

The 6th International Tutorial Conference of the Research Group on the Biochemistry of Exercise, a collaboration between the Nutrition Toxicology and Environmental Research Institute Maastricht and the Nutrition Society was held in Maastricht, The Netherlands on 18–21 February 1999

Symposium on ‘Metabolic aspects of human nutrition at rest and during physical stress; recent methodological and technical developments’

Introduction

The Research Group on the Biochemistry of Exercise consists of about twenty-five established scientists who as a group try to stimulate research into the benefits of exercise for human health and well-being, and who by this means try to generate the science-based evidence that exercise for many reasons should be part of our day-to-day life. Since 1968 the group has stimulated local organizations throughout the world to organize ten general international conferences and six tutorial conferences on specialized topics. These meetings can be regarded as the most prestigious scientific gatherings in the field of exercise biochemistry, physiology and metabolism. The main aim of the 6th Tutorial Conference was to give an update on the methods that are presently in use to investigate and quantify human metabolism *in vivo*. As this topic is of interest to a much broader community than those with an interest in exercise only (nutrition, metabolic drugs, trauma or sepsis, obesity and type 2 diabetes all influence human metabolism in addition to and in combination with exercise), the Nutrition Society was most pleased to co-organize this meeting as part of their wish to participate in European meetings and stimulate scientific education outside the UK. The Nutrition Society is an established academic organization in the UK with about 1000 members. The Nutrition Society organizes many meetings and high-quality educational symposia in the area of nutrition and metabolism in the UK every year.

An update of the methodology in use to investigate human metabolism was considered to be an important topic, as research questions and hypotheses can only be answered and checked when the right methodology is chosen with the required validity and precision. Methods as such are the most important tools in the hands of the young scientist, but regretfully most of the knowledge and expertise is present in the heads of experienced users and has never been put on paper. Twenty-one presentations were therefore given by worldwide experts in the respective fields in a 4 d programme. Most of the speakers have many decades of experience and either were the founders of these methodologies or the first-generation students. The topics dealt with included magnetic resonance imaging and spectroscopy, arterio-venous difference and blood-flow methodology,

microdialysis, stable-isotope tracers to investigate whole-body and tissue metabolism, and finally methods in use to assess free radical and antioxidant activity in human subjects at the whole-body and tissue level. Skeletal muscle and adipose tissue were the central tissues in most presentations, as they are central both in exercise and nutrition research, and because derangements in their metabolism play an important role in the development of obesity, type 2 diabetes and cardiovascular disease. Most of the speakers in their presentations focused on the strengths of the respective methodologies. However, each presentation was followed by extensive discussions on the individual papers and general discussion sessions to summarize the strengths of the methods and also highlight the weaknesses and limitations of the methods. Young scientists should realize not only how beautiful and powerful these techniques are or can be in order to further our present knowledge, but maybe more importantly they should also know the limitations, as otherwise experiments planned in the future may not bring the required or expected answers. Furthermore, interpretations and physiological messages may be published that are not based on sound data and hard evidence. All the speakers worked hard both before and after the meeting to write comprehensive reviews on what they know on the use of those methods they have used in their laboratory for many years. This volume of the *Proceedings of the Nutrition Society* therefore contains a valuable collection of peer-reviewed and edited expert accounts on these methodologies, which we hope will be a valuable support for young scientists and others who want to start metabolism research in human subjects, or for those who want to critically evaluate the current literature and the methodology in use in their own and other laboratories. The most important message that you may learn is that whatever method you plan to use, you have to validate it adequately and that you have to make estimates of the CV of the physiological process that you want to quantify (particularly in cases where it depends on mathematical models and multi-variable calculations) before you start to make real-life measurements in an applied study. Currently, time and money restraints and the wish of funding organizations to see only applied measurements often leads to publications

using new unvalidated methods. It is our common responsibility to stop such practises as soon as possible, as they are incompatible with the main aim that we all have, that is to further our knowledge and make scientific progress.

Apart from the main papers, thirty-one peer-reviewed and edited abstracts have been presented at the meeting by young active scientists presenting the latest developments or recent applications of methods that were not covered by the invited speakers. We hope that in this issue of the *Proceedings of the Nutrition Society* you will find all the information that you need, and that you will use this collection of papers and abstracts as a reference work on the methodology in use to investigate human metabolism *in vivo* at the turn of the millennium.

The enthusiasm of the students and speakers at the meeting has taught us that human metabolism is as alive as ever, and that there is a vast interest both in the use of the present methods and development of new ones. We hope that this enthusiasm conveys a clear message to research funding organizations and research policy makers, both in universities, in governmental organizations and within industry, that we need these traditional methodologies in addition to molecular biology in order to advance our knowledge in this field. Admittedly, molecular biology provides a number of new useful methodologies and techniques and is contributing important insights, but the area has attracted too much priority in recent years, often at the expense of the other methods that were covered at this meeting. In the end we will always need to be able to quantify the end result of the adaptation to important lifestyle changes such as regular exercise and healthy nutrition by quantifying human metabolism *in vivo*.

Last but not least I wish to thank the Research Group for bringing this Meeting to Maastricht, and the Nutrition Society for their active input into the scientific programme and organization and their valuable help with the publication of the meeting report, which lies in front of you now. A special thanks also to the Nutrition Society (UK) and the Physiological Society (UK) for bringing many young enthusiastic students to Maastricht. A meeting on methodology even more than others depends on sponsorship, as such meetings attract limited numbers of extremely interested attendants (about 220). Thanks, therefore, to the main sponsors (Isostar Sport Nutrition Foundation, Roche Vitamins Europe Ltd, Mars Incorporated, Novartis Nutrition Ltd) and the smaller sponsors for giving us this unique opportunity to express and formulate consensus opinions on methodology. Thanks to the speakers for their excellent presentations that ensured the success of the meeting, and to the delegates from all over the world that attended the meeting. My final and most important thanks go to the organization committee (Fred Brouns, chairman and Martina Brouns, the 'lady in charge') who, supported by collaborators from my own institute NUTRIM (Nutrition and Toxicology Research Institute Maastricht) and by students, worked tirelessly to make sure that everything ran smoothly.

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