
Preface

The matrix metalloprotease (MMP) field has witnessed enormous advances since Jerome Gross and Charles Lapière first observed in 1962 an enzymatic activity (collagen degradation) associated with tadpole tail metamorphosis. Since the identification of this enzyme (interstitial collagenase or MMP-1), more than 20 closely related and evolutionarily conserved vertebrate MMPs have been discovered. These MMPs and their endogenous inhibitors (TIMPS) are involved in a diverse range of functions including tissue remodeling, immunity, inflammation, and angiogenesis. The first part of this book outlines recent advances in the expression and purification of MMPs in various expression systems, highlighting the advantages and disadvantages of each. In Part II we highlight how various biophysical methods such as X-ray crystallography, NMR spectroscopy, and small angle X-ray scattering, in combination with computational analyses (Part III), can provide a detailed understanding of the molecular mechanism of action of these enzymes. Part IV details how experimental and bioinformatics approaches can be used to define the substrate specificity of MMPs while Part V discusses methods for detecting MMP activity in vitro and in vivo. In Part VI we present various methods for the development and characterization of MMP-based inhibitors as potential therapeutics for the treatment of various diseases. The final part presents an overview of the involvement of MMPs in various diseases and their potential as diagnostic biomarkers.

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Matrix Metalloproteases

Methods and Protocols

Galea, C.A. (Ed.)

2017, XI, 314 p. 56 illus., 34 illus. in color., Hardcover

ISBN: 978-1-4939-6861-9

A product of Humana Press