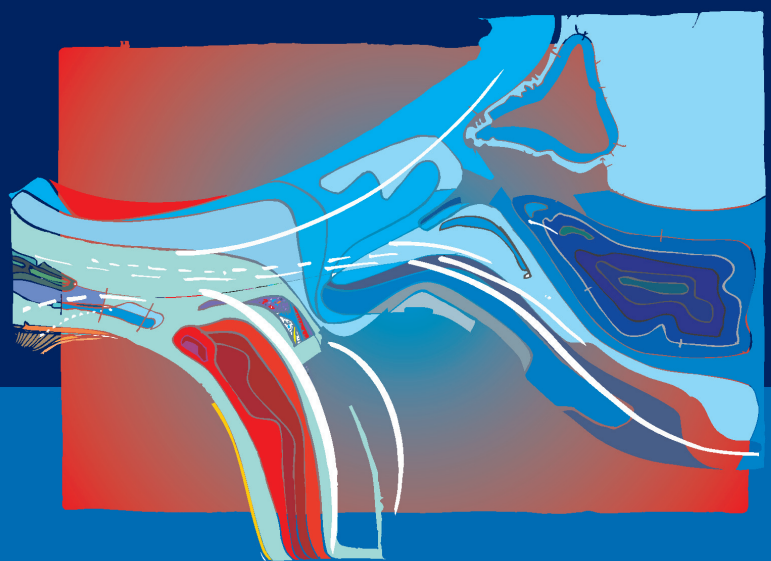
Emil MONOS

PHYSIOLOGY OF THE VENOUS SYSTEM



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PHYSIOLOGY OF THE VENOUS SYSTEM

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PREFACE

This university booklet written by Professor Emil Monos, revised from its first edition published in 1999, indeed represents an authoritative monograph of the physiology of veins. It is a unique and welcome contribution to our understanding of the physiology and pathophysiology of the venous component of the circulation. The extent to which the veins of the circulation have been neglected in the era of modern science is rather remarkable given their fundamental importance in the overall control of capillary filtration, blood volume distribution, and cardiac output of mammalian organisms, particularly in upright human subjects. Despite the explosive interest in vascular biology over the past 20 years stimulated by endothelial biology, one can find virtually no current monographs that specifically address the venous circulation. Indeed, to learn about the physiology of veins one must turn to superficial descriptions of the venous circulation provided by standard medical textbooks of physiology. To find monographs dedicated to veins, it is necessary to go back as early as those written by Kenneth J, Franklin, "A Monograph on Veins" published in 1937 by C. C. Thomas (Springfield, Ill) and "A Primer of Venous Pressure" by George E. Burch, M. D., published in 1950 by Lea & Feginger (Philadelphia, Pa.).

In the present monograph, Professor Monos brings together a lifetime of research experience and a consolidation of the literature specific to the physiology of the venous system that can currently be found in no other place. He succinctly reveals the challenges and complexities of studying veins and their function (such as their elliptical shapes requiring more complex hemodynamics and many other issues), while explaining both the theoretical and practical aspects of venous function. Such an accomplished description by Professor Monos

is presented with the great clarity and simplicity that could only be achieved after years of teaching this subject to medical and graduate students along with a deep understanding of venous function.

Professor Monos is to be congratulated for developing not only an authoritative booklet that will be of great interest to professional physiologists, but also an interesting and very readable text full of important examples of what happens in pathological states of venous dysfunction. The booklet is organized in a way that first presents the clinical relevance and manifestations of chronic venous disease and proceeds to developing the underlying structural and functional characteristics of veins and venules that determine the unique hemodynamic characteristics of venous pressures and flows and the regulation of these vessels. The functional relevance of the veins as they impact upon venous return of blood to the heart, and ultimately cardiac output control, is developed and the principles are used to explain how the veins participate to maintain the return of blood to the heart in the face of gravity in the upright (orthostatic) posture. The role of post-capillary venules in determining post-capillary resistance and filtration/reabsorption within organs is briefly emphasized. The passive biomechanics of veins are covered in considerable depth given the great functional importance of these aspects of the venous circulation. As the monograph progresses, a wonderfully integrated and coherent description of venous function is developed from the subcellular levels to control mechanisms at organ and organism levels, from theoretical aspects of the biomechanics of veins to the practical aspects of maintaining normal venous function. The broad area related to the synthesis and function of bioactive substances in the venous walls and the role of these substances in controlling venous tone is nicely summarized. So too are the functions of veins in special regions of the body such as the facial vein (e.g. thermal regulation), intracranial veins (e.g. buffer function of intracranial pressure), the subcutaneous venous plexes (e.g. thermoregulation), the portal circulation), and veins of other regions.

In this preface I wish to emphasize the significance of a subject whose awareness has received inadequate attention in the medical literature. This well written monograph by Professor Monos simultaneously provides both an introduction to the subject of the physiology

of veins, as well as a comprehensive review that will be of great interest to even experts in the field of cardiovascular physiology. Such a learned treatise on the veins fills an important gap in the current medical literature.

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11.0. Bibliography

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Semmelweis Kiadó

Emil Monos

(born 1935, Hungary) studied at the Semmelweis Medical University, Budapest, and he received his MD in 1959. Since then he has consistently worked at this institution, presently called Clinical Research Department and Institute of Human Physiology, Faculty of Medicine, Semmelweis University, Budapest. He obtained his PhD and DMSci in physiology at the Hungarian Academy of Sciences in 1974 and 1982, respectively. He was appointed full professor in 1983. Dr. Monos was director of the Institute (1990-2000) and deputy-rector of the University (1995-1999). Since 1989 he has been an adjunct professor of physiology at the Department of Physiology, Medical College of Wisconsin (Milwaukee, USA), where he worked as a visiting professor for more than two years. He teaches medical physiology in Hungarian and in English for graduate and post-graduate students in medicine, pharmacy, dentistry, and biomedical engineering. Dr. Monos is author and co-author of eight books and more than 450 articles in the fields of cardiovascular physiology and pathophysiology, neuroendocrinology, neurophysiology, behavioral physiology, biomedical engineering, and history of physiological sciences. He is editor-in-chief of the Acta Physiologica Hungarica, and serves on the editorial board of a number of scientific journals. He was Secretary-General (1982-1990) and President (1990-98) of the Hungarian Physiological Society. As Congress President, he organized the 4th International Congress of Pathophysiology in Budapest (2002), since than he was the President of the International Society for Pathophysiology up to 2006, and Past-President since then for four years. He is a full member of the American Physiological Society, elected member of the Academia Europaea, the Academia Scientiarum et Artium Europaea, and the European Academy of Sciences. A number of university and governmental honors have been conferred upon him. Dr. Monos and his co-workers have discovered important mechanisms operating in physiological control of arterial hemodynamics and the blood vessel functions, including myogenic capacity autoregulation and other local control mechanisms of veins. His present research interests are in the physiological control of orthostatic tolerance and the adaptation of extremity vessels as well as the whole circulatory system to long-term and intermediate-term gravitational stress. Since 2005 he has been an emeritus professor of physiology at the Semmelweis University.

This university booklet is a revised 2nd edition of the first one published in 1999. It is recommended to university students in medicine, in pharmacy, in health sciences, in biomedical engineering, and in PhD curses, as well as to all of those who are interested in the physiological functioning of a rather neglected but very important part of the cardiovascular system: the venous blood vessels.

12.0. Index

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13.0. Acknowledgements

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