

Protein Homeostasis

SECOND EDITION

The entire life cycle of a protein—from synthesis and folding to transport and degradation—is carefully controlled by the proteostasis network. This network, consisting of many interconnected pathways and processes, manages protein homeostasis by dynamically responding to the needs of the cell. Stress and aging can challenge the proteostasis network, resulting in the aggregation of misfolded proteins—a feature of numerous neurodegenerative conditions.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* provides a comprehensive update on how the proteostasis network functions in healthy cells and the diseases that result when protein quality control goes awry. The contributors examine the relevant biochemical attributes of proteins (e.g., solubility), the functions of normal protein aggregates (e.g., biofilm formation in bacteria), and the various heat shock proteins, chaperones, translocation machineries, proteasomes, signaling factors, and transcriptional programs involved in proteostasis. The roles of specific subcellular structures—the endoplasmic reticulum, mitochondria, ribosomes, lysosomes, and cytoplasm—in protein quality control are covered, as is the regulation of proteostasis at the organismal level (e.g., via neuronal activity).

Discussions of the responses by cells when errors in protein quality control occur, the medical disorders that can result (e.g., Alzheimer disease), and pharmacologic approaches to ameliorate protein conformational disorders are also included. This book is therefore an essential reference for biochemists, cell biologists, and all biomedical scientists wishing to understand the pathological consequences of and potential therapies for proteostasis deficiencies in common human diseases.



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