

Preface

Telling first year life and health science students they have to study chemistry as part of their degree programme is often met with disillusionment or despair. To many the very word chemistry conjures up images of blackboards filled with mind-numbing facts and formulae, seemingly irrelevant to their chosen career paths. This textbook is our response to the very many students who plead with their tutors to 'please teach us what we need to know'. Rather than the simplistic interpretation of this statement as an indirect way of asking tutors to 'please tell us what's on the exam paper' we would see this as a more meaningful and reasonable request.

In recent years we have completely overhauled the way in which we teach bio-analytical chemistry. Taking a 'back to the drawing board' approach, we embraced the challenge of carefully considering the key aspects of chemistry every life and health scientist really needs to know. Our goal was to produce a stand-alone first year undergraduate module comprising a discrete series of lectures and practical classes, using relevant real-life examples to illustrate chemical principles and applications in action. This represented a radical departure from the former module in approach and content, and was extremely well received by students, with a marked improvement in student feedback and academic performance.

On reflection we are at a loss as to why it is tradition for life and health science students not to be introduced to the bioanalytical tools of their trade from the outset of their course. To us this is like teaching students the principles of computer science without actually introducing them to a computer and what it can do. With this in mind, we purposely chose to take an applied approach to chemistry, with an introduction to relevant methods and technologies up front, in order to familiarize students with these tools before they encounter and study them in more detail later in their courses.

Our message to students: To argue that life and health scientists don't need chemistry is like arguing that the world is flat. That is, as much as you might be convinced that it is the case, it does not mean that you are correct. Whether we like it or not, the fact is chemistry lies at the heart of the vast majority of scientific disciplines. Given this, it is pretty much impossible to expect that you will really grasp the fundamentals of core disciplines such as physiology, pathophysiology and pharmacology or be prepared for the diverse range of careers in the life and

health sciences without at least a basic knowledge of core chemical principles and applications. This book is designed to complement delivery of first year chemistry, focusing on bioanalytical techniques and their real world applications.

Our message to tutors: We know, we've been there; despite all your best efforts, enthusing life and health science students to study (never mind enjoy) chemistry is like trying to encourage a physicist to build a time machine. The task has not been made any easier by the stereotypical stodginess of chemistry, the expansive nature of the subject, or the encyclopaedic nature of the average chemistry textbook. To compound the problem, few academics in life and health science departments either choose or wish to teach chemistry. Often considered the 'poisoned chalice' and the fate of many an unsuspecting fresh-faced newcomer, effective teaching and learning of first year chemistry represents a considerable challenge.

We hope that you will find this book a useful approach to the subject of bioanalytical chemistry and that it will help raise awareness of the vast scope and topics encompassed in what is a rapidly expanding and advancing field. Moreover, we hope that studying the content of this book will provide a fundamental introduction to the tools adopted by life and health scientists in the evolving and exciting new age of 'omics', with the promise of personalized medicine and novel approaches to the screening, diagnosis, treatment, cure and prevention of disease.