

Preface

Preface to this edition

It is a decade since the first edition of the *Oxford Dictionary of Biochemistry and Molecular Biology*. It was a remarkable work of scholarship, arising from the work of journal editors and scientific writers. Since then the landscape of biochemistry has changed immeasurably. The genome sequences have laid out the blueprints of whole organisms, especially Man. They have revealed the diversity of gene expression, and the complex systems by which cellular molecules organize themselves. The molecular basis of many diseases has been revealed, and vital cellular components discovered.

The literature is more diverse than ten years ago. The identification of the genes has rushed ahead of the biochemical characterization of their functions. Many protein and nucleic acid factors have been discovered. While their functions are incompletely understood, they are referred to by laboratory shorthand abbreviations. These are well understood by the investigators who work on them, but the mass of them becomes very confusing to the student, or to those viewing biochemistry from the outside. New methods of bioinformatics have been developed to bridge the gap. Meanwhile the '-omics' projects have introduced new layers of complexity as we see the interactions between macromolecules leading to new emergent properties.

As predicted in the first edition, the influence of the Internet has expanded. Instead of searching for information in libraries, students now usually go first to a search engine. So, does such a dictionary have a role in the age of Google? In fact it has gained in sales and popularity. Evidently it fills a need for a source of reliable information that is not always so easy to find.

A revised version of the dictionary, with some additions and corrections was printed in 2000. At that time, the need for a complete revision was apparent. The work continued with a new team, recruited by the ever-enthusiastic Peter Campbell. We deeply regret that he did not live to see the completion of this task, having died on February 8th 2005 from complications after an accident.

In order to keep the dictionary as a handy reference volume, we have endeavoured to avoid it becoming much heavier. It is only by being selective that there are only about 20% more entries than the first edition. Most of the appendices have been removed, or their useful parts transferred. The listed Nobel prizewinners in biochemistry and molecular biology have been

omitted except for eponymous entries, when they have lent their names to compounds or procedures. There has been a judicious removal of some older terms, though we found that surprisingly few have disappeared from the literature to such an extent that they are obsolete.

The literature abounds with laboratory shorthand names, database identifiers; TLA's (three-letter abbreviations) and other acronyms are extremely common, and a notorious source of ambiguity. We have cited these selectively, sometimes to indicate that a word or phrase has two meanings in different contexts. In the printed form we can show the full range of printed characters – boldface, italic, sub- and superscripts, Greek letters – that make up the syntax of many of the names, and that are difficult to find with search engines.

The dictionary is not intended to be a nomenclature document, and the terms that are in the entries are generally those that are in common use. We continue the practice of pointing the reader in the direction of recommended terminology and nomenclature. Nomenclature rules are applied less prescriptively these days; 'recommended' chemical nomenclature has become 'preferred'; 'recommended names' for enzymes have given way to 'common names'.

A great many of the new entries, on inherited diseases and much else besides are provided by Frank Vella, drawing on the eclectic collection of topical papers that he assembled for his columns in journals such as *IUBMB Life*. The entries on bioinformatics and genetics, which have assumed greater importance in BMB over the past decade, have been bolstered by the work of Terri Attwood and John Stirling. Finally it has been a pleasure to work with John Daintith and Robert Hine of Market House Books, whose expertise in chemistry and biology meant that their assembly of the book was an expert job.

The content of such a dictionary is necessarily selective. We have tried to ensure that the entries in the dictionary reflect current usage in biochemistry and molecular biology. As always, we are grateful to readers who point out errors in the present text.

Richard Cammack
March 2006

Preface to the revised first edition

It must be inevitable with any work of this nature that a number of imperfections and errors occur. So the opportunity provided by the need to reprint this dictionary has been taken to effect some improvements within the limitation imposed by retention of the original pagination. As well as the correction of a variety of minor misprints and other minor defects, over four hundred entries have been either revised or completely rewritten, and fifty or so new entries have been provided, some to remedy deficiencies and others to provide additional terms that have become of topical interest. To help make way for the new ones, about half as many original entries have been deleted. In

addition, Appendices B, C, and D have been updated, and Appendix B has been expanded and provided with all the relevant Internet addresses available at the time of writing.

Valuable comments on the original edition by a number of readers are gratefully acknowledged, and thanks are again due to Dr. H. B. F. Dixon for advice on aspects of nomenclature as well as to Oxford University Press and Market House Books for their much appreciated cooperation.

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A. D. S.

Preface to the first edition

Nearly twenty years ago one of us (S. P. D., soon joined by G. H. S.), began a distillation of the elements of biochemistry into an alphabetical arrangement. The task was formidable and eventually other editors were recruited, an editorial board was established, and now the work is offered as the *Oxford Dictionary of Biochemistry and Molecular Biology*. It is hoped that the dictionary will serve the needs of the research biochemist or molecular biologist, as well as teachers of the subject and their students. In addition, it should prove of value to practitioners of other fields of study or work seeking the meaning of a biochemical term.

An important function of a dictionary is to provide guidance on current usage in the field within its scope. The original 12-volume *Oxford English Dictionary* was compiled from about five million slips of paper bearing sentences or phrases extracted by some thousands of 'readers' from classical works of literature and those of the best contemporary authors. It was thus firmly based on good usage. In scientific subjects, specialist terminology is often codified in sets of recommendations regarding nomenclature, meaning, abbreviations, symbols, and so on. These have been agreed by international commissions (e.g. those of The International Union of Pure and Applied Chemistry and The International Union of Biochemistry and Molecular Biology) as a means of preserving order and facilitating communication between scientists. We have striven to conform as far as possible to the relevant international recommendations, but in some cases, where usage so frequently diverges from a recommendation that adherence to it would seriously detract from ease of use of the dictionary, we have kept to the principle that the dictionary should reflect usage (see the definitions of *lexicographer*). This does not extend, of course, to cases where usage, however widespread, contradicts sound scientific principles. The internationally agreed recommendation is always also listed. The various compilations of these recommendations that have been drawn upon are listed in Appendix B, together with a number of other sources of information on nomenclature.

Biochemistry is the discipline that embraces the study of the structure and function of life-forms at the molecular level. Molecular biology is a closely related discipline that originates in the study of DNA and its metabolism, and now embraces all those investigations that exploit the technology that has resulted from this work. Both disciplines aim to explain the behaviour of life-forms in molecular terms, and are so closely interrelated that separation is barely possible. It is inevitable that the content of this dictionary is to a degree arbitrary, but it is

hoped that all important aspects of these subjects have received consideration. The compilers have attempted to offer a broad coverage of terms encountered in the literature of biochemistry and molecular biology by including an appreciable number from cognate sciences. Although the compilation is designed primarily to serve readers of contemporary material, the needs of those who turn to older literature have also been borne in mind. Some of the entries thus have a historical flavour, some obsolete terms are included (e.g. *zymase*), and in some cases a historical approach has been used as the best means of presenting an explanation of a term, as for example in the case of the entry for *gene*. The value of a scientific dictionary is enhanced by inclusion of contextual information as well as mere explanations of meaning or terminology. This dictionary will be found to have some of the attributes of an encyclopedia, although the extent to which it veers in this direction has varied with the whim of its compilers. It is our hope that in a single volume the reader has easy access to basic definitions as well as a generous helping of other information.

In the present-day world, we are assailed by floods of 'information'. It has been suggested that the average weekday edition of a newspaper of record (e.g. *The New York Times*) provides more information than Shakespeare and his contemporaries would have acquired in a lifetime. With the availability of much information through the Internet, it may be asked whether a dictionary in paper form is actually necessary. In answer, we note that the Internet can be slow, and is not readily accessible in some parts of the world; the databases may be inadequate, and although usually very up-to-date, the high cost of their maintenance restricts them to specialized knowledge in a limited number of fields. Moreover, books have a quality of their own, which is enabling them to maintain their popularity. It appears that the increasing use of the Internet is actually paralleled by the rate of publication of printed dictionaries; in an information-hungry age, there cannot be too many sources of good-quality information.

We are deeply indebted to the Leverhulme Trust for the award of an emeritus fellowship to one of us (A. D. S.), to University College London, which has provided us with friends and expert colleagues, and to Dr O. Theodor Benfey, Dr Mary Ellen Bowden, and Professor Arnold Thackray, The Beckman Center for History of Chemistry, Chemical Heritage Foundation, Philadelphia, and Dr John Edsall, Harvard University for assistance with biographical data.

Particular thanks are due to Dr H. B. F. Dixon for much advice on nomenclature and related matters. Help on questions of

nomenclature from Dr G. P. Moss and Dr A. D. McNaught is also acknowledged. We are grateful to Dr D. H. Jenkinson for his help with the recommendations of the International Committee on Nomenclature in Pharmacology. We are also grateful for the valuable advice of Professor K. W. Taylor and Dr J. L. Crammer, on clinical topics, and Professor M. C. W. Evans, on plant biochemistry, and to Dr Margaret McKenzie, for reading the proofs.

During the earlier stages of the project, Mrs S. Gove gave much valuable assistance and Miss A. Straker was most helpful in suggesting terms for inclusion. We also wish to thank all those other friends and colleagues, in addition to those separately listed, who have unstintingly given us help and advice.

We are pleased to acknowledge the collaboration and material support given to us by Oxford University Press. We also acknowledge the very friendly cooperation of Market House Books, especially the patience and good humour of

Dr John Daintith through all the complications of the production. The copy editors, Robert Hine and Jane Cavell, made a number of helpful suggestions.

The compilers offer no apology for their failure to include many deserving terms in the dictionary, but would be pleased to have their attention drawn to errors and to receive suggestions for additional entries in any future edition.

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A. D. Smith, S. P. Datta, G. H. Smith, P. N. Campbell, R. Bentley, H. A. McKenzie

This whole book is but a draught—nay, but the draught of a draught. Oh, Time, Strength, Cash, and Patience.

Herman Melville (1851) *Moby Dick, or The Whale* (ed. T. Tanner, 1988, p. 147, Oxford University Press).

Note on proprietary status

This dictionary includes some words which are, or are asserted to be, proprietary names or trade marks. Their inclusion does not imply that they have acquired for legal purposes a non-proprietary or general significance, nor is any other judgement implied concerning their legal status. In cases where the editor has some evidence that a word is used as a proprietary name or trade mark this is indicated by the designation *proprietary name*, but no judgement concerning the legal status of such words is made or implied thereby.