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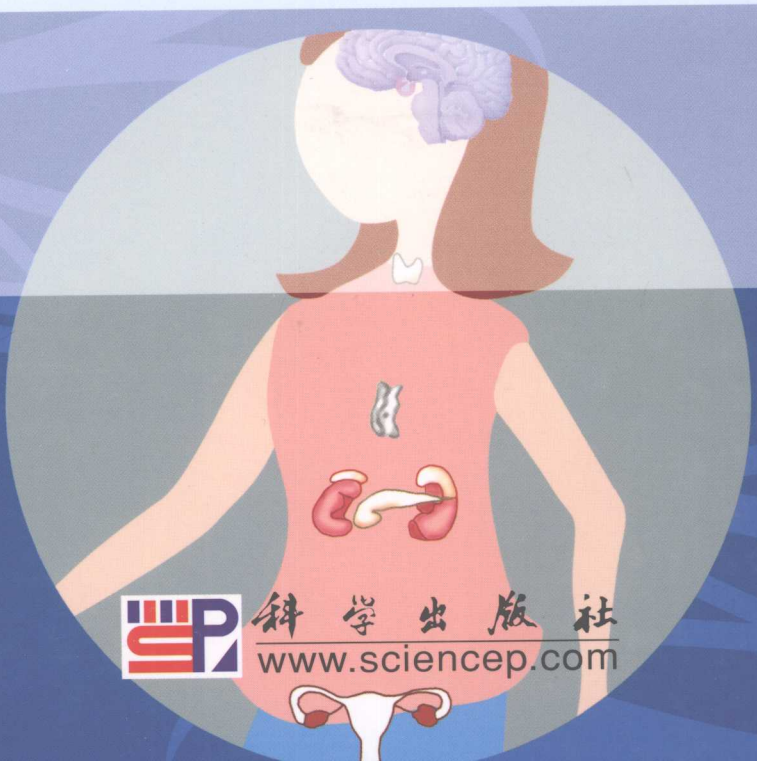
Encyclopedia of Endocrine Diseases: Male Reproduction

内分泌疾病百科全书 6

男性生殖

Luciano Martini



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Encyclopedia of Endocrine Diseases
内分泌疾病百科全书⑥

Male Reproduction
男性生殖

Editor-in-Chief

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Luciano Martini.

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一部值得拥有的内分泌学案头参考书

—评《内分泌疾病百科全书》(Encyclopedia of Endocrine Diseases)

史轶蘩　伍学焱

(中国医学科学院北京协和医院内分泌科,北京,100730)

如何毫不费力地从大海里捞起一枚细针?如何简简单单地在一堆沙砾中找到你想要的一粒珍珠?毫无疑问,精良的工具必不可少。

内分泌学发展迅猛,其理论知识日新月异;新发现的激素物质也层出不穷,其内容浩如烟海。当今,即便是十分优秀博学的内分泌学家,也仅能熟知其日常所研究的领域,不可能成为内分泌学的"百事通"。当遇到你不太熟悉的内分泌学术语或知识时,你一定如独处在茫茫大海上一样无助,有如面临要从一大堆的沙砾中找到一粒珍珠般沮丧,《内分泌疾病百科全书》正是帮你解决此类难题行之有效的工具之一!

这套《内分泌疾病百科全书》为国际上第一部有关内分泌疾病的大型百科全书。它由16位国际顶尖的内分泌学家共同组织和领导全世界约800位知名内分泌学者编写而成,具有很高的学术权威性。本书内容翔实、丰富,囊括了内分泌疾病方面的近500个条目。全书共分为十五个主题,每个主题由一名通晓该领域并在其研究中处于领先地位的学者担任副主编,具体负责该大主题编写人员的组织和文章内容的学术审定。此十五个主题分别为:肾上腺皮质、钙、比较内分泌学、糖尿病、衰老内分泌学、女性生殖内分泌学、胃肠激素、高血压、脂质代谢和动脉粥样硬化、男性生殖内分泌学、神经内分泌学、肽类激素生物合成、垂体疾病、青春期及其相关疾病和甲状腺等。每个主题之下又细分有多个条目,每个条目自成一篇独立的文章,每篇文章内容均可归属上述十五个主题之一,也可能跨越多个主题。

为了让临床与非临床领域的读者都接受本书,所有的文章采用了相同的编排格式。每篇文章均以一个词汇表开头,定义关键术语,全书大约有4800个这样的术语词汇。文章主体以简明扼要的引言开篇,中文选译版已将其翻译为中文,使读者在进入正文之前对下文内容有了初步的了解,有利于方便进入英文原文的阅读和理解。文中的细目标题以醒目的黑体字标出,使读者对本篇文章的内容一目了然。多数文章的重点内容还配有图片和表格进行简洁阐释和直观说明。正文末尾列出了与该篇文章内容相关联的词条,引导读者交叉阅读本书中其他相关的条目内容,使之相互参阅,加深理解。本书所提供的交互参考词条总数达3400条之多。最后的参考文献使读者能够快速地获取和阅读与文章内容密切联系的主要相关文献,以便能对文章主题进行更深入和详尽地了解。

此中文选译版由科学出版社科爱传播中心组织全国各地工作在第一线的数十位医师,对书中要点进行翻译、注解,更加方便国内读者阅读和理解。本书可作为案头必备医学书籍之一,供从事内分泌学或对内分泌学感兴趣的临床医师和基础研究人员以及医学生们随时参考查阅。

我认为本书具有如下特色：

内容全面——全书有近500个条目，并对1500多个术语进行了解释。其内容涉及内分泌疾病的各个方面，既包括糖尿病、甲状腺疾病等经典的常见内分泌疾病，也包括了诸如脂肪细胞因子、ghrelin以及醛固酮受体对心血管疾病发生的作用机制等新近的内分泌学研究成果。

作者专业——本书总主编由国际著名内分泌学家、意大利米兰大学教授Luciano Martini担任，他曾任*Frontiers in Neuroendocrinology*杂志主编，参与编著40多部内分泌领域的图书。全书由25个国家和地区的800多位医学专家共同编著而成。其作者阵容足可组成一部内分泌学界的“名人录”。每位作者均是相应内容研究领域的知名专家。

图文并茂——全书共有900多张精美图片，可帮助读者直观理解文字内容；还配有450个表格，可帮助读者归纳、总结。

结构新颖——本书内容简洁、安排合理。该书原版仅分4卷，我国引进时，为适应国内读者的阅读习惯，按主题不同进行拆分后增加为12卷，但仍然保持了原版书内容的次序。每卷包含一个或两个主题，因而更具针对性，阅读起来也就更加方便。

中文注解——由国内数十名医师对原书的前言、目录、词汇、图注、表注以及其他要点进行了中文翻译及注解，更方便国内读者阅读，有利于准确理解原文，帮助提高英语阅读能力。

查阅便捷——本书极似一部字典，查阅轻松方便。好似能从树叶沿着树枝-树干的方向，深挖根系，追本溯源，加深理解。其内容简明、准确而又十分全面。条理清晰，如抽丝剥茧，层层深入。每一词条内容自成独立单元，短小精悍，避免了专业书籍通常留给读者的内容冗长、连绵不断的不良印象。每次阅读可随时进行或快速终止，化整为零，灵活机动，绝无通常阅读其他大部头书籍时所感到的望不到终点的尴尬和不安。词条之间又可相互链接，形成有机整体。

面对一个不懂的生词，最简单也最可靠的办法是查阅词典。《内分泌疾病百科全书》就相当于这样的一部词典，是一部值得拥有的内分泌学案头参考书。

在此，我特向大家推荐此书！

前　言

内分泌学与生理学两大医学领域息息相关。最初建立内分泌学专业即是因为明确了各种内分泌腺体分泌的激素对生长、生殖与代谢等特征性生理学效应的影响。在早期，对诸如艾迪生病以及黏液性水肿等激素缺乏综合征进行了描述后，激素替代治疗策略很快跟进，常常会极大提升临床疗效。所有这些观察积累使内分泌学者在其后的研究中倾注了巨大的努力，分离并明确了肾上腺、甲状腺、甲状旁腺、垂体与胰腺，以及其他内分泌腺体产生的类固醇与肽类激素的特征。1922 年分离出胰岛素并成功治疗了儿童 1 型糖尿病，即是这个时期内分泌学成就的缩影。而放射免疫测定法（RIAs）的建立则是里程碑式的进步，它使得人们可在不同生理条件下测定激素水平。RIAs 对内分泌学的改变比其他医学领域都大。由于具有了在刺激与抑制试验中稳定测定激素水平的能力，人们不仅建立了反馈调节机制，也依之形成了当前许多诊断模式的基础。RIAs 不仅揭示了激素分泌的固有模式（包括昼夜节律与再生循环等），也揭示了在睡眠、进食、应激、运动以及其他日常生活事件中的激素反应。激素细胞膜受体与细胞核受体形成了靶细胞的特异性反应，相关研究已经加速了我们对激素作用的理解。这些受体引出的信号转导途径形成了错综复杂的信息网络，细胞即通过这个网络感知外部环境。对于编码庞大的激素及其受体家族的基因与 cDNA，重组 DNA 技术已成为对其进行克隆的基本方法。第一批克隆的哺乳动物 cDNA 包括生长激素、绒毛膜促性腺激素以及生长抑素。随着人类基因组计划的完成，编码激素及其受体的所有基因基本都已确定。然而，由于不清楚其配体且功能尚未完全确定，许多受体仍是“孤儿”。毫不奇怪，遗传学的进步极大地加深了我们对遗传性内分泌疾病的理解。

由于内分泌领域将生理学、生物化学与细胞信号转导等内容与患者看护完美地结合在一起，因而其吸引了大多数内科医生的兴趣。内分泌疾病的临床表现通常可由对激素生理作用的理解来进行阐释——即不足或亢进。临床医生对激素分泌、作用以及反馈调节机制进行理解并构建相应概念框架，能够为其提供逻辑上的诊断方法，并可有针对性地进行适当的实验室检验以及影像学检查。许多内分泌疾病可被治愈这一事实，或者说那些行之有效的疗法，使得内分泌学的实践特别令人满意。但由于进行体格检查时无法触及大多数内分泌腺体，内分泌专科医生必须经过训练，来发现那些指示真正内分泌疾病的病史与细微体征的主要特点。人们越来越需要尽早发现内分泌疾病，而不是在临床表现很明显时再去确诊。因此，“亚临床型甲状腺功能减退症”、“葡萄糖耐量受损”，以及“偶发肾上腺或垂体腺瘤”等术语已经慢慢进入我们的词汇表，并改变了对患者进行诊疗的方法。在我们尝试诊断更精细的疾病时，实验室检查更显其重要性。

由于内分泌学建立在基础学科的坚实基础上，其知识库在不断地快速更新。除了依靠遗传学与分子生物学而产生的的巨大进步外，内分泌领域还得益于空前数量新药的引入，尤其是那些治疗糖尿病和骨质疏松症的药物。糖尿病、高血压、肥胖与骨质疏松等普通疾病，已经成为很多大规模临床试验的研究主题，这些临床试验为医疗决

策提供了强有力的循证依据。

医学的飞速变化要求内科医生随之不断更新自己的知识与临床技能。《内分泌疾病百科全书》已经意识到这种挑战，对内分泌学基础以及临床的当前知识进行了出色的整理编辑。这部不同凡响的四卷集专著，向读者提供了近 500 篇关于内分泌学基础与临床的文章。文章的专题内容不仅有经典内分泌学主题，如甲状腺功能减退症与肢端肥大症等，也包括脂肪细胞因子、胃促生长素，以及醛固酮受体在心血管疾病中的作用等新内容。本书国际化的作者团队均为其撰写主题领域的专家，这些主题已经过精细划分，以期提供深入的知识覆盖面。例如，肢端肥大症这一主题分为临床特征、诊断、治疗等内容，对于最具难度的病例，也能提供所需的细节。而且，标准化的格式与清晰明了的图示有助读者迅速找到答案。本百科全书涉及了所有内分泌领域，在内分泌学方面为读者提供了奥妙人体知识的一部新颖、综合的参考文献。

读者有一部《内分泌疾病百科全书》在手，可以饶有兴趣地去思索内分泌领域仍存的重大问题以及未来探索的方向。哪些遗传与适应因素使得体内激素水平处在相对较宽的正常范围？令人惭愧的是，对于一些基本过程（如青春期发育、食欲控制、性腺分化为睾丸或卵巢、胰岛细胞再生、胰岛素抵抗以及自身免疫性内分泌疾病的原因等）的激素调控，我们还没有完全理解清楚；对于许多激素治疗所应采取的模拟生理的最佳途径，我们还需要努力探索。这方面的一个例子就是研究者已提供了胰岛素强化替代治疗，以及生长激素或皮质醇替代治疗，以使有益疗效胜过并发症。新治疗方法（如使用周期性 PTH 治疗骨质疏松症）仍需临床试验的检验，读者可以轻易联想到以下问题，比如如何制定治疗周期，以及此种疗法如何与其他改变成骨细胞与破骨细胞功能的疗法相关联。基因转移与干细胞疗法也为糖尿病与骨质疏松症等疾病的治疗提供了新的希望。《内分泌疾病百科全书》可使研究人员与临床医生处在内分泌学的前沿，从而促进上述新发现进一步的发展。

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序

在人体最复杂的结构中，内分泌系统包含了一组分泌激素直接进入血液的腺体、这些激素的受体，以及它们所涉及的细胞内信号通路。内分泌系统通过激素调控代谢、体温、生物循环、体液量、生殖、生长和发育，维持和调节机体的稳定。幸运的是，当这个系统功能达到最佳状态时，其效果是让人惊叹的。然而，内分泌系统的运行、作用和功能失调的方式也种类繁多。

这部《内分泌疾病百科全书》并非内分泌学科的入门书籍，而是试图为可能发生于内分泌系统的庞杂的疾病和功能失调谱提供一个全面的参考。在过去的 10～20 年中，内分泌领域出现了很多引人瞩目的发现，特别是在诊断技术和治疗方法方面，有鉴于此，这部开创性的百科全书出现得非常及时。事实上，在本书还在构思阶段时，新的激素就已经被命名。

这部包罗万象的大型参考书从最初的构思到最后的出版，饱含了无数人的努力，涉及大量的策划、分期和组织工作。在初始阶段，我们对最广泛的可能的题目名单进行了汇编，并组织 14 名副主编组成了一个卓越的跨国团队。在编纂过程中，编辑们对他们专长的学科领域的编写进行了指导，推荐并联系文章撰稿人，审阅手稿，并且一直协助推敲主题列表。

本百科全书意在成为跨越内分泌系统的多个不同方面的有用和综合的信息来源。本书中，来自全世界的约 800 名内分泌领域著名的临床医师和科学家对近 500 个题目进行了探讨。有兴趣的读者可以在书中找到关于新发现激素的文章，如胃促生长素和瘦素；也可以找到关于一些疾病的文章，如高血压、低血糖症、糖尿病、癌症、骨质疏松、肾结石、Graves 病、Paget 骨病、阿尔茨海默病、Noonan 综合征、朗格汉斯细胞疾病、库欣综合征、甲状腺和垂体功能失调；以及一些探讨如下专题的文章：内分泌系统的进化、激素的作用机制、衰老的内分泌衰竭和神经系统与内分泌系统的整合作用。

为使本书能够同时被临床领域和非临床领域的读者所接受，所有的文章都采用了相似的格式，每一个专题都进行了独立的表述。每篇文章的开头是一个词汇表，定义了那些读者可能不熟悉，但对理解文章很重要的关键术语。文章主体以精要的引言开篇，以贯穿全文的黑体标题对读者进行引导，多数文章都采用图片和表格进行阐释说明。紧随文后的参考文献使读者能够对主题进行深入思考，并引导读者阅读书中其他相关条目。最后一卷中对完整的四卷文献中出现过的所有词汇条目进行了汇编，作为与内分泌系统及其功能紊乱相关的主题词典。

我希望这部《内分泌疾病百科全书》对不同的读者来说都是有价值的资源，特别是学生，这套书可能会将他们吸引到内分泌这一领域中来。如果没有日本、荷兰、丹麦、瑞士、意大利和美国的关键人物的电邮合作、协调和互相信赖，这套书是不可能完成的。非常感谢各位编辑专注无私的努力，同时也感谢指导本书规划的 Elsevier 集

团旗下的 Academic Press 职员的勤奋与慷慨，他们是：Tari Paschall，Chris Morris，Carolan Gladden 和 Joanna Dinsmore。向所有的撰稿人表示衷心的感谢，你们付出时间和精力完成的文章才成就了这部百科全书。

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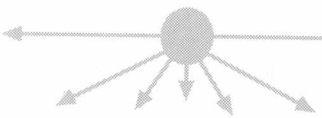

Foreword

The field of endocrinology is inextricably linked to physiology. The specialty was initially founded when it became clear that various glands produced hormones that exerted characteristic physiologic effects on growth, reproduction, and metabolism. Early descriptions of hormone deficiency syndromes such as Addison's disease and myxedema were soon followed by hormone replacement strategies, often resulting in dramatic clinical effects. These observations unleashed intensive efforts to isolate and characterize the steroid and peptide hormones produced by the adrenal, thyroid, parathyroid, pituitary, and pancreatic islets, and other glands. The success of this era was epitomized by the isolation of insulin and the successful treatment of children with type 1 diabetes mellitus in 1922. The development of radioimmunoassays (RIAs) was a monumental advance that allowed hormones to be measured in various physiologic conditions. RIAs transformed endocrinology more than any other field. The ability to measure hormone levels during stimulation and suppression tests firmly established the principles of feedback regulation and formed the basis for many current diagnostic algorithms. RIAs also revealed the natural patterns of hormone secretion, including circadian rhythms and reproductive cycles, as well as hormonal responses to sleep, meals, stress, exercise, and other daily life events. Our understanding of hormone action has been accelerated by studies of their membrane and nuclear receptors, which convey hormone specificity in target tissues. The signaling pathways elicited by these receptors constitute intricate and complex networks that inform the cell about its external environment. Recombinant DNA technology has been essential for cloning the genes and cDNAs that encode large families of hormones and receptors. Growth hormone, chorionic gonadotropin, and somatostatin were among the first mammalian cDNAs to be cloned. With completion of the human genome project, all of the genes that encode hormones and their receptors have, in principle, been identified. However, many of these receptors remain "orphans" with still-unknown ligands and incompletely defined functions. Not surprisingly, genetic advances have revealed remarkable insight into inherited endocrine disorders.

Most physicians are attracted to the field of endocrinology because it so beautifully integrates physiology, biochemistry, and cell signaling with patient care. Clinical manifestations of endocrine disorders can usually be explained by understanding the physiologic role of hormones—whether deficient or excessive. The conceptual framework for understanding hormone secretion, hormone action, and principles of feedback control provides the clinician with a logical diagnostic approach that typically employs appropriate laboratory testing and/or imaging studies. The fact that many endocrine disorders are amenable to cure or effective treatment also makes the practice of endocrinology especially satisfying. Because most glands are inaccessible to physical examination, endocrinologists are trained to detect key features of the medical history and subtle physical signs that point toward true endocrine disease. Increasingly, the challenge is to identify endocrine disorders at their earliest stages rather than when the clinical manifestations are obvious. Terms such as subclinical hypothyroidism, impaired glucose tolerance, and incidental adrenal or pituitary adenoma have crept into our vocabulary and have changed our approach to patients. Laboratory testing takes on added importance as we attempt to diagnose more subtle forms of disease.

Building on this strong foundation of basic science, the knowledge base in endocrinology continues to change rapidly. In addition to the dramatic advances

generated from genetics and molecular biology, the field has benefited from the introduction of an unprecedented number of new drugs, particularly for the management of diabetes and osteoporosis. Common diseases such as diabetes, hypertension, obesity, and osteoporosis have also been the subject of numerous large-scale clinical trials that provide a powerful evidence base for medical decision-making.

The rapid changes in medicine mandate that physicians continuously update their knowledge base and clinical skills. The *Encyclopedia of Endocrine Diseases* recognizes this challenge and provides a remarkable compilation of current knowledge in basic and clinical endocrinology. This ambitious four-volume set provides nearly 500 articles on basic and clinical endocrinology. The topics range from classic endocrine subjects such as hypothyroidism and acromegaly to new dimensions of the field including adipocytokines, ghrelin, and the role of the aldosterone receptor in cardiovascular disease. The international group of authors are experts in their topics, which have been subdivided to provide in-depth coverage. Thus, acromegaly is separated into articles on clinical features, diagnosis, and therapy to provide the level of detail needed to manage the most challenging cases. The standardized format and clear illustrations help to quickly offer answers. It is difficult to imagine an endocrine topic not covered in this encyclopedia, which provides a new, comprehensive reference for the daunting body of knowledge in endocrinology.

With a four-volume *Encyclopedia of Endocrine Diseases* in hand, it is interesting to speculate about the remaining big questions and future discoveries in endocrinology. What are the genetic and adaptive elements that cause such a broad normal range for hormone values? It is humbling to recognize that we still have an incomplete understanding of the hormonal control of fundamental processes such as the onset of puberty, appetite control, gonadal differentiation into testes or ovaries, islet cell regeneration, insulin resistance, and causes of autoimmune endocrine disease. We still have much to learn about the optimal way to deliver many hormone therapies to mimic normal physiology. This topic is prominent in our efforts to provide intensive insulin replacement, or to replace growth hormone or cortisol, such that the beneficial effects outweigh complications. New therapies, such as intermittent PTH for osteoporosis, will be subjected to additional clinical trials, and one can easily imagine emerging questions about how to cycle the therapy and how to use it in relation to other treatments that alter osteoblast and osteoclast function. Gene transfer and stem cell strategies provide promising treatments for disorders such as diabetes and osteoporosis. The *Encyclopedia of Endocrine Diseases* can help to foster these discoveries by keeping researchers and clinicians at the cutting edge of endocrinology.

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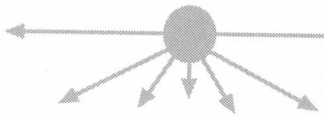

Preface

Among the most complex constructs in the body, the endocrine system comprises a group of glands that secrete hormones directly into the bloodstream, together with the receptors for these hormones and the intracellular signaling pathways they invoke. The endocrine system maintains and regulates stable functioning by using hormones to control metabolism, temperature, biological cycles, internal fluid volume, reproduction, growth, and development. Fortunately, the system is a marvel when functioning optimally. However, the ways in which its processes, actions, and functions may go awry are myriad.

The *Encyclopedia of Endocrine Diseases* is not meant as a primer on the subject of endocrinology, but instead is intended to provide a comprehensive reference work on the extensive spectrum of diseases and disorders that can occur within the endocrine system. This groundbreaking encyclopedia is especially timely, as there have been dramatic discoveries in the field of endocrinology over the past 10 to 20 years, particularly with respect to diagnosis techniques and treatment methods. Indeed, during the time since the encyclopedia was conceived, new hormones have been named.

To bring a major reference work of such broad scope from initial conception to final publication involved a great deal of planning, staging, and organization, together with the efforts of innumerable individuals. At the start, the broadest possible list of topics was compiled and a distinguished multinational panel of 14 associate editors was assembled. Throughout the editorial process, the editors supervised their subject area of expertise, recommended and corresponded with article contributors, reviewed the subsequent manuscripts, and continuously helped to refine the topics list.

The encyclopedia is intended to serve as a useful and comprehensive source of information spanning the many and varied aspects of the endocrine system. It consists of nearly 500 topics explored by some 800 eminent clinicians and scientists from around the world, a veritable who's who of endocrine research. Here the interested reader can find articles on newly discovered hormones such as ghrelin and leptin; articles about such maladies as hypertension, hypoglycemia, diabetes, cancer, osteoporosis, kidney stones, Graves' disease, Paget's disease, Alzheimer's disease, Noonan syndrome, Langerhans cell disease, Cushing's syndrome, thyroid and pituitary disorders; and articles dealing with subjects ranging from the evolution of the endocrine systems, the mechanisms of hormone action, and the endocrine failure in aging to the integration between the nervous and the endocrine systems.

Written to be accessible to both the clinical and nonclinical reader, all of the articles are formatted in similar fashion and each is intended as a stand-alone presentation. Beginning each article is a glossary list defining key terms that may be unfamiliar to the reader and are important to an understanding of the article. The body of the article begins with a brief introduction to the subject under discussion, bold headings lead the reader through the text, and figures and tables explain and illuminate most articles. Following the article are reference citations to provide the reader with access to further in-depth considerations of the topic and cross-references to related entries in the encyclopedia. A compilation of all glossary terms appearing in the complete four-volume work is presented in the final volume as a dictionary of subject matter relevant to the endocrine system and its disorders.

It is my hope that the *Encyclopedia of Endocrine Diseases* proves to be a valuable resource to a deservedly diverse readership, and particularly to students, many of whom it may well attract to the rewarding field of

endocrinology. The project would not have been possible without cooperation, coordination, and reliance on e-mail among the key people, who were located in Japan, The Netherlands, Denmark, Switzerland, Italy, and the United States. I am greatly indebted to the dedicated and unstinting efforts of my associate editors, as well as the diligence and generosity of spirit of the Elsevier/Academic Press personnel who shepherded the project: Tari Paschall, Chris Morris, Carolan Gladden, and Joanna Dinsmore. To all of our contributors go profound thanks for investing time and energy to produce their articles, which together have made the encyclopedia.

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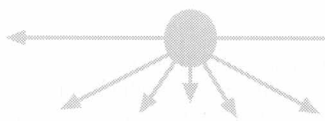

Guide to the Encyclopedia

The *Encyclopedia of Endocrine Diseases* is a comprehensive and authoritative study of the various disorders that affect or involve the endocrine system. It includes nearly 500 different articles on various aspects of this subject, written by experts from around the world. The print version of this work consists of four separate volumes and about 3,200 pages.

Each entry in the encyclopedia provides a focused description of the given topic, intended to inform a broad spectrum of readers, ranging from research professionals to students to the interested general public. The entries are self-contained and can be read in isolation, but there is a general scheme linking related topics by means of cross referencing and by their placement in specific subject areas (see Organization).

In order that you, the reader, will derive the greatest possible benefit from your use of the *Encyclopedia of Endocrine Diseases*, we have provided this guide. It explains how the encyclopedia is organized and how the information within it can be located.

FORMAT

All the articles in the *Encyclopedia of Endocrine Diseases* are arranged in a single alphabetical sequence by title. Articles whose titles begin with the letters A to D are in Volume 1, articles with titles from E to Im are in Volume 2, articles from In to Pl are in Volume 3, and articles from Po to Z are in Volume 4, along with the combined glossary and the subject index.

So that they can be easily located, article titles generally begin with the key word or phrase indicating the topic, with any generic terms following. Thus, for example, "Acromegaly, Diagnosis of" is the article title rather than "Diagnosis of Acromegaly," and "Hypothyroidism, Causes of" is the title rather than "Causes of Hypothyroidism."

ORGANIZATION

For the purpose of this encyclopedia, chief editor Dr. Luciano Martini and the associate editors have defined the study of endocrine diseases as consisting of 15 distinct subject areas, as follows:

Adrenal Cortex
Calcium
Comparative Endocrinology
Diabetes
Endocrinology of Aging
Female Reproduction
Gastrointestinal Hormones
Hypertension
Lipid Metabolism and Atherosclerosis
Male Reproduction
Neuroendocrinology
Peptide Hormone Biosynthesis
Pituitary Gland and Diseases
Puberty and Related Diseases
Thyroid Gland

Each of these subject areas was assigned by the chief editor to an associate editor or pair of editors with particular expertise in that discipline. The editor in question was primarily responsible for the selection of topics and authors in this area, and for the review and approval of manuscripts, in consultation with the chief editor and the other associate editors.

Every article in the encyclopedia is designated as part of one (or more) of these 15 subject areas. For example, various articles on glucocorticoids appear in the adrenal cortex subject area. Please see p. xvii for a complete listing of the articles in the encyclopedia according to their subject area.

GLOSSARY

The glossary section appears before the beginning of the article text and is displayed in a tinted box. It contains terms that are important to an understanding of the article and that may be unfamiliar to the reader. Each term is defined in the context of the particular article in which it is used. The encyclopedia includes approximately 4,800 glossary terms. For example, the article "Magnesium Disorders" includes the following glossary entries:

insulin resistance A pathophysiological state in which the tissues and organs are insensitive (resistant) to insulin actions, resulting in hyperinsulinemia, which leads to a syndrome of hypertension, diabetes, and hyperlipidemia (syndrome X or metabolic syndrome).

magnesium deficiency An intracellular lack of magnesium resulting in a derangement of numerous biochemical and physiological reactions.

preeclampsia A state of pregnancy-induced hypertension that, if left unchecked, can result in severe morbidity and mortality for both mother and baby.

torsades de pointes Ventricular tachycardia characterized by polymorphic QRS complexes that change in amplitude and cycle length.

DEFINING PARAGRAPH

The text of each article begins with a single introductory paragraph that is printed in a different typeface and set off from the rest of the article. This introduction defines the topic under discussion and summarizes the content of the article. For example, the entry "Langerhans Cell Disease" begins with the following defining paragraph:

Langerhans cell disease or Langerhans cell histiocytosis (LCH) is a rare disease of varied biologic behavior and course, resulting from the pathologic accumulation of cells that resemble the epidermal Langerhans cell. Although sometimes it may resolve spontaneously, it usually follows a chronic course and can either be localized to a few systems or progress to a multisystem disease, with considerable morbidity and mortality.

CROSS-REFERENCES

All the articles in the encyclopedia have cross-references to other articles. These appear at the end of the article, following the end of the narrative text and preceding the further reading section. The encyclopedia contains about 3,400 cross-references in all. The cross-references indicate related articles that can be consulted for further information on the same topic, or for information on a related topic. For example, the article "Prolactinoma, Pathogenesis" provides the following cross-references:

Fibroblast Growth Factor • Prolactin (PRL) • Prolactin, Evolution of • Prolactinoma, Clinical Manifestations • Prolactinoma, Diagnosis • Prolactinoma, Therapy • Thyrotropin-Releasing Hormone (TRH)

FURTHER READING

The further reading section appears as the last element of the article. It lists recent secondary sources to aid the reader in locating more detailed or technical information. Review articles and research papers that are important to an understanding of the topic are also listed. For example, the article "Kidney Stones" has the following suggested readings:

Andreucci, V. E. (1999). New frontiers in renal stone disease. *Nephron* **81** (Suppl. 1).

Bihl, G., and Meyers, A. (2001). Recurrent renal stone disease: Advances in pathogenesis and clinical management. *Lancet* **358**, 651–656.

Khan, S. R. (1999). Second Finlayson Colloquium on Urolithiasis. *J. Am. Soc. Nephrol.* **10** (Suppl. 14).

Morton, A. R., Iliescu, E. A., and Wilson, J. W. L. (2002). Nephrology: I. Investigation and treatment of recurrent kidney stones. *Can. Med. Assoc. J.* **166**, 213–218.

Pearle, M. S. (2001). Prevention of nephrolithiasis. *Curr. Opin. Nephrol. Hypertension* **10**, 203–209.

Tiselius, H. G., Ackerman, D., Alken, P., Buck, C., Conort, P., and Galluci, M. (2001). Guidelines on urolothiasis. *Eur. Urol.* **40**, 362–371.

Wilkinson, H. (2001). Clinical investigation and management of patients with renal stones. *Ann. Clin. Biochem.* **38**, 180–187.

The further reading references are for the benefit of the reader; they provide the author's recommendations for more information on the given topic. Thus they consist of a limited number of entries. They do not represent a complete listing of all the sources consulted by the author in preparing the paper.

INDEX

A subject index is located at the end of Volume 4. This index is the most convenient way to locate a desired topic within the encyclopedia and thus it should be the starting point for any reader seeking to find a topic. The entries in the index are listed alphabetically and indicate the volume and page number where information on this topic can be found.