

# Introduction to Human Nutrition

Second Edition

Edited on behalf of The Nutrition Society by

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# Series Foreword

The early decades of the twentieth century were a period of intense research on constituents of food essential for normal growth and development, and saw the discovery of most of the vitamins, minerals, amino acids and essential fatty acids. In 1941, a group of leading physiologists, biochemists and medical scientists recognized that the emerging discipline of nutrition needed its own learned society and the Nutrition Society was established. Our mission was, and remains, “to advance the scientific study of nutrition and its application to the maintenance of human and animal health”. The Nutrition Society is the largest learned society for nutrition in Europe and we have over 2000 members worldwide. You can find out more about the Society and how to become a member by visiting our website at [www.nutsoc.org.uk](http://www.nutsoc.org.uk)

The ongoing revolution in biology initiated by large-scale genome mapping and facilitated by the development of reliable, simple-to-use molecular biological tools makes this a very exciting time to be working in nutrition. We now have the opportunity to obtain a much better understanding of how specific genes interact with nutritional intake and other lifestyle factors to influence gene expression in individual cells and tissues and, ultimately, affect our health. Knowledge of the polymorphisms in key genes carried by a patient will allow the prescription of more effective, and safe, dietary treatments. At the population level, molecular epidemiology is opening up much more incisive approaches to understanding the role of particular dietary patterns in disease causation. This excitement is reflected in the several scientific meetings that the Nutrition Society, often in collaboration with sister learned societies in Europe, organizes each year. We provide travel grants and other assistance to encourage students and young researchers to attend and participate in these meetings.

Throughout its history a primary objective of the Society has been to encourage nutrition research and to disseminate the results of such research. Our first journal, *The Proceedings of the Nutrition Society*, recorded, as it still does, the scientific presentations made to the Society. Shortly afterwards, *The British Journal of Nutrition* was established to provide a

medium for the publication of primary research on all aspects of human and animal nutrition by scientists from around the world. Recognizing the needs of students and their teachers for authoritative reviews on topical issues in nutrition, the Society began publishing *Nutrition Research Reviews* in 1988. In 1997, we launched *Public Health Nutrition*, the first international journal dedicated to this important and growing area. All of these journals are available in electronic, as well as in the conventional paper form and we are exploring new opportunities to exploit the web to make the outcomes of nutritional research more quickly and more readily accessible.

To protect the public and to enhance the career prospects of nutritionists, the Nutrition Society is committed to ensuring that those who practice as nutritionists are properly trained and qualified. This is recognized by placing the names of suitably qualified individuals on our professional registers and by the award of the qualifications Registered Public Health Nutritionist (RPHNutr) and Registered Nutritionist (RNutr). Graduates with appropriate degrees but who do not yet have sufficient postgraduate experience can join our Associate Nutritionist registers. We undertake accreditation of university degree programs in public health nutrition and are developing accreditation processes for other nutrition degree programs.

Just as in research, having the best possible tools is an enormous advantage in teaching and learning. This is the reasoning behind the initiative to launch this series of human nutrition textbooks designed for use worldwide. This was achieved by successfully launching the first series in multiple languages including Spanish, Portuguese and Greek. The Society is deeply indebted to Professor Mike Gibney and his team of editors for their tireless work in the last 10 years to bring the first edition of this series of textbooks to its successful fruition worldwide. We look forward to this new edition under the stewardship of Dr Susan Lanham-New in equal measure. Read, learn and enjoy.

Professor Ian McDonald  
*President of the Nutrition Society*

# Preface

The Nutrition Society Textbook Series started ten years ago as an ambitious project to provide undergraduate and graduate students with a comprehensive suite of textbooks to meet their needs in terms of reference material for their studies. By all accounts the project has been successful and the Nutrition Society Textbook Series have been adapted by all of the best academic nutrition units across the globe. The series has been translated into Spanish and Portuguese.

This second edition of *Introduction to Human Nutrition* is an update of the very basic foundations for the study of human nutrition. Although little has changed, all authors have made whatever updates are necessary and we have made some re-arrangements of some chapters. The study of human nutrition at universities across the globe is rapidly expanding as the role of diet in health becomes more evident. Indeed, the sequencing of the human genome has highlighted the narrower range of genes controlling human biology, emphasising the critically important role of the environment including diet in human health. Moreover, we now recognize the important role that diet plays in interacting with our genome both *in utero* and in the immediate period of post natal development.

The study of human nutrition needs a solid base in the physiology and biochemistry of human metabolism and that is the basis of the textbook *Nutrition and Metabolism*. The present textbook is designed to serve two needs. Firstly, many will use this book as an introduction to human nutrition and go no further. Students in pharmacy, food science, agriculture and the like may take introductory modules to human nutrition and leave the subject there but be well informed in the area. Those who will go on to study human nutrition will find within this textbook an introduction to the many areas of diet and health that they will go on to study in greater depths using the remaining textbooks in the Nutrition Society series. Besides the basic biology, students will be introduced to the concept of food policy and to the dual challenges to the global food supply, both over and under nutrition.

As I write, I am handing over the leadership of the Nutrition Society Textbook Series to Dr Susan Lanham-New at the University of Surrey who has agreed to take on this important task for the Society. I would like to thank all those with whom I have worked with on this project and to wish Sue and her new team all the very best.

Michael J Gibney

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