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## Carnitine – Its Role in Lung and Heart Disorders



Proceedings of a Satellite Symposium on the Occasion of the  
Central European Congress for Anesthesiology (ZAK), Graz (Austria),  
September 13, 1985

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# Carnitine – Its Role in Lung and Heart Disorders

Editors

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## Contents

|  |      |
|--|------|
| Preface.....   | VI   |
| List of Contributors .....   | VIII |
| <i>Carnitine</i>   |      |
| <i>Lohninger, A.; Kaiser, E.; Legenstein, E.; Staniek, H.</i> (Vienna): Carnitine, Metabolism and Function .....   | 1    |
| <i>Carnitine in Lung Disorders</i>   |      |
| <i>Mitzner, W. A.</i> (Baltimore, MD): The Physiology and Pathology of Respiration: Factors Affecting the Stability of the Lungs .....   | 26   |
| <i>Clements, J. A.</i> (San Francisco, CA): Structure-Function Relationships in Lung Surfactant .....  | 44   |
| <i>Pauser, G.; Lohninger, A.; Linhart, L.; Kaiser, E.</i> (Vienna); <i>Mutz, N.; Benzer, H.</i> (Innsbruck): Carnitine and Lung Lavage Dipalmitoyl Phosphatidylcholine in War-Gas Injured Patients .....   | 55   |
| <i>Lohninger, A.</i> (Vienna); <i>Krieglsteiner, H.-P.</i> (Bonn); <i>Salzer, H.</i> (Vienna); <i>Erhardt, W.</i> (Munich); <i>Kaiser, E.</i> (Vienna): Role of L-Carnitine in Perinatal Metabolism and Effects of L-Carnitine Administration on Dipalmitoyl Phosphatidylcholine Content in Fetal Rat Lungs and Human Amniotic Fluid ..... | 66   |
| <i>Carnitine in Heart Disorders</i>  |      |
| <i>Liedtke, A. J.</i> (Madison, WI): Metabolism of the Ischemic Heart: Alterations in Fatty Acid Intermediates and Role of Carnitine .....   | 100  |
| <i>Spieckermann, P. G.; Hütter, J. F.</i> (Vienna): Special Aspects of Myocardial Energy Metabolism .....  | 112  |
| <i>Senekowitsch, R.</i> (Munich); <i>Lohninger, A.</i> (Vienna); <i>Kriegel, H.</i> (Munich); <i>Staniek, H.</i> (Vienna); <i>Krieglsteiner, H.-P.</i> (Bonn); <i>Kaiser, E.</i> (Vienna): Protective Effects of Carnitine on Adriamycin Toxicity to Heart .....   | 126  |
| Subject Index .....  | 138  |

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## Preface

Eighty years ago the presence of carnitine was first described in extracts from beef muscle. About 20 years later its chemical structure was established by Japanese investigators. In the early 1950's carnitine was shown to be an essential nutrient in the diet of the yellow meal worm *Tenebrio molitor*, and thus called vitamin B<sub>T</sub> for its water solubility.

The interest in carnitine research has been highly stimulated by the findings of Fritz in 1959, showing its importance in the metabolism of fatty acids. Since this discovery, the role of carnitine in the oxidation of long chain fatty acids by several organs has been thoroughly investigated. It is now well established that carnitine is responsible for the transport of long chain fatty acids through the inner mitochondrial membrane to ensure oxidation of fatty acids in the mitochondrial matrix. When carnitine is lacking, an inhibition of fatty acid oxidation diverts fatty acid from oxidation to esterification, resulting in an accumulation of long-chain acylcoenzyme A and triglycerides in the cell.

Considerable interest in carnitine and its metabolism has been created by reports of cases of primary genetic carnitine deficiency and clinical states associated with secondary carnitine deficiency. Carnitine deficiency states can arise from a defective intestinal absorption or a defect in endogenous carnitine biosynthesis. In addition, deficiency states are due to increased renal loss of carnitine or to alterations in cellular transport, affecting uptake or release of carnitine from tissues.

Animal experiments have demonstrated that carnitine application has favorable effects on numerous pathological conditions called forth by carnitine deficiency. These observations and the absence of toxic actions of carnitine administration have initiated a series of successful trials in

man. It is evident from the important involvement of carnitine in fatty acid metabolism that its availability in sufficiently high amounts is essential in those organs in which fatty acids are either the main metabolic fuel, or in those tissues in which the biosynthesis of physiologically important lipids takes place at high rates (i.e. heart and lung).

It is the aim of this book to accentuate the role of carnitine in lung and heart metabolism, and to initiate some new possible therapeutic applications of carnitine in man, on the basis of updated information on the theoretical background of lung and heart functions and metabolism. The papers were first presented at the symposium 'Carnitine in Heart and Lung Disorders' in Graz in September 1985.

We wish to express our sincere thanks to all participants of the Symposium who presented most stimulating lectures and who were willing to prepare a manuscript. In addition, we want to thank Dr. List, President of the European Congress of Anesthesiology, for the permission to include the symposium into the program. We are equally grateful to Leopold Inc., Graz (Austria), for sponsoring this symposium, and to Dr. Schaupp, Mrs. Legenstein and Mrs. Lohninger for their invaluable assistance in arranging this symposium and preparing this book.

Vienna, April 1986

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