

METHODS IN MOLECULAR BIOLOGY

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Bioluminescence


Methods and Protocols

Third Edition

Edited by

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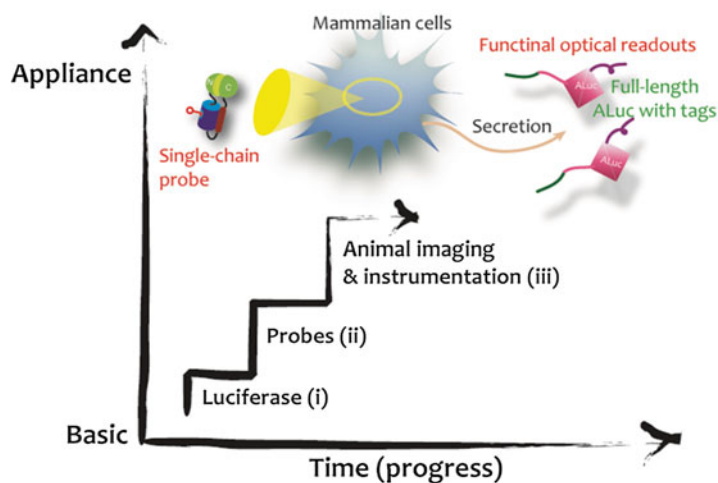
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Preface

Luciferases catalyzing oxidation of luciferins are a nearly ideal reporter for bioanalysis and molecular imaging of intracellular molecular events. Bioluminescent probes fabricated from luciferases generally allow low backgrounds, high signal-to-noise (S/N) ratios, wider dynamic ranges of signals, versatility in the molecular design, and suitability in the imaging of small model animals. Recent studies on bioluminescence-based technologies may be categorized into three major routes: (i) establishment of new luciferases and synthesis of novel luciferins; (ii) fabrication of bioluminescent probes with the luciferases and luciferins; and (iii) practical application of the probes to animal imaging and instrumentations. These three categories are closely correlated in the technical progression: e.g., if we establish de novo luciferases with excellent optical properties, it allows fabrication of new optical probes with a novel strategy. The novel bioluminescent probes should facilitate better optical performance in visualization of molecular events of interest in living subjects. This book represents detailed laboratory protocols regarding the three major route technologies from the establishment of new luciferases, efficient optical probes, to their applications to visualizing molecular events in living subjects.

I am greatly honored to work with the authors who contributed to this book. They are all talented in their research subjects in bioluminescence and generously accepted one or two chapters in this book. I am deeply thankful for Professor John Walker and Dr. Fujii for their timely advices and encouragement. Finally, I owe a special thank you to Young-Eun, my wife, and Tae-Yun and Tae-Hun, my children, for their endless support.

I hope that this book will provide a comprehensive guidance to researchers and technicians on how to establish luciferases and to fabricate bioluminescent probes for molecular imaging.



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