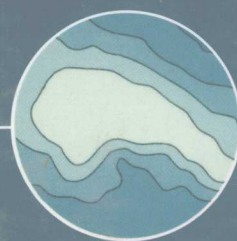


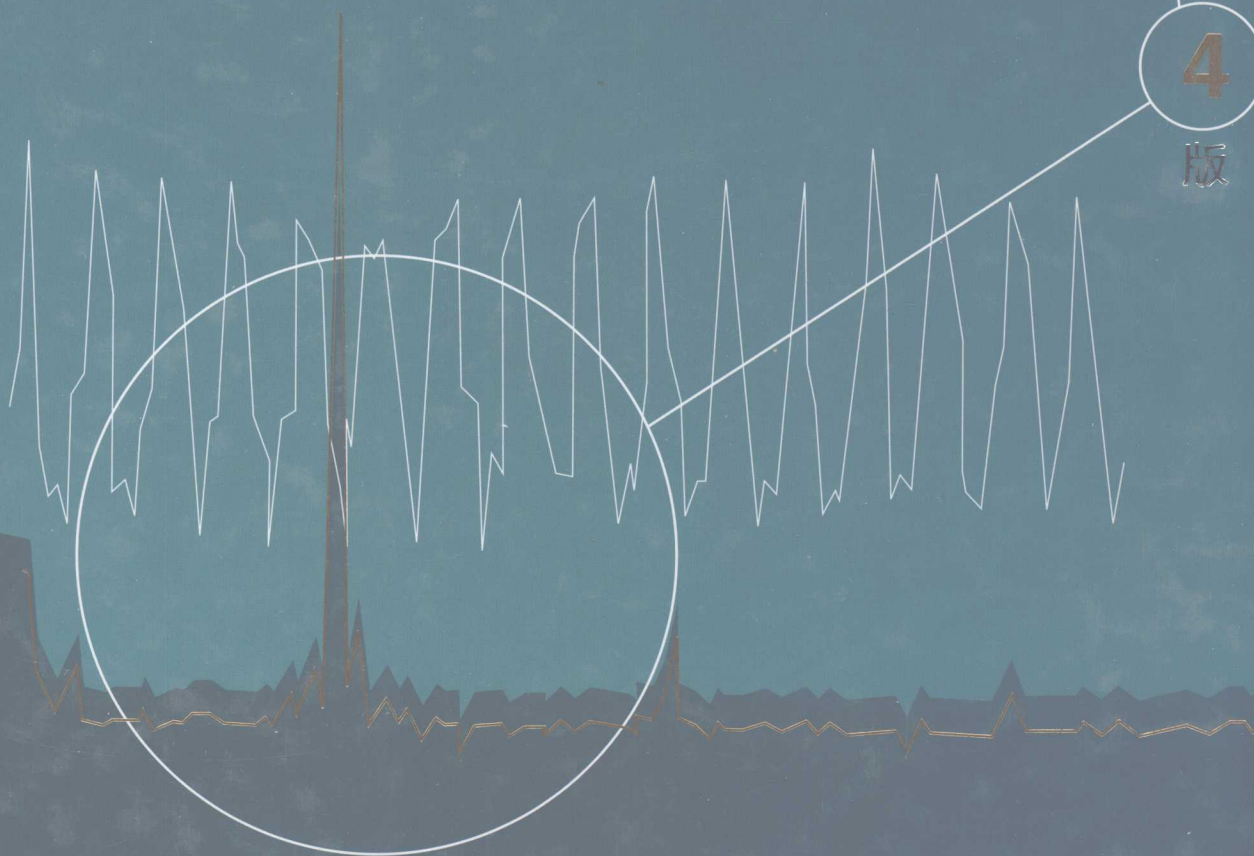
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# 心脏电生理：从细胞到临床

CARDIAC ELECTROPHYSIOLOGY  
From Cell To Bedside

第  
4  
版



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# 心脏电生理： 从细胞到临床

第四版

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珍贵的留念：Zipes 与郭继鸿

# 译者前言

“前言”总位于书的最前面，但实际都是整书收笔时撰写的最后点缀。相当于一项浩大工程竣工时的备忘录，将工程立项的初衷，工程的精采夺目之处，有关工程的轶闻轶事都札记在案，留给读者和后人。

本书选题之时，略有踌躇和争议，当时 Josephson 的《临床心脏电生理学：技术与理论》的中译版刚面世不久，仅几个月 2000 册就畅销一空，此时再重组兵马将帅挥师翻译另一部心脏电生理学的巨著，唯恐触犯重复选题之大忌。但是翻开本书马上就意识到，这两本书的内容、风格、学术意义迥然不同。一个是繁华的“Downtown”中心矗立的摩天大厦，一个则是洒满耀眼珍珠、风景宜人的避暑海滩。前者是 Josephson 一人执笔捉刀，就一个主题，一泻千里，冲击成一本深不可测、举世无双的 Bible（圣经）。而后者则是 Zipes 统辖百员战将就 120 个专题，铺天盖地，气势磅礴，打造出一部铁壁铜墙、令人仰视的心律失常的“百科全书”。这 120 个精选的专题，每个专题都可以或已经独立成书，而此时却由 120 位该专题的世界级大师各怀英雄绝技，一气呵成盖世佳篇，堆秀于本书。本书第一版于 1990 年问世，当时仅是一本纪念 Zipes 的老师 Moe 诞辰 100 周年学术会议的论文集，但经过主编的精心策划与谋略，使本书成为心律失常领域最重要的专著与工具书。难能可贵的是，第三版心律失常和心脏电生理的内容中基础与临床各自掺半，每章内容都是前沿与精粹并举，深邃与直白相伴，真正意义上体现了从细胞到临床、从理论到实践这一主题，是心律失常领域一本盖世绝伦的“百科全书”，让你通读本书时，顿生“夺之，必能得天下”之感。还需强调的是，限于篇幅，本版有些章节采取以分析和荟萃第三版以来该专题的进展为主线，而前版中已经阐述的基本概念、方法学等内容部分已被删减而未重述，读者需要了解这些内容时还需查阅第三版或其他相关文献。

再说本书主帅 Zipes，他是目前美国，乃至全世界最负盛名、最具权威的心脏病学大师，心律失常和

心脏电生理学的超级教授。如同当年的 White 一样，担任着美国心脏病学领域像 JACC 主席等多种最重要的学术领军位置和头衔。如果美国总统的亲自接见与会晤还不能证明他学术成就的显赫，那么 Braundwald 教授在《Braundwald 心脏病学》第七版面世之时，将第一主编让位给 Zipes，而自己退居该书第四主编的事实足以证明 Zipes 教授在世界心脏病学界的顶级位置。可以想象，本书能聚集这么多位的学术权威，共铸如此权威的专著，非 Zipes 莫属。Zipes 教授与中国人民十分友好，几年前他访问了中国，除在北京等地做了精彩的学术报告外，还访问了西藏拉萨市医院。

本书决定翻译出版后，云集国内近百名精兵强将，奋勇上阵，势如破竹，众志成城。本书包括 120 个心律失常的专题，由于全书总篇幅的限制，各章原著者都竭力精练语言，高度浓缩内容，使部分的英文表述较难理解，造成直译或意译都颇棘手和艰难。翻译过程中，这些难点都经反复讨论和争辩，反复推敲和商榷。鉴于专业和翻译的水平，肯定本书正式出版时仍将存在理解不够、翻译不妥之处，敬请同道慷慨斧正。

本书翻译过程中，几位年轻有为的学者一直奋战在第一线。李学斌教授在繁忙的临床工作重压之下，仍不负众望，废寝忘食，出色完成了主译工作。浦介麟教授英中文水平双全，他认真伏案，逐句推敲，不愧是一位真正的学者。翻译此书时，张幼怡教授已任北京大学心血管病基础研究所所长之职，重任和繁忙都未能影响她对本书的一丝不苟，显示出一位年轻大师的风范。张萍教授受命于全书关键性的环节工作，擂鼓督战，兢兢业业。刘元生教授身为急诊科主任，业务与行政之事贯缠全身，但仍能静心笔耕，专注操笔，难能可贵。杨延宗教授是国内著名的心脏电生理学专家，又兼院长重职，他能捧印出山，执著参与使本书蓬荜生辉。本书的秘书王云龙博士为本书的出版做了大量的工作。还应当感谢北京大学医学出版社的王凤廷副社长，没有他的慧眼识珠，果断定夺，则根



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# 序 言

对于基础研究的科学家、基础和临床心脏电生理学家以及心内科医生来说，全新改版的《心脏电生理学：从细胞到临床》第四版仍是学习和洞悉心脏电生理学及最新进展的可靠宝库。来自不同专业领域的精英撰写了本书各章精湛丰富的内容。本书就像副标题“从细胞到临床”暗示的两方面内容。本版坚守往版确定的作为本领域完备参考书的传统。前 51 章为心脏电生理学基础研究的内容，后 69 章是心律失常临床方面的内容。通过本书读者可以了解世界顶尖专家的最新研究进展。

基础研究新的章包括：如 HCN 的分子和结构基础，张力激活和内流放大通道。收缩-兴奋反馈新章介绍了心脏机械活动调节电学功能的方式。神经再生和心律失常章介绍了心肌梗死后交感神经再生所导致的神经重构进而引起心肌组织的电重构，并形成室速或室颤的触发因子。关于心房颤动的两章介绍了肺静脉中局灶电活动引发的房颤发作，以及左房后部及肺静脉区域的局灶折返引起的急性房颤的持续和向右房的扩布。有关室颤一章讨论了强的内流放大钾通道与室颤可能有关的转子稳定中的作用。有关心律失常的基因敲除和转基因动物模型的新章，回顾了建立鼠模型和研究电学功能的方法并分析了目前与心脏电生理学有关的遗传模型。另一方面，在药物遗传学与心律失常的章中讨论了基因组中多个 DNA 变异对药物反应的调节模式。临床相关新章包括 Brugada 综合征、儿茶酚胺和短联律间期室速以及植入式 Holter 的临床应用等。此外，介绍了新的标测技术并详细介绍了最新

非传统的抗心律失常药物，以及房颤导管消融的最新研究成果和房颤发生中肺静脉的作用。

总之，读者将了解心脏电活动的分子和细胞基础，心律失常的机制，如何检测猝死的高危患者，如何评价患者病情，如何使用电学、手术或药物治疗。显然，本书的独特性在书的副标题中已经得到体现，读者在本书可获得心脏电生理学基础和临床方面的各种知识。这是《心脏电生理学：从细胞到临床》一书最重要的特点。

临床心脏电生理学仍在持续不断地快速发展，因此，不久的将来，读者将会发现本版书中许多概念是错误的。但我们相信本书对心脏电生理学感兴趣的人来说未来数年间仍是有用的参考书。

我们的妻子 Joan Zipes, Paloma Jalife 一如既往的坚定支持是本书得以成功完成的基础，在此深表感谢。本书各章作者的杰出工作使本书得以出版，并在此对他们卓有成效的工作深表感谢。感谢 Laurie LeBouef 和 Janet Hutcheson 所做的秘书工作。最后感谢在 Elsevier 公司工作的 Anne Lenehan 及其同事的耐心和帮助，并使本书能够送到全世界的心脏电生理学家手中。

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**Results of Clinical Trials of Automatic External Defibrillators and Implantable Cardioverter-Defibrillators in Patients at Risk for Sudden Death**

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**KCNQ1/KCNE1 Macromolecular Signaling Complex: Channel Microdomains and Human Disease**

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**Differential Diagnosis of Wide QRS Complex Tachycardia**

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**Molecular Organization and Regulation of the Cardiac Gap Junction Channel Connexin43; Prospects for Pharmacologic Targeting of Gap Junction Channels**

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**Pacemaker Channels and Normal Automaticity**

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**Cellular Mechanisms of Sinoatrial Activity**

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**Molecular Organization and Regulation of the Cardiac Gap Junction Channel Connexin43; Prospects for Pharmacologic Targeting of Gap Junction Channels**

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**Mechanisms of AV Nodal Excitability and Propagation**

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#### **Cellular Mechanisms of Defibrillation**

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#### **Cholinergic Atrial Fibrillation**

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#### **Ventricular Tachycardia in Arrhythmogenic Right Ventricular Cardiomyopathies**

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#### **Electrophysiologic Characteristics of Atrioventricular Nodal Reentrant Tachycardia: Implications for the Reentrant Circuits**

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#### **Monophasic Action Potential Recording**

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#### **Nonlinear Dynamics of Excitation and Propagation in Cardiac Muscle**

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#### **Class I Antiarrhythmic Drugs: Quinidine, Procainamide, Disopyramide, Lidocaine, Mexiletine, Flecainide, and Propafenone**

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#### **Newer Applications of Pacemakers**

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#### **Impact of Nontraditional Antiarrhythmic Drugs on Sudden Cardiac Death**

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#### **Global Mechanisms of Defibrillation**

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#### **Accelerated Idioventricular Rhythm and Bidirectional Ventricular Tachycardia**

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#### **Arrhythmias in Patients with Neurologic Disorders**

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#### **The Biophysics and Pathophysiology of Lesion Formation during Radiofrequency Catheter Ablation**

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**Catheter Ablation of Atrial Fibrillation: Triggers and Substrate**

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**Modeling Cardiac Defibrillation**

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**Implantable Pacemakers**

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**Homomeric and Heteromeric Gap Junctions**

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**Ventricular Tachycardia in Arrhythmogenic Right Ventricular Cardiomyopathies**

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**Three-dimensional Propagation in Mathematical Models**

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**HCN Channels: From Genes to Function**

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**Catheter Ablation of Atrial Flutter**

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**HCN Channels: From Genes to Function**

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**T-Wave Alternans**

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**Cellular Mechanisms of Sinoatrial Activity**

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**Pharmacology of L-Type and T-Type Channels in the Heart**

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**Membrane Pumps and Exchangers**

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**Three-dimensional Propagation in Mathematical Models**

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**Defibrillation Waveforms**

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**Ventricular Tachycardia in Arrhythmogenic Right Ventricular Cardiomyopathies**

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**Ventricular Tachycardia in Patients with Structurally Normal Hearts**

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**Electrophysiologic Characteristics of Atrioventricular Nodal Reentrant Tachycardia: Implications for the Reentrant Circuits**

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**Catheter Ablation of Atrial Fibrillation: Triggers and Substrate**

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**Dynamics and Molecular Mechanisms of Ventricular Fibrillation in Normal Hearts**

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**Pharmacology of the Cardiac Sodium Channel**

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**Three-dimensional Propagation in Mathematical Models**

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**Ventricular Tachycardia in Patients with Coronary Artery Disease**

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**Impact of Nontraditional Antiarrhythmic Drugs on Sudden Cardiac Death**

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**KCNQ1/KCNE1 Macromolecular Signaling Complex: Channel Microdomains and Human Disease**

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**Use of Long-term (Holter) Electrocardiographic Recordings**

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**Transthoracic Cardioversion and Defibrillation**

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**Intracellular Signaling and Regulation of Cardiac Ion Channels**

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**Electrocardiographic Manifestations of Supernormal Conduction, Concealed Conduction, and Exit Block**

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**Intercellular Communication and Impulse Propagation**

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**The Use of Implantable Loop Recorders; Wolff-Parkinson-White Syndrome**



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**Atrioventricular Reentry and Variants**

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**Cardiac Tissue Architecture Determines Velocity and Safety of Propagation**

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**Exercise-induced Cardiac Arrhythmias**

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**KCNQ1/KCNE1 Macromolecular Signaling Complex: Channel Microdomains and Human Disease**

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**Mechanoelectric Transduction/Feedback: Prevalence and Pathophysiology**

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**Exercise-induced Cardiac Arrhythmias**

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**Modeling Cardiac Defibrillation**

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**Restitution, Repolarization, and Alternans as Arrhythmogenic Substrates**

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**Electrophysiologic Characteristics of Atrioventricular Nodal Reentrant Tachycardia: Implications for the Reentrant Circuits**

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**Ventricular Tachycardia in Patients with Structurally Normal Hearts**

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**Gap Junction Distribution and Regulation in the Heart**

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**Implantable Atrial Defibrillators for Atrial Fibrillation**

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**HCN Channels: From Genes to Function**

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**Long QT Syndrome—Therapeutic Considerations**

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**Electrophysiologic Characteristics of Atrioventricular Nodal Reentrant Tachycardia: Implications for the Reentrant Circuits**

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**Genetics of Long QT, Brugada, and Other Channelopathies; Catecholaminergic Polymorphic Ventricular Tachycardia and Short-coupled Torsades de Pointes**

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**Atrial Fibrillation**

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**Heterogeneous Expression of Potassium Channels in the Mammalian Myocardium**

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**Mechanisms of AV Nodal Excitability and Propagation**

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**Electrophysiology of the Pulmonary Veins: Mechanisms of Initiation of Atrial Fibrillation**

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**Junctional Rhythms and Junctional Tachycardia**

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**Voltage-regulated Potassium Channels**

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**Catheter Ablation of Atrioventricular Reentry**

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**Pulmonary Vein Isolation for Atrial Fibrillation**