
Preface

Autophagy is a self-eating pathway that the cell uses to recycle its cellular components in lysosomes. Over the years, our understanding of autophagy has evolved from a mere "garbage disposal" pathway to a highly sophisticated system that plays integral roles in multiple cell survival processes. There is a paradigm shift in the recognition of autophagy as a significant pathway that triages health and diseases. This was recently affirmed by the 2016 Nobel Prize in Physiology or Medicine to Professor Yoshinori Ohsumi for his pioneering work on elucidating how autophagy works in yeast.

Besides being a quality control process, autophagy participates in a myriad of physiological functions that directly impact cellular and organismal health. Healthy functional autophagy is associated with longevity while dysfunction in this pathway contributes to the aging process and an array of diseases. Autophagy maintains the health of cells and tissues by regulating cellular homeostasis, cell fate and remodeling, metabolism, immune defense, stress responses and repairs. In recent years, different forms of autophagy have been identified that endow cells with multifaceted mechanisms to better counteract different stressors and toxic cargoes. Further findings support a central role of autophagy in many molecular networks, where autophagy is interconnected with other signaling pathways, serving either as a regulator or an effector to coordinate and orchestrate specific or systematic cellular responses and adaptation. These different autophagic variants and multiplicity of connections together confer cells with great versatility for survival. Thus, understanding autophagy signaling has direct relevance for promoting health and mitigating disease progression. This sets the backdrop for this book, which aims to provide an up-to-date overview of the plethora of signaling pathways that converge on regulating autophagy in response to different cellular needs. The various chapters cover the current perspective of autophagy in regulating cell fate, immune response, nutrient sensing and metabolism, neural functions, and homeostasis. Some chapters also include exploration of the mechanisms and significance of cross talk between autophagy and other cellular processes. Alterations in autophagy observed in aging and age-related pathologies are also discussed. I hope each reader will gain new insights on the different flavors of autophagic mechanisms and come to appreciate the diverse functions and importance of autophagy from the different chapters. Finally, special thanks to all the authors for contributing their time and talent for this book.

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