reading almost all of the many draft chapters, and for figures credited to her; Dr. Paul DeAngelis, professor and colleague in the Department of Biochemistry & Molecular Biology, University of Oklahoma Health Sciences Center, who contributed substantially to the chapter on blood clotting; Dr. Chadwick Cox who first sketched the figures that Dr. DeAngelis provided for this book; and Ms Lindsay Collins, my technical assistant, who tirelessly reformatted all the chapters and helped me negotiate copyright approval for figures and tables as necessary.

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Finally, I dedicate this book to my wife, Laura, for her continuous support of my career. I began my career as a BDS degree and was working as a Dentist in the UK National Health Service alongside my father in Glasgow, Scotland at the age of 23. Laura encouraged me to follow my dreams and undertake a BSc honors degree in Biochemistry, followed by a PhD degree from the University of Glasgow. She and our two very young boys accompanied me for a year in the USA on a Sir Henry Wellcome Fellowship at the University of Washington, Seattle in 1973. The following year, I was invited to become a visiting assistant professor at SUNY Buffalo, where I started to teach the material in this book. In 1976, I came to the Dept of Biochemistry and Molecular Biology at the University of Oklahoma Health Sciences Center where I have spent the last 34 years.

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