Nutrition and Critical Care
This book is dedicated to Bernard Beaumée, Chris Pennington, Peter Reeds and Arvid Wretlind who contributed greatly to this field and passed away during 2002.
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Nutrition and Critical Care

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Preface

Over the past 30 years, nutritional support has evolved tremendously. While the beneficial effects of nutritional support have been demonstrated in specific types of patients (e.g. burns, trauma, postoperative cancer resection), it has been difficult to document improved outcomes in less homogenous populations. Intensive care unit (ICU) patients, due to their intense injury stress response, have the potential to benefit most from nutritional support. On the other hand, ICU patients, because of the complexity of their underlying diseases, are especially vulnerable to develop nutritional support-related complications. Despite considerable progress in understanding the optimal route of administration as well as the qualitative and quantitative needs of ICU patients, a lot of controversies and uncertainties exist. In fact, the exact pathophysiologic mechanisms that drive the injury stress response in ICU patients is still a subject of intense research. Over the last decade, a variety of pro- and anti-inflammatory mediators (reactive oxygen metabolites, cytokines, prostaglandins, and nitric oxide) have been identified that modulate hormonal control of nutrient flux. Most recent genomic research has identified a gene polymorphism that results in patients producing different levels of mediators following the same insult. In some, this causes dysregulation of the injury stress response which contributes to adverse outcomes.

This issue is not theoretical, but has important therapeutic implications. A variety of nutritional interventions (e.g. ‘immune enhancing diets’, β-blockers, antioxidants, and growth hormone) that modulate the immune-neuro-endocrinologic response to stress are being tested (by necessity in homogenous study populations) and are showing promising results. However, if they are truly modulating the injury stress response, it is quite conceivable that these therapies will be harmful in different subsets of critically ill ICU
patients. Obviously, continued epidemiologic study of high risk patients is needed and new risk factors need to better characterized (e.g. the epidemic of obesity).

Since qualitative and quantitative requirements in critically ill ICU patients are different from normal ones, and since nutrition is emerging as an effective intervention in ICU patients, we have to look at nutrients as drugs. This means, for instance, the choice of lipids or specific amino acids (certain being immunostimulating while others might depress immunity), the avoidance of iatrogenic hyperglycemia or the intake of micronutrients must be carefully examined. Also, dose-ranging studies should be considered. Finally, knowledge of the pharmacokinetics of nutrient provided by the enteral or parenteral routes is essential.

The current era of molecular biology offers the potential to truly understand the driving mechanisms of the stress injury response. However, to maximally benefit our patients, translational research cannot be underemphasized. Also, we need to be pragmatic: excellent products disappear from the market if they are not tolerated by our patients. Moreover, we need to take advantage of the expertise of other practitioners who have interests similar to ours. National and international experts have written guidelines and consensus reports in recent years. These documents have been studied in depth resulting in a synthesis presented in the last chapter of this book. In sum, we feel that the chapters of this book and the attached discussions well reflect the outstanding meeting that we had near Paris in September 2002. This book should be of great interest and helpful to everyone working in the field. Good readings!

Luc A. Cynober, Frederick A. Moore
Severe metabolic alterations frequently occur in critically ill patients. If nutrition plays an important role in critical care, what are the needs for critically ill patients? Are the requirements organ- and/or age-specific? What is the best route of administration in artificial nutrition? If enteral, what exactly does the gut tolerate? In order to answer these questions and to further understand the pathogenesis of and the therapeutic implications for certain diseases, such as pancreatitis, multiple organ failure and sepsis, the topic ‘Nutrition and Critical Care’ was chosen for this Workshop, which took place near Paris in September 2002.

I sincerely thank the two chairmen, Prof. Luc Cynober and Prof. Frederick Moore, both outstanding experts in this field, for establishing the program and inviting as speakers the opinion leaders in the experimental and clinical field of nutrition in critically ill patients suffering from various diseases. Scientists from 20 countries contributed to the discussions that are also published in this book.

Furthermore, I would like to express my gratitude to Mrs. Isabelle Babin, Dr. Franck Arnaud-Battandier and their team from Nestlé France who provided the logistical support and their legendary French hospitality. Dr. Philippe Steenhout from the Nutrition Strategic Business Division in Vevey, Switzerland, was responsible for the scientific coordination. His cooperation with the chairpersons was essential for the success of this Workshop.

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