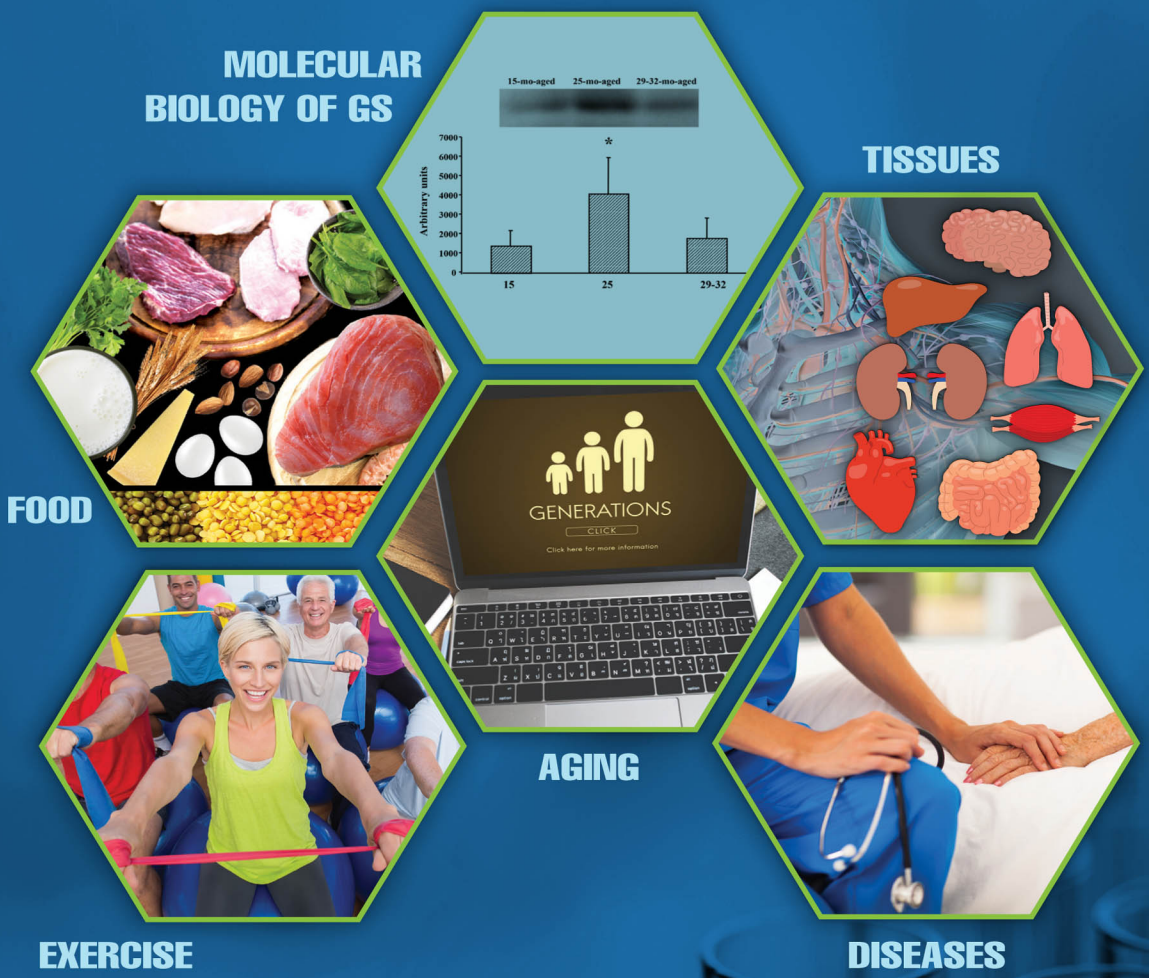
Glutamine

Biochemistry, Physiology, and Clinical Applications



Edited by
Dominique Meynial-Denis

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This book is dedicated to the memory of Dr. Maurice Arnal and Professor Bernard Beaufrère. Gifted with imagination and vision and exemplars of scientific rigor, both were renowned scientists in the field of amino acid and protein metabolism, to which they made outstanding contributions. In spirit they were humanists and at all times retained a sense of humility. In 1992, Dr. Arnal created the Human Nutrition Research Center in Clermont-Ferrand, which is now one of the most active in France. Professor Bernard Beaufrère joined Dr. Arnal's project to become assistant director and then director until his untimely death in 2002.

For me, it was a privilege and a pleasure to work with two men of such exceptional qualities and throughout my career as a scientist I have attempted to apply their high standards to all areas of my work.

Contents

Preface xi
Editor xiii
Contributors xv
Introduction: The Magic of a Marvelous Amino Acid—Glutamine xix

SECTION I Basics of Glutamine Metabolism

Chapter 1 An Introduction to Glutamine Metabolism 3
Vinicius Fernandes Cruzat and Philip Newsholme

SECTION II New Data on the Biochemistry of Glutamine

Chapter 2 Intestinal Glutamine Synthetase Colocalizes with Goblet Cells and Decreases Enterocyte Proliferation 21
Theodorus B.M. Hakvoort, Youji He, Irene van Herk, Jacqueline L.M. Vermeulen, Jan M. Ruijter, and Wouter H. Lamers

Chapter 3 Glutaminase Isoforms and Glutamine Metabolism 31
Norman P. Curthoys

SECTION III Molecular and Cellular Aspects of Glutamine Metabolism

Chapter 4 Importance of Glutamine to Insulin Secretion, Insulin Action, and Glycemic Control 49
Gaewyn Ellison, Cyril Mamotte, Vinicius Fernandes Cruzat, and Philip Newsholme

Chapter 5 Glutamine and Autophagy 69
Rolf Gebhardt

Chapter 6 Regulation of Hepatic Glutamine and Ammonia Metabolism by Morphogens 83
Madlen Matz-Soja, Jan Böttger, and Rolf Gebhardt

SECTION IV Glutamine, the Brain and Neurological Diseases

Chapter 7 Brain Glutamine: Roles in Norm and Pathology 97
Jan Albrecht, Monika Szeliga, and Magdalena Zielińska

Chapter 8 Brain Glutamine Accumulation in Liver Failure: Role in the Pathogenesis of Central Nervous System Complications 111
Roger F. Butterworth and Chantal Bemeur

Chapter 9 Glutamate/Glutamine Cycle: Evidence of Its Role in Parkinson's Disease Using *In Vivo* MRS Techniques 119
Carine Chassain, Guy Bielicki, Jean-Pierre Renou, and Franck Durif

SECTION V Glutamine and the Intestinal Tract

Chapter 10 Glutamine and Intestinal Physiology and Pathology 137
François Blachier, Moïse Coeffier, Wei-Yun Zhu, Chunlong Mu, Yuxiang Yang, Guoyao Wu, Xiangfeng Kong, Antonio Lancha Jr., Mireille Andriamihaja, Daniel Tomé, and Yulong Yin

Chapter 11 Glutamine: General Facilitator of Gut Absorption and Repair..... 149
Essam Imseis, Yuying Liu, and J. Marc Rhoads

Chapter 12 Therapeutic Role of Glutamine in Inflammatory Bowel Disease..... 165
Hongyu Xue and Paul Wischmeyer

SECTION VI Glutamine and the Catabolic State: Role of Glutamine in Critical Illness During Childhood

Chapter 13 Glutamine in the Critically Ill Neonate..... 185
Nan Li, Liya Ma, and Josef Neu

SECTION VII Glutamine and the Catabolic State: Role of Glutamine in Critical Illness from Adulthood

Chapter 14 Rationale for and Efficacy of Glutamine Supplementation in Critical Illness..... 195
Christina C. Kao and Farook Jahoor

Chapter 15 Role of Glutamine Oxidative Injury Pathways in Critically Ill Patients 207
Kaushik Mukherjee, Addison K. May, and Naji N. Abumrad

Chapter 16 Glutamine Supplementation in Critical Illness: Clinical Endpoints 223
Marie Smedberg and Jan Wernerman

Chapter 17 Glutamine Supplementation in Critical Illness: Action Mechanisms 233
Moïse Coëffier and Pierre Déchelotte

Chapter 18 Glutamine Supplementation in Critical Illness: Focus on Renal Injury 243
Giacomo Garibotto, Alice Bonanni, Giacomo Deferrari, and Daniela Verzola

SECTION VIII Glutamine and the Catabolic State: Role of Glutamine in Cancer

Chapter 19 Glutamine Transport and Metabolism in Cancer 259
Barrie P. Bode

Chapter 20 Glutamine as a New Therapeutic Target in Cancer: Use of Hyperpolarized Magnetic Resonance Spectroscopy 281
Dominique Meynial-Denis and Jean-Pierre Renou

SECTION IX Glutamine, Immunity, and Exercise

Chapter 21 Glutamine and the Immune System 293
Luise V. Marino and Philip C. Calder

Chapter 22 Glutamine and Exercise and Immune System 315
Marcelo Macedo Rogero and Ronaldo Vagner Thomatieli dos Santos

Chapter 23 Role of Glutamine in Exercise-Induced Immunodepression in Man 333
Lindy Castell and Natalie Redgrave

SECTION X Glutamine and Aging

Chapter 24 Glutamine Metabolism in Old Age 347
Dominique Meynial-Denis

SECTION XI Conclusion

Chapter 25 Sum Up and Future Research 367
Dominique Meynial-Denis

Index 373

Preface

This book gathers advanced expertise on the most significant aspects of glutamine metabolism and its health implications. Its aim is to present fully up-to-date coverage of research in this field.

This book is didactically orientated and addressed to nutritionists with a research interest in amino acids, glutamine, or catabolic states; graduate students in nutrition; medical students and postdoctoral researchers in nutrition, biology, and medicine; dieticians and pharmacists looking for a comprehensive update on glutamine; and clinicians with an interest in catabolic states and/or artificial nutrition. Readers will be interested in finding out about experimental research in the most advanced areas of glutamine metabolism, and in its designation as conditionally essential, as a regulator of cellular function, as a therapeutic nutrient to improve mucosal recovery in the intestine during certain diseases or aging, as a potential adjuvant in patient therapy, and as a potential metabolic target in cancer therapy and imaging.

Such a book can only come into being through the efforts of many people. I would like to acknowledge the efforts of the contributors who enthusiastically accepted to participate in this project and for their understanding and willing cooperation during the preparation of this book. I must also thank Morey Haymond for readily agreeing to write the introduction. I am deeply grateful to Maurice Arnal, without whose initial efforts and foresight, this book would never have gotten off the ground. His help and support throughout my career and up to his death in 2000 was invaluable. I am greatly indebted to Bernard Beaufrère who believed in me and gave me the confidence to take up research. My thanks go to Philip Calder, a firm supporter who was instrumental in turning my thoughts on glutamine metabolism into a book. I would like to thank Kevin Brindle for critically reading the manuscript and providing valuable comments to improve the relevance of the chapter on the use of hyperpolarized ^{15}N glutamine as a new therapeutic target in cancer. I would like also to thank Marc Ferrara, director of the Human Nutrition Unit to which I belong, who allowed me to embark on this project. I am grateful to Blandine Tamboise, for secretarial assistance in the preparation of this book. Finally, I would like to thank my husband, Christian, and my daughters, Audrey-Marie and Marie-Anaïs, for their total support and their patience during the hours I spent at my computer and not with them.

Dominique Meynial-Denis
Clermont-Ferrand, France

Editor

Dominique Meynial-Denis studied biochemistry and molecular biology at the University Paul Sabatier of Toulouse, France and earned her PhD on intermolecular interactions between drug and plasma proteins using magnetic resonance spectroscopy (MRS) at the same University in 1985. Since 1986, she has worked as a scientist at the National Institute of Agricultural Research (INRA) in Clermont-Ferrand in the Department of Human Nutrition. She began specialist research into sarcopenia and aging in 1994. She applied MRS in work on metabolic pathways of amino acids in muscle during aging. Meynial-Denis earned a second PhD in 1998 on amino acid fluxes throughout skeletal muscle during aging. More recently, her main interest has been the effect of glutamine supplementation in advanced age. She is a member of the Société de Gérontologie et de Gériatrie (SFGG), of the International Association of Gerontology and Geriatrics (IAGG), of the Société Française de Nutrition Entérale et Parentérale (SFNEP), of the Société Européenne de Nutrition Clinique et Métabolisme (ESPEN), and of the Société Française de Nutrition (SFN). She is a regular referee for different international nutrition journals. As an editor of books that give an overview of latest scientific findings from recognized international experts she aims to enhance the status of research in the field.