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## Preface

It is widely accepted that “evidence-based dentistry” is fundamental to clinical practice and that well-controlled randomized clinical trials followed by systematic reviews and meta-analyses provide much of this evidence base. However, it is still the basic biological and physical sciences that underpin advances in dentistry and form the basis for subsequent clinical trials. It is equally true that the treatment of any disease should be based on an understanding of the etiology and pathogenesis of that disease, and in this context, the future of dentistry lies very much in continued research in the basic biological sciences.

This second edition of *Oral Biology: Molecular Techniques and Applications* continues the approach taken in the first edition and has not attempted to cover all aspects of oral biology, but rather to present a selection of cellular and molecular techniques that can be adapted to cover a range of applications and diseases. The first part on saliva, for example, has been updated and expanded to include proteomic analyses by mass spectrometry and NMR-based metabolomics that can be used not only in the study of saliva but also in assessing other oral fluids such as gingival fluid. Clearly, saliva is unique to the oral cavity but so too is gingival fluid which, in essence, is the fluid medium of the gingiva and gingival sulcus, and thus is the fluid environment where interactions between the plaque biofilm and the host take place. Hence, techniques for its collection and analysis have now been included.

Although it is 6 years since publication of the first edition of this book, many of the techniques described are still in widespread use and so have been retained, albeit updated, in this second edition. In the part on molecular biosciences, for example, chapters on profiling of oral microbial communities, quantitative real-time PCR, and adhesion of yeast and bacteria to oral surfaces have all been retained but substantially updated.

Epigenetics is now a major theme in biology and is providing great insight into how we interact with our environment. As DNA methylation features heavily in epigenetic studies, new chapters on tools and strategies that facilitate the analysis of genome-wide or gene-specific DNA methylation patterns have been included.

As in the first edition, the last part of this second edition deals with a range of approaches that enable the behavior of cells and tissues in both health and disease to be analyzed at the molecular level. The future of dentistry and of the profession lies in research, and it is anticipated that this second edition of *Oral Biology: Molecular Techniques and Applications* will continue to be a useful resource for oral biologists at all levels, be they students, early career or experienced veterans, and that it provides a ready reference enabling new techniques and approaches to be used in answering a range of specific scientific questions that will underpin a deeper understanding and treatment of oral diseases.

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