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Sommario/riassunto

The mechanisms and physiological functions of urea transport across biological membranes are subjects of long-standing interest. Recent advances in the molecular biology and physiology of urea transport have yielded new insights into how and why urea moves across cell membranes. In the last two decades, seven facilitated urea transporters (UT-A1-6 and UT-B) have been cloned, and their gene organization, protein crystal structure, expression localization and physiological functions in the tissues have been described. In recent years, the studies in urea transporter knockout mouse models suggest that urea transporters may be useful targets for drug discovery of selective inhibitors. The modulation of urea transport activity by pharmacological agents may provide novel treatments for hypertension, congestive heart failure and other fluid-retaining states. However, although urea represents about 40% of all urinary solutes in normal human urine, the handling of this solute in the tissues has been largely neglected in the past, and few clinical or experimental studies now report data about urea. Most recent physiological textbooks include chapters on water and electrolyte physiology but not a single chapter on urea. Our aim in writing this book is to stimulate further research in new directions by providing novel and provocative insights into further mechanisms and the physiological significance of urea metabolism and transport in mammals. The book provides a state-of-the-art report on the latest findings on urea transport and where the field is going. Although some older work is cited, the main focus is on advances made over the past 20 years with regard to the biophysics, genetics, protein structure, molecular biology, physiology, pathophysiology and pharmacology of urea transport in mammalian cell membranes. These aspects are especially valid, as advances in our understanding of urea transporting mechanisms and physiology promise to yield new insights into biology and medicine.