

# METHODS IN MOLECULAR BIOLOGY™

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# **Necrosis**

## **Methods and Protocols**

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## Preface

Cell death is an essential process in development and a major contributor to a wide range of human diseases. Three major classifications of cell death, apoptosis, autophagic cell death, and necrosis, have been described for years, and the existence of many more forms of cell death is now accepted. Research on apoptosis accelerated in the 1990s, leading to a detailed understanding of its genetic and biochemical mechanisms. However, a molecular understanding of necrosis has lagged, in part because it was considered an “accidental” form of cell death. Recent progress in several different organisms has revealed that necrosis is controlled by distinct signaling pathways, stimulating a rapid increase in necrosis-related research. It is expected that advances in this area will translate pharmacologically to the clinic, as necrosis is relevant to infectious disease, ischemia, neurological disorders, and pathological situations where apoptosis is inhibited.

*Necrosis Methods and Protocols* provides a wide range of techniques for the study of necrosis in vitro and in vivo. The first part of the book presents methods for the analysis of necrosis in mammalian cells. Biochemical and imaging approaches are described that allow for the detection of several hallmarks of necrosis. The second part provides protocols for the characterization of alternative forms of cell death: entosis and pyroptosis. The third part presents techniques for the analysis of cell death in mammalian tissues, including chapters on skin, brain, and heart. These chapters offer tools used to distinguish necrosis from apoptosis in vivo. The final part provides experimental protocols for use in non-mammalian model systems. These include organisms that lack true caspases (bacteria, yeast, and plants) and organisms that display both necrotic and apoptotic cell death (flies and worms).

Each technique in *Necrosis Methods and Protocols* is described in an easy-to-follow manner with details so that the beginner can succeed with challenging techniques. The Notes section provides the researcher with valuable hints and troubleshooting advice. We wish to thank the authors for their valuable time in preparing these chapters.

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