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Cell Biology
A Laboratory Handbook
细胞生物学实验手册

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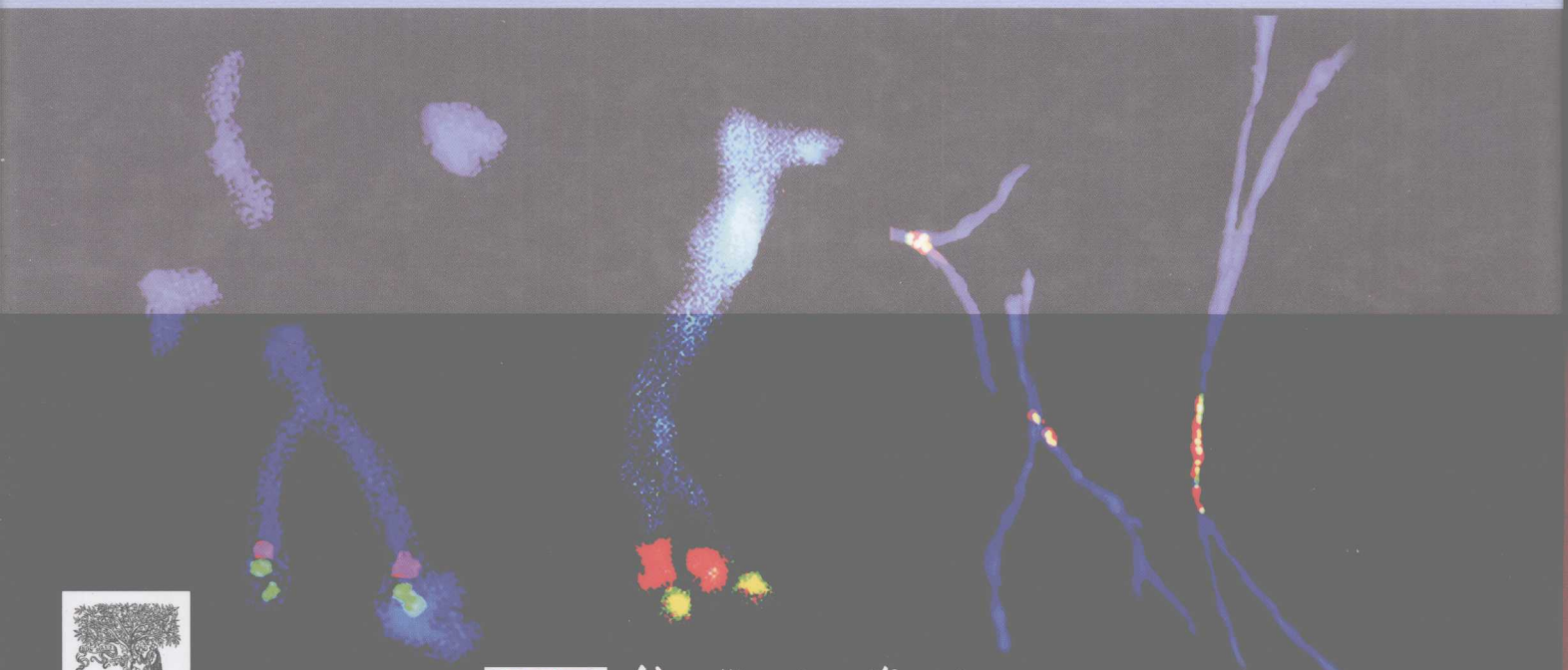
Julio E. Celis



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Cell Biology
A Laboratory Handbook

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Volume 3

细胞生物学实验手册

第三版

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细胞生物学技术方法领域中的“4 颗闪亮之星”

2002 年第 420 卷第 6916 期的 *Nature* 扉页写着“细胞生物学是一门大学科”（Cell Biology is a Big Science）。

或许我们可以从下述两段权威性讲话中，感受细胞生物学学科之“大”，及其在生命科学中的重要地位。

“地球上所有的生物都起源于 30 亿年前的一个原始细胞，从那时起细胞分裂从未间断。每一个人的生命都开始于单个细胞——受精卵，经不断分裂最终产生了我们整个身体 100 万亿（10^{14}）个细胞。在我们身体内每秒钟都有成百上千个细胞在分裂。”这是本世纪第一个年头，即 2001 年生理学/医学诺贝尔奖颁奖仪式上，主持人安德斯·塞特博格的演讲。

“每一个生物学问题的关键最终必将从细胞中寻求（The key to every biological problem must finally be sought in the cell)”。这是上个世纪 20 年代细胞生物学和细胞遗传学一代宗师 Wilson E. B. 在他的不朽著作《细胞的发育与遗传》中的格言。

其实，除了相距近一个世纪的两位大师的格言之外，我们还可从细胞生物学研究领域之广阔，领略它在生命科学与医学中的重要地位。细胞生物学研究内容几乎涉及机体中的所有重要且基本的生命现象，其中包括细胞的生长、增殖、运动、发育、遗传、突变（尤其是癌变）、衰老和死亡（尤其是凋亡）等。由于细胞的生命现象是整个机体生命现象的基础与本质所在，其重要性是不言而喻的。因此，也毫不奇怪近些年来不少诺贝尔奖的工作大都属于细胞生物学范畴，或是与之密切相关。譬如 1999 年生理学/医学奖授予了细胞内信号系统的研究，2000 年授予神经细胞传导的研究，2001 年授予细胞周期的研究，2002 年授予细胞凋亡的研究，2003 年的化学奖授予细胞膜通道的研究，2006 年授予 RNA 干扰的研究，2007 年授予基因打靶的研究。

正是由于细胞生物学的重要地位，它的发展也极其迅猛，如今，细胞生物学的研究内容已突破了细胞本身的局限性，扩展到对细胞、亚细胞、分子等多个层次进行生命现象的探索。今天的细胞生物学家也不再是“纯粹”的细胞学家，他们集细胞生物学家、分子生物学家、免疫学家等于一身。同样，分子生物学家、免疫学家，甚至临床学家也努力地向细胞生物学靠拢，他们热切地希望了解细胞生物学知识，并期盼将细胞生物学技术引入他们的学科。在这种态势下，细胞生物学理论及技术方法倍受相关学科的青睐，于是有关细胞生物学研究方法的专著也应运而生。近年来最受人瞩目的专著或许要数下列几种：《精编细胞生物学实验指南》*Short Protocols in Cell Biology*、《当代细胞生物学实验方法全编》*Current Protocols in Cell Biology*。国内也有数种出版物，诚然，各种版本各具特色。

就实验手册的本质而言，无疑要求它们有如下几个根本的特征：

其一，内容要新，即所介绍的方法具有时代性、前沿性。我们认为，只有能反映与推动细胞生物学及相关学科继续发展的那些新技术才称得上具有时代性与前沿性。本书中有关干细胞、显像技术、大分子转移的内容都不乏新颖性与前沿性。

其二，可操作性。无疑，实验手册是授以操作技能的，因此方案的制定和步骤的描述都必须条理清晰，而理论基础则需言简意赅。本书有关操作步骤的描述该详则详，不尚空谈，相信我国多数读者，遵循其步骤“按图索骥”便会取得明显的功效，因此可适用于各个层次的实验人员。

其三，系统性。虽然实验手册不一定要如教科书那样有十分严密的顺序连贯性，但作为一个学科（如细胞生物学）的技术介绍仍有它的脉络联系，它必然逐次深入，或称作由表及里、由此及彼。本手册共四卷，就方法学讲也是有机联系的，即从细胞培养，结构分析，形态研究到最后的大分子研究。这种布局从形态到机能，从细胞到分子也反映出全书的逻辑性联系。

其四，人性化。这主要表现在各种方法步骤的描述皆以读者为本，处处考虑到能让读者理解与操作无

误，因此语言简洁、并配有必要的示意图。此外还特别指出可能会出现差错与“不尽人意”之处，并因此提出对策。读者无疑会在本手册中体会出这些特性，并感到特别实用甚至非常亲切。

本书分四卷，第一卷主要介绍细胞培养及相关的实验方法。其中有关线虫和其他非共生线虫的实验室培养是不可多得的资料（国内尚未发现相关信息）。第二卷主要介绍细胞器的分类与检测，方法之多、之新，是类似的其他手册不可企及的。第三卷介绍各种成像技术。除了常规的光学和电镜技术，还深入至组织矩阵、基因组学的研究等，这些内容无疑反映了“与时俱进”的特色。第四卷主要介绍大分子转移及表达系统的研究方法，其中包括体细胞核转移技术。可以认为本卷是分子生物学与细胞生物学理论与技术相结合的产物，或许可以认为是最具时代性的篇章。

由上也就不难看出本手册不仅适用于细胞生物学研究，对于从事分子生物学、生物化学、生物工程、发育生物学、病毒学、遗传学，甚至临床医学的研究者也是必不可缺的工具。

本书由 Elsevier Academic Press 出版。主编 Julio E. Celis 为世界著名肿瘤生物学家。副主编等人皆在各自领域中有所建树，并富有实验室经验。正如美国 Thomas Jefferson 大学的 Gregory J. B. 教授所评述的那样“4 颗闪亮之星——此 4 卷总结了几乎全部的现代细胞生物学方案”，我国学者清华大学吴畏教授、陈晔光教授对此书都有很高的评价，认为“非常细致、实用”、“是一套好书，其中的一些编著者也很有名，如 Tony Hunter 和 K. M. Simons 等。”

“他山之石，可以攻玉”，相信本手册为推动我国细胞生物学及相关学科的发展将起到一定的作用。

章静波
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二零零七年八月

前　言

当有新技术的创建，或是旧程序的改良时，常常会促成科学的进步。时至今日，随着从对单个分子的分析迅速地转向对复杂生物学问题的研究时，人们比以往更加需要有互补性的多种技术平台，以解决复杂的生物学问题。《细胞生物学实验手册》第3版萃集了236篇文章，涵盖了细胞学、分子生物学、蛋白质组学、基因组学和功能基因组学中的各种新技术和程序。其中165篇为新征集的文章，多数是应科学界的反馈意见而撰写的。

一如本书第二版那样，本版也分四卷。第一卷包括组织培养及其相关技术、病毒、抗体和免疫组织化学。第二卷包括细胞器和细胞结构，以及细胞生物学检测技术。第三卷涉及成像技术、电子显微镜、扫描探针和扫描电子显微镜、显微解剖、组织矩阵、细胞遗传学和原位杂交、基因组学、转基因、基因敲除和基因削减方法等。最后一卷包括大分子转移、表达系统、除各种蛋白质组学技术之外的基因表达模型。附录收集具代表性的培养细胞系及它们的特征、细胞生物学互联网资源、计算机模拟的蛋白质组分析系统中的生物信息资源。本手册能独到地提供从事生命科学研究所不可缺少的经典及最新的技术。若你身边缺乏专家，则本手册在你科研生涯的任何阶段，均能帮助你利用各种技术和模型系统进行生物学问题的研究。本书所介绍的技术都以一种人性化的、循序渐进的方式娓娓道来，并且还教你某些有用的小窍门以避免实验操作中可能遭遇到的小麻烦。

在此，我向那些辛勤工作、竭力支持、在遴选新技术方面具有远见卓识的副主编们表示由衷的感谢。我同样感谢Elsevier出版社的工作人员对出版本书的不懈支持和敬业精神。许多朋友也参与了本手册的出版，我特别要感谢的是Lisa Tickner，Karen Dempsey，Angela Dooley，Carl Soares以及Tari Paschall，是他们通力协作并组织各卷的撰写。我还要表达对所有作者的谢意，乃因他们不惜时间与精力献身于本书的出版工程。

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（章静波　译）

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