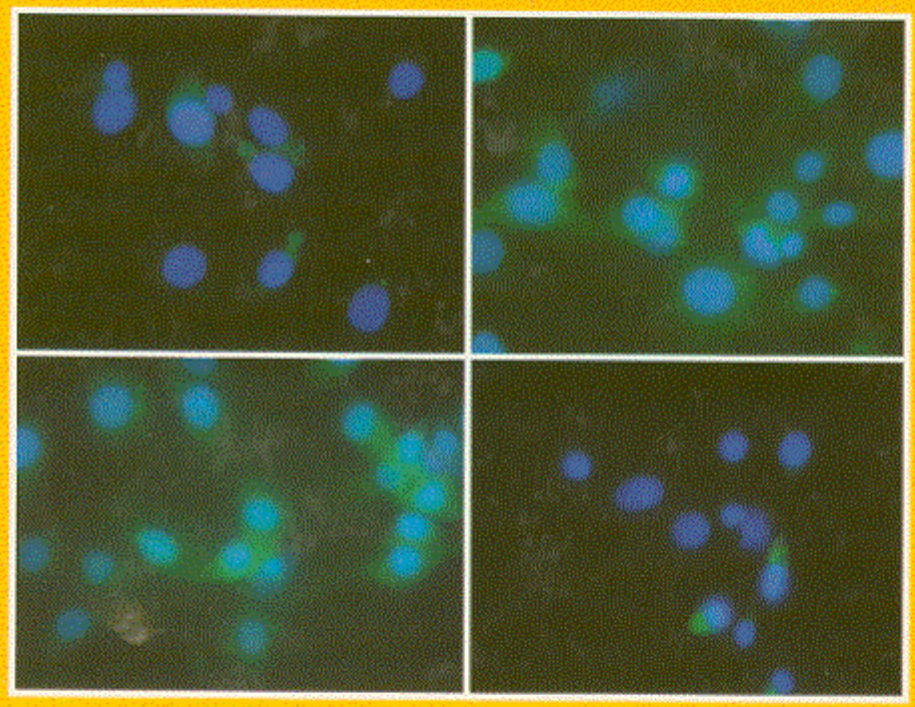
This book reviews current understanding of the biological roles of extracellular molecular chaperones. It provides an overview of the structure and function of molecular chaperones, their role in the cellular response to stress, and their disposition within the cell. It also questions the basic paradigm of molecular chaperone biology – that these proteins are, first and foremost, protein-folding molecules. The current paradigms of protein secretion are reviewed, and the evolving concept of proteins (such as molecular chaperones) as multi-functional molecules, or "moonlighting proteins," is discussed. The role of exogenous molecular chaperones as cell regulators is examined, and the physiological and pathophysiological roles that molecular chaperones play are described. In the final section, the potential therapeutic use of molecular chaperones is described, and in the final chapter, the crystal ball is brought out and the question – what does the future hold for the extracellular biology of molecular chaperones – is asked.



LEFT: Fluorescent photomicrographs showing the induction of interferon-gamma expression by Hsp70. Courtesy of A. Asea, Boston University School of Medicine.

FRONT COVER: Cryo-electron micrograph showing the structure of a chaperonin complex during the ATPase cycle. The semi-transparent blue-green surface shows the electron density map determined by electron microscopy (EM), and the subunits shown in different colors were determined by X-ray crystallography and have been docked into the EM density. Image kindly provided by Helen Saibil, from the work of Ranson et al (2001) *Cell* 107, 869–879.

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ISBN 0-521-83654-9

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Cover design by James F. Brisson