

## <<分子影像技术及其应用>>

### 图书基本信息

书名：<<分子影像技术及其应用>>

13位ISBN编号：9787308082716

10位ISBN编号：7308082717

出版时间：2012-10

出版单位：浙江大学出版社

作者：田捷

页数：699

字数：1382000

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## &lt;&lt;分子影像技术及其应用&gt;&gt;

## 前言

Preface As an effective information acquisition and processing methodology for biomedical study, molecular imaging has become a rapidly developing and very promising research area, in which conventional medical imaging technology and modern molecular biology are being combined to non-invasively delineate in vivo physiological and pathological processes directly, sensitively and specifically at cellular and molecular levels. The goals of this discipline are to develop imaging theories, technologies and instruments for studying biological and medical processes as well as diagnosing and managing diseases better, especially for tumorigenesis research, cancer diagnosis, metastasis detection, gene therapy, drug discovery and development. Discussing the problems and challenges in details and illustrating recent progress and future directions, this book introduces novel theories and algorithms, new molecular probes, imaging systems and experiments, final clinical or preclinical applications of recent years according to the traditional research guidelines from the theory, to the system to be probed and then to the application. This book is based on the published research results of our group and other scholars or experts in the area of molecular imaging. The contents can be divided into three sections. The first section presents the details of molecular imaging theory and the system for different modalities, including diffuse optical tomography (DOT), fluorescence molecular tomography (FMT), bioluminescence tomography (BLT), positron emission tomography (PET), single photon emission computed tomography (SPECT), magnetic resonance imaging (MRI) and some other imaging technologies. For optical molecular imaging, the molecular optical simulation environment (MOSE) is presented for the simulation of light propagation both in tissues with complicated shapes and in free-space based on the Monte Carlo method. Furthermore, optical multi-modality molecular imaging, the algorithms and platforms of medical image processing and analysis are also described in this section. The next section starts with radiolabeled molecular probes and then covers oligonucleotide probes, quantum dots, and RGD-based molecular probes. The last section mainly illustrates the applications of molecular imaging in biomedical and life science research, such as clinical practice for tumors, protein-protein interactions, transgenic animals and diabetes-related studies. This book is supported by the National Basic Research Program of China (973 Program) under Grant Nos. 2006CB705700, 2011CB707700 and the Hundred Talents Program of the Chinese Academy of Sciences. In Part I we are grateful to Professor Jing Bai and her group for Chapter 4 and part of Chapter 10; Professor Shanglian Bao and his group for Chapters 7, 8 and part of Chapter 10; Professor Feng Gao and his group who contributed to Chapter 3; Professor Baoci Shan and his group for providing Chapter 6. We appreciate Professor Taiwei Chu, Professor Deming Kong, Professor Wenyou Li, Professor Fan Wang and their groups for writing Chapters 1, 2, 3 and 4 in Part II, respectively. In Part III we are thankful to Professor Yinghui Li and her group for Chapters 1 and 4; Professor Xiaopeng Zhang and his group for writing Chapter 2; Professor Liangyi Chen and his group for Chapters 3 and 5. Finally, we wish to thank our group, Dr. Karen von Deneen, Dr. Xin Yang, Dr. Chenghu Qin, Dr. Xiaochao Qu, Dr. Shouping Zhu and our students Ping Wu, Jinchao Feng, Kai Liu, Jianghong Zhong, Dong Han, Xibo Ma, Xiaoqian Dai, Xiuli Li, Kexin Deng, Dehui Xiang, Xing Zhang, Wei Jiang, Peng Zhao, Fei Yang and others for editing the text and proof-reading the book. We express our sincere thanks to all the authors for making this book possible and successful. Jie Tian Beijing, China June 8, 2012

## <<分子影像技术及其应用>>

### 内容概要

Jie Tian Editor 《Molecular Imaging》 Fundamentals and Applications is a comprehensive monograph which describes not only the theory of the underlying algorithms and key technologies but also introduces a prototype system and its applications , bringing together theory, technology and applications .

## <<分子影像技术及其应用>>

### 书籍目录

Contents 9

List of Contributors 15

Part I Molecular Imaging Theory and System

1 Introduction

1 . 1 Development of Molecular Imaging

1 . 2 Advantages of Molecular Imaging

1 . 3 Basic Principles of Molecular Imaging Modalities

1 . 4 General Development of Molecular Imaging Probe

1 . 5 Application Involving Molecular Imaging

References

2 Molecular Optical Simulation Environment

2 . 1 Introduction

2 . 2 Review of the Current Simulation Platform

2 . 3 Introduction of MOSE

2 . 4 Introduction of the Algorithm

2 . 5 Validation of the Simulation Experiment Results .

References

3 Diffuse Optical Tomography

3 . 1 Outline

3 . 2 Medical Background and Optical Properties of Human Tissue

3 . 3 Photon Transport Model in Tissues and Image

Reconstruction

Algorithms

3 . 4 Simulative and Experimental Tomographic and Topographic

Imaging on a Phantom

References

4 Fluorescence Molecular Tomography

4 . 1 Overview

4 . 2 Fundamental Principles in Fluorescence Molecular

Tomography

4 . 3 Experimental System in Fluorescence Molecular Tomography .

4 . 4 The Reconstruction Algorithms in Fluorescence Molecular

Tomography

4 . 5 Experiment in Fluorescence Molecular Tomography

References

5 Bioluminescence Tomography

5 . 1 Introduction

5 . 2 The Forward Model for BLT

5 . 3 BLT Reconstruction Algorithms

5 . 4 Experiments and Applications

References

6 Positron Emission Tomography

6 . 1 Prologue

6 . 2 The Principle of PET

## <<分子影像技术及其应用>>

- 6 . 3 Positron Emission Tomography Scanner
- 6 . 4 Reconstruction Algorithms and Correction Techniques in PET
- 6 . 5 PET / CT Image Fusion
- 6 . 6 Experimental PET Imaging References
- 7 Radioisotope Labeled Molecular Imaging in SPECT
- 7 . 1 Outline ofMolecular Imaging in SPECT
- 7 . 2 Key Technologies ofAnimal Pinhole SPECT References
- 8 MRI Facility-Based Molecular Imaging .
- 8 . 1 Outline ofthe MIU Facility—Based Molecular Imaging
- 8 . 2 Main mMgl Contrasts .
- References .
- 9 Other Molecular Imaging Technology
- 9 . 1 Photoacoustic Tomography
- 9 . 2 Optical Coherence Tomography
- 9 . 3 Confocal Laser Scanning Microscopy .
- 9 . 4 Ultrasound in Molecular Imaging .
- 9 . 5 X—Ray Micro-Computed Tomography .
- References .
- 10 Optical Multi-Modality Molecular Imaging
- 10 . 1 Fusion ofBLT and Nicro-CT System
- 10 . 2 Fusion ofDOT and BLT Systems
- 10 . 3 Multi—Mod~ity Imaging ofFMT and CT
- 10 . 4 Image Registration and Fusion Between SPECT and CT .
- References
- 11 Medical Image Processing and Analysis
- 11 . 1 Overview .
- 11 . 2 Medical Image Segmentation
- 11 . 3 Medical Image Registration
- 11 . 4 New Techniques ofImage Fusion
- 11 . 5 Medical Image Visualization .
- Reference
- PartII Molecular Probes
- 12 Opportunities and Challenges of Radiolabeled Molecular Probes
- 12 . 1 Introduction
- 12 . 2 The Opportunities ofRadiolabeled Molecular Probes .
- 12 . 3 The Challenges ofRadiolabeled Molecular Probes
- 12 . 4 Summary .
- References
- 13 oli20nucleotide Probes
- 13 . 1 Design Principle ofOligonucleotide Probes
- 13 . 2 Anti . Nuclease Modification ofOligonucleotide Probes
- 13 . 3 Delivery ofProbes into Cells
- References
- 14 Quantum Dots for Biological Imaging
- 14 . 1 ODs Based on CdTe

## <<分子影像技术及其应用>>

- 14 . 2 ODs Based on CdSe
- 14 . 3 ODs Based on CdSe / ZnS
- 14 . 4 QDs Based on CdSe / CdS / ZnS
- 14 . 5 ODs Based on InP / ZnS
- 14 . 6 QDs Based on CdHgTe
- 14 . 7 ODs Based on Lead Salts
- 14 . 8 Other QDs

### References

- 15 RGD-Based Molecular Probes for Integrin  $\alpha_v\beta_3$  Imaging
- 15 . 1 Introduction
- 15 . 2 Multi—Modality RGD Probes Targeting Integrin  $\alpha_v\beta_3$
- 15 . 3 Dual Functional RGD Probes for Integrin  $\alpha_v\beta_3$  Targeting .
- 15 . 4 Optimizmion OfRGD Probes
- 15 . 5 Conclusions and Future Perspectives

### References

## Part III Applications of Molecular Imaging .

- 16 Basics of Molecular Biology
- 16 . 1 Introduction .
- 16 . 2 Techniques ofMolecular Biology .
- 16 . 3 Cells and Viruses
- 16 . 4 Transcription
- 16 . 5 Transcription and Translation in Eukaryotes
- 16 . 6 Post . Transcriptional Events
- 16 . 7 DNA Replication and Recombination
- 16 . 8 DNA Damage and Repair
- 16 . 9 Transiation

### References .

## 17 Molecular Imaging Techniques in Clinical Practice of Tumors

- 17 . 1 Application of Molecular Imaging Techniques in Tumor Diagnosis and Differentiation

## 17 . 2 Application of Molecular Imaging Techniques in the Clinical

### Staging ofMalignancies

- 17 . 3 Application ofMolecular Imaging Techniques in Lymph Nodes

### Evaluation

- 17 . 4 Application of Molecular Imaging Techniques in Tumor Therapeutic Monitoring and Efficacy Evaluation

## 17 . 5 Application ofMolecular Imaging Techniques in Other Aspects

### ofCancer Therapy

- 17 . 6 Conclusions and Prospects .

### References

- 18 Using Molecular Imaging Techniques to Study Protein-Protein Interactions .

## <<分子影像技术及其应用>>

18 . 1 The Yeast Two—Hybrid System .	
18 . 2 FRET	
18 . 3 BRET	
18 . 4 PCA	
18 . 5 Concluding Remarks	
References	
19 Application of Molecular Imaging in Transgenic Animals	
19 . 1 The Stem Cells	
19 . 2 Molecular Imaging in Stem Cell Research for Heart Repair	
19 . 3 Molecular Imaging in Stem Cell Research for Kidney Repair	
19 . 4 Molecular Imaging in Stem Cell Research for Liver Repair	
19 . 5 Molecular Imaging in Neural Stem Cell Research	
19 . 6 Conclusion	
References .	
20 Molecular Imaging Methods in Diabetes-Related Studies	
20 . 1 Molecular Imaging Applications in Diabetes—Related Fundamental Research	
20 . 2 Molecular Imaging Assists Diabetic—Related Therapeutic Research	
20 . 3 Recent Advances in Molecular Imaging .	
20 . 4 Concluding Remarks	
References	
Index g Theory and System 18	
1 Introduction 20	
1.1 Development of Molecular Imaging 20	
1.2 Advantages of Molecular Imaging 22	
1.3 Basic Principles of Molecular Imaging Modalities 24	
1.4 Generous Development of Molecular Imaging Probe 27	
1.5 Application Involving Molecular Imaging 28	
References 29	
2 Molecular Optical Simulation Environment 32	
2.1 Introduction 32	
2.2 Review of the Current Simulation Platform 33	
2.3 Introduction of MOSE 35	
2.4 Introduction of the Algorithm 44	
2.5 Validation of the Simulation Experiment Results 57	
References 62	
3 Diffuse Optical Tomography 64	
3.1 Outline 64	
3.2 Medical Background and Optical Properties of Human Tissue 94	
3.3 Photon Transport Model in Tissues and Image Reconstruction Algorithms 110	
3.4 Simulative and Experimental Tomographic and Topographic Imaging on a Phantom 153	

# <<分子影像技术及其应用>>

References 193

4 Fluorescence Molecular Tomography 202

4.1 Overview 202

4.2 Fundamental Principles in Fluorescence Molecular Tomography 203

4.3 Experimental System in Fluorescence Molecular Tomography 206

4.4 The Reconstruction Algorithms in Fluorescence Molecular Tomography 208

4.5 Experiment in Fluorescence Molecular Tomography 218

References 228

5 Bioluminescence Tomography 234

5.1 Introduction 234

5.2 The Forward Model for BLT 236

5.3 BLT Reconstruction Algorithms 238

5.4 Experiments and Applications 250

References 255

6 Positron Emission Tomography 258

6.1 Prologue 258

6.2 The Principle of PET 260

6.3 Positron Emission Tomography Scanner 263

6.4 Reconstruction Algorithms and Correction Techniques in PET 272

6.5 PET/CT Image Fusion 306

6.6 Experimental PET Imaging 313

References 320

7 Radioisotope Labeled Molecular Imaging in SPECT 330

7.1 Outline of Molecular Imaging in SPECT 330

7.2 Key Technologies of Animal Pinhole SPECT 336

References 347

8 MRI Facility-Based Molecular Imaging 350

8.1 Outline of the MRI Facility-Based Molecular Imaging 350

8.2 Main mMRI Contrasts 354

References 376

9 Other Molecular Imaging Technology 378

9.1 Photoacoustic Tomography 378

9.2 Optical Coherence Tomography 384

9.3 Confocal Laser Scanning Microscopy 389

9.4 Ultrasound in Molecular Imaging 392

9.5 X-Ray Micro-Computed Tomography 395

References 399

10 Optical Multi-Modality Molecular Imaging 406

10.1 Fusion of BLT and Micro-CT System 407

10.2 Fusion of DOT and BLT Systems 410

10.3 Multi-Modality Imaging of FMT and CT 412

10.4 Image Registration and Fusion Between SPECT and CT 417

References 427



## <<分子影像技术及其应用>>

11	Medical Image Processing and Analysis	432
11.1	Overview	432
11.2	Medical Image Segmentation	433
11.3	Medical Image Registration	440
11.4	New Techniques of Image Fusion	456
11.5	Medical Image Visualization	472
	References	483
	Part II Molecular Probes	488
12	Opportunities and Challenges of Radiolabeled Molecular Probes	490
12.1	Introduction	490
12.2	The Opportunities of Radiolabeled Molecular Probes	491
12.3	The Challenges of Radiolabeled Molecular Probes	493
12.4	Summary	497
	References	497
13	Oligonucleotide Probes	500
13.1	Design Principle of Oligonucleotide Probes	500
13.2	Anti-Nuclease Modification of Oligonucleotide Probes	506
13.3	Delivery of Probes into Cells	508
	References	511
14	Quantum Dots for Biological Imaging	518
14.1	QDs Based on CdTe	518
14.2	QDs Based on CdSe	519
14.3	QDs Based on CdSe/ZnS	520
14.4	QDs Based on CdSe/CdS/ZnS	520
14.5	QDs Based on InP/ZnS	522
14.6	QDs Based on CdHgTe	522
14.7	QDs Based on Lead Salts	523
14.8	Other QDs	523
	References	525
15	RGD-Based Molecular Probes for Integrin $\alpha_v\beta_3$ Imaging	530
15.1	Introduction	530
15.2	Multi-Modality RGD Probes Targeting Integrin $\alpha_v\beta_3$	533
15.3	Dual Functional RGD Probes for Integrin $\alpha_v\beta_3$ Targeting	542
15.4	Optimization of RGD Probes	543
15.5	Conclusions and Future Perspectives	549
	References	550
	Part III Applications of Molecular Imaging	556
16	Basics of Molecular Biology	558
16.1	Introduction	558
16.2	Techniques of Molecular Biology	564
16.3	Cells and Viruses	569
16.4	Transcription	573
16.5	Transcription and Translation in Eukaryotes	576
16.6	Post-Transcriptional Events	585
16.7	DNA Replication and Recombination	590

## <<分子影像技术及其应用>>

16.8 DNA Damage and Repair	598
16.9 Translation	607
References	609
17 Molecular Imaging Techniques in Clinical Practice of Tumors	620
17.1 Application of Molecular Imaging Techniques in Tumor Diagnosis and Differentiation	620
17.2 Application of Molecular Imaging Techniques in the Clinical Staging of Malignancies	625
17.3 Application of Molecular Imaging Techniques in Lymph Nodes Evaluation	628
17.4 Application of Molecular Imaging Techniques in Tumor Therapeutic Monitoring and Efficacy Evaluation	633
17.5 Application of Molecular Imaging Techniques in Other Aspects of Cancer Therapy	636
17.6 Conclusions and Prospects	639
References	639
18 Using Molecular Imaging Techniques to Study Protein-Protein Interactions	650
18.1 The Yeast Two-Hybrid System	650
18.2 FRET	656
18.3 BRET	663
18.4 PCA	667
18.5 Concluding Remarks	670
References	671
19 Application of Molecular Imaging in Transgenic Animals	678
19.1 The Stem Cells	678
19.2 Molecular Imaging in Stem Cell Research for Heart Repair	679
19.3 Molecular Imaging in Stem Cell Research for Kidney Repair	682
19.4 Molecular Imaging in Stem Cell Research for Liver Repair	683
19.5 Molecular Imaging in Neural Stem Cell Research	684
19.6 Conclusion	685
References	685
20 Molecular Imaging Methods in Diabetes-Related Studies	688
20.1 Molecular Imaging Applications in Diabetes-Related Fundamental Research	689
20.2 Molecular Imaging Assists Diabetic-Related Therapeutic Research	696
20.3 Recent Advances in Molecular Imaging	704
20.4 Concluding Remarks	706
References	706
Index	712

## <<分子影像技术及其应用>>

### 编辑推荐

《中国科技进展丛书:分子影像技术及其应用(英文版)》通过对分子影像学的基本概念、基本原理、成像方法、研究进展和及其在生物制药领域应用的介绍，为从事医学影像研究和生命科学研究的科研人员提供详尽的理论知识和技术方法。

《中国科技进展丛书:分子影像技术及其应用(英文版)》既有理论算法，又有关键技术，既有原型系统，又有应用实例，是理论、技术与应用相结合的产物。

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