Table of Contents

Part I: Activation and Function of Components of the MAP Kinase Signaling Cascades

1. The MAP Kinase Signaling Cascades: A System of Hundreds of Components Regulates a Diverse Array of Physiological Functions
   Yonat Keshet and Rony Seger

2. Determination of ERK Activity: Anti-Phospho-ERK Antibodies and In vitro Phosphorylation
   Shiri Procaccia, Sarah Kraus, and Rony Seger

3. Determination of ERK Activity: Anti-Phospho-JNK Antibodies and In vitro Phosphorylation
   Sarah Kraus, Shiri Procaccia, and Rony Seger

4. Determination of p38 Activity and Determination of Its Activity
   Huamin Zhou, Jianming Chen, and Jiahuai Han

5. Determination of the Activity of MAP Kinase Activity
   Kazuhiro Nakamura and Gary L. Johnson

6. Use of Inhibitors in the Study of MAP Kinase Activity
   Kimberly Burkhard and Paul Shapiro

Part II: Study of MAP Kinase Cascades as Transmitters of Membranal Receptor Signals

7. MAP Kinase Activation by Receptor Tyrosine Kinases: In Control of Cell Migration
   Gabi Tarcic and Yosef Yarden

8. Activation of Ras and Rho GTPases and MAP Kinases by G Protein-Coupled Receptors
   Mario Chiariello, Jose P. Vaqué, Piero Crespo, and J. Silvio Gutkind

9. Regulation of MAP Kinase Signaling by Calcium
   Colin D. White and David B. Sacks

10. Identification of Novel Substrates of MAP Kinase Cascades Using Bioengineered Kinases that Uniquely Utilize Analogos of ATP to Phosphorylate Substrates
    Hui Zheng, Adnan Al-Ayoubi, and Scott T. Ebben

11. ERK-MAP Kinase Signaling in the Cytoplasm
    Michelle C. Mendoza, Ekrem Emrah Er, and John Blenis

12. Lentiviral Vectors to Study the Differential Function of ERK1 and ERK2 MAP Kinases
    Marzia Indrigo, Alessandro Papale, Daniel Orellana, and Riccardo Brambilla

Part III: Structure-Function Relationships and Localization of MAP Kinases

13. Structural Studies of MAP Kinase Cascade Components
    Elizabeth J. Goldsmith, Xiaoshan Min, Haixia He, and Tianjun Zhou

    Kevin M. Sours and Natalie G. Ahn

15. A 'Molecular Evolution' Approach for Isolation of Intrinsically Active (MEK-Independent) MAP Kinases
    Vered Levin-Salomon, Oded Livnah, and David Engelberg

16. Reconstitution of the Nuclear Transport of the MAP Kinase ERK2
    Arif Jivan, Aarati Ranganathan, and Melanie H. Cobb

17. Localization and Trafficking of the Fluorescently Tagged ERK1 and ERK2 Matilde Marchi, Riccardo Parra, Mario Costa, and Gian Michele Ratto

Part IV: Studies on the Regulation of MAP Kinase Cascades

18. Studying the Regulation of MAP Kinase by MAP Kinase Phosphatases in vitro and in Cell Systems
    Céline Tárrega, Caroline Nunes-Xavier, Rocío Cejudo-Marin, Jorge Martínez-Muñoz, and Rafael Pulido

19. Proteomic Analysis of Scaffold Proteins in the ERK Cascade
    Melissa M. McKay and Deborah K. Morrison

20. Analysis of ERKs' Dimerization by Electrophoresis
    Adán Pinto and Piero Crespo

21. MAP Kinase - SUMO Pathway Interactions
    Shen-Hsi Yang and Andrew D. Sharrocks

22. Computational Modelling of Kinase Signalling Cascades
    David Gilbert, Monika Heiner, and Rainer Breitling

Part V: Use of Lower Organisms, Animal Models, and Human Genetics in the Study of MAP Kinases

23. Analysis of MAP Kinase Activity in Yeast
    Elaine A. Elion and Rupam Sahoo

24. Detection of RTK Pathway Activation in Drosophila Using Anti-dpERK Immunofluorescence
    Staining Aharon Helman and Ze'ev Paroush

25. Studying MAP Kinase Pathways During Early Development of Xenopus laevis
    Avlad Keren and Eyal Bengal

26. Deciphering Signaling Pathways in vivo: The Ras/Raf/Mek/Erk Cascade
    Gergana Galabova-Kovacs and Manuela Baccarini

27. Mutation and Functional Analysis in Human Ras/MAP Kinase Genetic Syndromes
    William E. Tidyman and Katherine A. Rauen

28. Implication of the ERK Pathway on the Post Transcriptional Regulation of VEGF mRNA Stability
    Khadija Essafi-Benkhadir, Jacques Pouyssegur, and Gilles Pagès

29. Studies on MAP Kinase Signaling in the Immune System
    Hongbo Chi and Richard A. Flavell

30. Methods to Study MAP Kinase Signaling in the Central Nervous System
    Bettina Wagner and Maria Sibilia

31. MAP Kinase Regulation of the Mitotic Spindle Checkpoint
    Eva M. Eves and Marsha Rich Rosner

32. Using High-Content Microscopy to Study Gonadotrophin-Releasing Hormone (GnRH) Regulation of ERK
    Christopher J. Caunt, Stephen P. Armstrong, and Craig A. McArdle