

<<节律与同步>>

图书基本信息

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作者：斯奎尔 编

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## 前言

什么是百科全书？

这一名词来自于两个希腊单词：enkuklios（意思是循环的）和paideia（意思是教育）。

在16世纪早期，拉丁手稿的抄写者们将这两个单词合而为一，其在英语中演化为一个单词，意思是具有广泛指导意义的工具书（The

American Heritage Dictionary, 2000, Boston: Houghton Mifflin, p.589）。

从其来源可见，其希腊文原词中蕴含着以探索、综合的方式努力获取知识的含义。

无论是拉丁文还是英文，该单词泛指涵盖广泛领域知识的工具书。

希腊文中强调的以创造性手段获取知识，在神经科学领域尤其适用。

神经科学本身就是一个非常新的名词。

Francis Schmitt在本书第一版的前言中指出，本书的编写过程就是将不同领域的科学家们聚集在一起，冲击大脑研究中最顽固的难题。

他推动建立了神经科学研究项目（Neuroscience Research Program, 简称NRP）。

早期的NRP成员包括一些学术巨匠，如因关于光合作用的研究获得诺贝尔奖的：Melvin Calvin、诺贝尔奖获得者物理化学家Manfred Eigen、生物化学家Albert Lehninger，和当时正在努力破解基因编码的年轻分子生物学家Marshall Nirenberg。

Schmitt建立NRP的时候，神经科学作为一门综合学科还几乎不存在。

微电极的发明使神经生理学家们得以记录单细胞的电活动，但是几乎不可能甄别其生物化学特性。

一个重要的推进来自20世纪60年代中期涌现的Falck-Hillarp荧光显微镜技术，它能够选择性地观察儿茶酚胺和5-羟色胺能神经元。

这些胺类通路的研究又很快使得检测选择性损伤后效应的行为学家们和生物化学家们开始合作研究，使得后者的工作不再局限于在整个脑组织匀浆的水平研究神经递质。

20世纪70年代关于神经递质受体的生化研究、它们位点的放射自显影研究，以及神经多肽的免疫组织化学研究，更是进一步促进了神经生理学家、神经解剖学家、神经化学家和神经药理学家们的对话。

而过去两个世纪以来，分子生物学技术手段的应用更加丰富了这一交流。

神经科学的爆炸性发展也体现在神经科学学会（Society for Neuroscience, SFN）的历史上。

SFN于1970年（译者注：SFN网站中所写的时间为1969年）由几百名研究人员在华盛顿特区创立，首任会长是Vernon Mountcastle。

而当我于1980年担任会长时，会员人数已经增长到

7000人。

我当时的一个主要任务是应对关于学会存在合理性的争论。

有人认为“我们学会的科学家人数太多了。

应当将其一分为二，如实验类的和理论类的”。

与此相反，为了强调该领域的整体特点，我们推出了《神经科学杂志》（Journal of Neuroscience）。

同时，我们认为学会的增长可能会最终进入平台期，精心的会议组织将可以避免会员个人“在会议的人潮中迷失”。

现在看来，我当时关于平台期的预言偏离了实际。

截至2007年5月，神经科学学会的会员人数已经超过了38 000名，其中超过35 000人参加每年的年会，这样的规模超过了其他任何生物医学类的学会。

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### 内容概要

《神经科学百科全书》原书篇幅巨大，为所有神经科学百科全书之首。由来自世界各地的2400多位专家撰稿人合力打造，覆盖了神经科学全部主要领域。每个词条在收入书中之前均经过顾问委员会的同行评议，词条中均含有词汇表、引言、参考文献和丰富的交叉参考内容。

主编为著名神经科学家、美国神经科学学会前主席Larry R. Squire。

内容平易，本科生即可读懂。

深度和广度独一无二，足可满足专家学者的需要。

导读版精选原书中的部分主题，按内容重新编排，更适合国内读者购买和阅读。

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作者简介

编者：（美国）斯奎尔（Larry R.Squire）

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## 书籍目录

昼夜节律 Circadian Function and Therapeutic Potential of Melatonin in Humans Circadian Gene Expression in the Suprachiasmatic Nucleus Circadian Genes and the Sleep-Wake Cycle Circadian Metabolic Rhythms Regulated by the Suprachiasmatic Nucleus Circadian Organization Circadian Organization in Non-Mammalian Vertebrates Circadian Oscillations in the Suprachiasmatic Nucleus Circadian Regulation by the Suprachiasmatic Nucleus Circadian Regulation in Invertebrates Circadian Rhythm Models Circadian Rhythms in Sleepiness, Alertness, and Performance Circadian Rhythms: Influence of Light in Humans Circadian Systems: Evolution Clock Gene Regulation of Endocrine Function Clock Genes and Metabolic Regulation Entrainment of Circadian Rhythms by Light Genetic Regulation of Circadian Rhythms in Drosophila Genetics of Circadian Disorders in Humans Mammalian Sleep and Circadian Rhythms: Flies Melatonin Regulation of Circadian Rhythmicity in Vertebrates Non-Photoreceptor Photoreception Peripheral Circadian Oscillators Photoreceptors and Circadian Clocks Psychiatric Disorders Associated with Disturbed Sleep and Circadian Rhythms. Serotonin and the Regulation of Mammalian Circadian Rhythms Shift Work and Circadian Rhythms Single Cell Neuronal Circadian Clocks Sleep and Circadian Rhythm Disorders in Human Aging and Dementia Sleep and Waking in Drosophila Sleep: Development and Circadian Control Transcription Control and the Circadian Clock 季节节律 Photoperiodic Regulation of Reproductive Cycles Seasonal Changes in Night-Length and Impact on Human Sleep Seasonal Hormonal Changes and Behavior Seasonal Timing: Neural Mechanisms 睡眠、做梦与清醒 Autonomic Dysregulation During REM Sleep Cataplexy Coma Dopamine Control of Arousal Dream Function Dreams and Dreaming: Incorporation of Waking Events Dreams and Nightmares in PTSD Dreams, Dreaming Theories and Correlates of Nightmares Endocrine Function During Sleep and Sleep Deprivation Hibernation Immune Function During Sleep and Sleep Deprivation Metabolic Syndrome and Sleep Napping Narcolepsy Nightmares Parasomnias Pharmacology of Sleep: Adenosine Reticular Activating System Sleep and Circadian Rhythm Disorders in Human Aging and Dementia Sleep and Sleep States: Gene Expression Sleep and Sleep States: Hippocampus-Neocortex Dialog Sleep and Sleep States: Histamine Role Sleep and Sleep States: Hypothalamic Regulation Sleep and Sleep States: Network Reactivation Sleep and Sleep States: PET Activation Patterns Sleep and Sleep States: Phylogeny and Ontogeny Sleep and Sleep States: Thalamic Regulation Sleep Apnea Sleep Architecture Sleep Deprivation and Brain Function sleep Deprivation: Neurobehavioral Changes Sleep in Adolescents Sleep in Aging Sleep Mentation in REM and NREM: A Neurocognitive Perspective Sleep Oscillations Sleep Oscillations and PGO Waves Sleep Research and Sleep Medicine in Historical Perspective Sleep-Dependent Memory Processing Sleeping Sickness Sleep-Wake State Regulation by Acetylcholine Sleep-Wake State Regulation by Noradrenaline and Serotonin Stimulant and Wake-Promoting Substances The AIM Model of Dreaming, Sleeping, and Waking Consciousness Thermoregulation during Sleep and Sleep Deprivation 原书词条中英对照表

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## 章节摘录

插图：The alternation of light and dark is the most reliable timing cue on our planet, and therefore it is not surprising that the retina has evolved a precise timing mechanism that allows it to anticipate and then to adapt to the more than 1 million-fold change in light intensity during a 24 h period. The retina was the first extra-SCN oscillator to be discovered in mammals. Several studies have now demonstrated that many of the physiological, cellular, and molecular rhythms that are present within the retina are under the control of a circadian clock, or more likely a series of circadian clocks that are present within this tissue ( Figure 1 ). For example, the disk shedding that occurs in the rod photoreceptors is under circadian control. Shedding persists in animals with SCN lesions or a transected optic nerve, indicating its independence from the central circadian pacemaker. Additional studies have reported that sensitivity to light-induced photoreceptor damage is modulated by the circadian clock via a cyclic adenosine monophosphate ( cAMP ) -dependent pathway. Other important retinal functions, such as visual sensitivity, are also under circadian control. Although results from these studies suggested that retinal physiology was regulated by a circadian clock, they were not sufficient to conclude that an independent circadian pacemaker was located within the retinal tissue. The definitive demonstration of the presence of an autonomous retinal clock in mammals was achieved a few years ago when it was shown that a circadian rhythm of melatonin release persisted in mammalian retinas maintained in culture. In light/ dark cycles, melatonin levels were high during the night and low during the day. In constant darkness, the circadian rhythm of melatonin release free-ran, exhibiting a period close to 24 h. The circadian rhythm of melatonin release in the retina can be entrained by light in vitro and is temperature compensated. Such results demonstrated that the retina can be considered a bona fide circadian pacemaker, since it satisfies the three fundamental properties ( i.e., freerunning, entrainment, and temperature compensation ) that describe a circadian rhythm.

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### 编辑推荐

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