

# CLINICAL CHEMISTRY



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**David White**

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## About the authors

**David White** was awarded a BSc in Chemistry and a PhD in Physiological Chemistry at the University of Birmingham. Following postdoctoral study at The Johns Hopkins Medical School in Baltimore, he pursued an academic career at the University of Nottingham where he was promoted to Associate Professor and Reader in Medical Biochemistry and awarded a DSc in 1998. Dr White has taught undergraduate courses to both bioscience and medical students, supervised many graduate PhD students, and been external examiner in Biochemistry at medical schools in the UK, the Republic of Ireland, and Libya. He was appointed Director of Academic Affairs at the University of Nottingham Graduate Entry Medical School in 2002.

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# PREFACE

The discipline of Clinical Chemistry has many aliases throughout the world, including Chemical Pathology, Medical Biochemistry, and different permutations of the terms clinical, medical, and biochemistry. Even within the departments in which it is a subdiscipline it may be known variously as Clinical Pathology, Blood Sciences, or—increasingly—Laboratory Medicine. Despite this slight identity issue, Clinical Chemistry is a strong discipline that underpins much of the diagnosis and monitoring of patients in modern health care systems. A good understanding of clinical chemistry and an awareness of its use in the management of patients are essential for both users and providers.

This text evolved from our combined experiences in the postgraduate teaching of Clinical Chemistry, using material from courses in biochemistry, physiology, and sub-specialties of medicine. Content has been expanded to include core subjects from the syllabuses of examinations for the Royal Colleges, particularly of the Royal College of Pathologists, and other graduate courses. The book is thus a suitable text for both undergraduate students of medicine and biosciences as well as for postgraduates undergoing professional training.

From the start, we wanted the book to be relevant to clinical practice, but also to include the core knowledge that enables the reader to see the full picture from first principles. Our extensive combined experiences both as full-time academics at the University of Nottingham (David and Danny) and as hospital consultants in Clinical Chemistry at the Chesterfield Royal and Royal Derby Hospitals (Paul and Nigel) have been equally valuable in enabling us to achieve these aims. The book contains many analytical and clinical practice points, distilled as “pearls of wisdom,” which are intended to be relevant on a day-to-day basis to people working (or wishing to work) in Clinical Chemistry. In addition, there are many case histories included that help to put the subject into its clinical context. We believe that inclusion of clinical cases in each chapter is essential to illustrate the way in which an understanding of the underlying basic science enables interpretation of laboratory data in real-life clinical practice. Each case is based on genuine data and scenarios that we have encountered in our laboratory and clinical services. These case histories have been found to be very popular with medical students, especially those undertaking case-oriented courses, such as the University of Nottingham’s Graduate Entry Medicine program in the UK.

In selecting topics for the book, we have sought to provide a varied yet comprehensive approach to Clinical Chemistry, with a mixture of chapters; some describe individual analytes, while others emphasize tissue integrity and function. In addition, we have included chapters on therapeutic drug monitoring, poisons, pregnancy, inborn errors of metabolism, and, importantly, immediate assessment of the critically ill patient. Clinical Chemistry, like any other discipline, is always developing, and we have tried to ensure that the book reflects current practice.

We have been very fortunate to work with many excellent academic, scientific, and clinical staff from the University of Nottingham and the Royal Derby and Chesterfield Royal Hospitals. Such good working interactions are vital in running successful Clinical Chemistry departments. We believe those working relationships have been reflected in how we have put Clinical Chemistry into context with the rest of medicine. Countless numbers of students have been through

our training courses, and many have gone on to become medical and scientific consultants. We hope that this book will enable a new generation of students to develop their careers, and hopefully some will become Clinical Chemists.

We are forever indebted to various members of staff at Garland Science for commissioning the book. The initial project would never have got off the ground without the continued “gentle” prompting and encouragement of our editor Liz Owen and, latterly, of our assistant editor David Borrowdale, whose tireless work, patience, and humor ensured the eventual delivery of the first set of draft chapters and who oversaw the rewriting following the comments of the reviewers. Matt McClements deserves credit for turning our self-made lecture slides into the full-color pictures presented here. We would also like to thank Georgina Lucas (Senior Production Editor) for typesetting of the book and delivery of the final product.

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David White, Nigel Lawson, Paul Masters, and Danny McLaughlin

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