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978-1-107-61588-5 - Physics, Pharmacology and Physiology for Anaesthetists: Key Concepts  
for the FRCA: Second Edition

Matthew E. Cross and Emma V. E. Plunkett

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# Physics, Pharmacology and Physiology for Anaesthetists

Key concepts for the FRCA

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Second edition

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Foreword to the second edition by

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It was with great sadness that we learned of the death of  
Dr Mark duBoulay shortly after the first edition of this book  
had gone to print. He is missed by many.

**MC & EP**

For Anna, Harvey and Fraser,  
a wonderful family

**MC**

For Mum and Dad. Thank you for everything.

**EP**

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Anaesthetics Department, Queen Alexandra Hospital, Portsmouth, UK

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Professor Peter Hutton PhD FRCA FRCP FIMechE  
Anaesthetics Department, University Hospital Birmingham, Birmingham, UK

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## Preface

In the years since the first edition of this book was published much has changed in the world of anaesthesia. Some of these changes relate to the way we practise as professionals and the way in which the evidence is shaping our knowledge in new areas. Other changes relate to the way in which anaesthetists in the United Kingdom progress through their training programmes. It is natural for the world around us to change in this way but, of course, it means that we have to continually reassess our practice, our knowledge and how that knowledge may best be applied.

Fortunately, the fundamental basic science principles that underpin much of anaesthesia have not changed to such an extent and so it is unlikely that you will suddenly be faced with the challenge of revising a newly discovered law of physics for the examination.

Where practice has changed, and where these changes have been incorporated into the syllabus of the Royal College, we have tried to reflect this in the latest edition. The second edition introduces applied physiology, more physical principles, fundamental biochemistry and many additional pages of information both in the body of the book and in the larger appendix. The layout and principles remain the same in that we hope you can use this book as a useful companion to explain some principles in a different way or to remind you of things that you will have read elsewhere. One thing that remains constant is that the FRCA examination is hard but fair. If you dedicate yourself to learning, absorbing and using all the information you need to be successful in the examination then you will emerge with the skills required to flourish in your profession. It is worth it and we hope this book can help you along the way.

Good luck in the examinations, by the time you read this the end is already in sight!

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## Foreword to the second edition

An understanding of physics, pharmacology and physiology is central to high-quality patient care. Grasping the key concepts is not optional: it is an essential cornerstone underpinning the frequent judgements that have to be made in everyday clinical practice.

Today, information is available from many sources: books, journals, the internet and podcasts. However, some of this is not written for the postgraduate student and a proportion is unfiltered and of uncertain provenance. Sorting the wheat from the chaff can be both time-consuming and frustrating, and not infrequently leaves the explorer less, rather than more, focused in their awareness of what really counts.

This book, written by two enthusiasts whose own experiences of postgraduate examinations is still within recent memory, is a considerable contribution to the resources of those preparing for postgraduate examinations in anaesthesia and intensive care. In terms of key subject areas, I cannot find anything included within it that is not essential and I can think of nothing excluded which is.

The text is clear and concise: the diagrams are immediately comprehensible but do not lack detail; the general presentation reflects good examination technique. The authors themselves recognize the need for more detailed companion texts where deeper study is necessary and have not tried to misrepresent their book's place in the wider armamentarium of the examinee.

What all examinees need as they study for, and approach, postgraduate examinations is a single reliable source of pre-prepared essential information that they can both carry with them and refer to with confidence. This book meets these two needs admirably. In addition, the text style demonstrates the way to convey information quickly but without unnecessary embellishment – the ideal method for a candidate to adopt.

In summary, I think this is a valuable second edition of a text that has already received a considerable following. The authors have done an excellent job; postgraduate trainees have available a book that 'does what it says on the can'; and examiners can look forward to future answers with that frequently elusive 'high signal to noise ratio'.

All I can do now is to wish both the authors and the readers the very best in their personal efforts to provide high-quality care for patients. This after all, is what medicine is all about.

**Professor Peter Hutton PhD FRCA FRCP FIMEchE**

Consultant Anaesthetist, University Hospital Birmingham

Honorary Professor, University of Birmingham

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## Foreword to the first edition

Many things are currently in a state of flux within the world of medical education and training, and the way in which candidates approach examinations is no exception. Gone are the days when large weighty works are the first port of call from which to start the learning experience. Trainees know that there are more efficient ways to get their heads around the concepts that are required in order to make sense of the facts.

It is said that a picture says a thousand words and this extends to diagrams as well. However, diagrams can be a double-edged sword for trainees unless they are accompanied by the relevant level of detail. Failure to label the axis, or to get the scale so wrong that the curve becomes contradictory is at best confusing.

This book will give back the edge to the examination candidate if they digest its contents. It is crammed full of precise, clear and well-labelled diagrams. In addition, the explanations are well structured and leave the reader with a clear understanding of the main point of the diagram and any additional information where required. It is also crammed full of definitions and derivations that are very accessible.

It has been pitched at those studying for the primary FRCA examination and I have no doubt that they will find it a useful resource. Due to its size, it is never going to have the last word, but it is not trying to achieve that. I am sure that it will also be a useful resource for those preparing for the final FRCA and also for those preparing teaching material for these groups.

Doctors Cross and Plunkett are to be congratulated on preparing such a clear and useful book – I shall be recommending it to others.

**Dr Tom E. Peck MBBS BSc FRCA**

Consultant Anaesthetist, Royal Hampshire County Hospital, Winchester, UK