<<细胞和分子神经生理学>>

图书基本信息

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作者：Constance Hammond

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前言

人脑或神经系统是我们已知的宇宙中最复杂的物质结构，神经科学是探索脑的奥秘的科学，是21世纪迅猛发展的生命科学中最为突出的领域之一。
过去的十多年中，分子生物学和计算机科学技术的快速发展，极大地推动了神经科学的发展，人类基因组DNA序列的阐明及其对神经科学的推动、脑功能成像技术研究人脑和心理活动的巨大进展便是最突出的代表。
对许多神经元活动的基本过程，神经科学家已经可以通过基因操作，在基因及其编码的蛋白分子的结构和功能水平上进行描述和分析，从而精细地研究其复杂的细胞膜上和胞内信号的调控分子机制。
脑功能成像技术使得过去只能停留在人脑这个“黑箱”外、对心理现象的脑机制进行各种猜测和假说的时代成为过去，人脑的认知和思维活动变得“看得见”了。
神经科学不仅吸引着各类神经生物学家、化学家和物理学家，而且吸引分子生物学家、计算机科学家和心理学家纷纷加入其中，成为真正意义上的多种学科交叉的科学。

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内容概要

这本《细胞分子神经生理学》描述了神经细胞生理活动过程的基本概念、基本原理和主要的实验依据，包括神经细胞和胶质细胞的结构与功能、电压门控性离子通道与神经元的兴奋性、受体门控性离子通道与突触传递、神经电信号在树突一胞体的整合、神经元发放模式、突触可塑性以及神经网络等。尽管该书没有探讨多突触信号的汇聚整合原理、整合信号驱动神经细胞编程的机理、神经信号编程的内涵、神经信号编程的稳态以及网络内神经元的时空编程等神经科学的基本问题，但对于神经生理学领域教学研究人员仍然是一本应选用的好教科书，尤其是对于神经科学的初学者来说，这本书是建立神经生理学基本概念和知识的精品读物。
为了使初学者能够尽快地把握该书的内容，导读作者用中文给出了各个章节的核心要点。

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作者简介

作者：(美国)Constance HammondLarry R. Squire is Distinguished Professor of Psy-chiatry, Neurosciences, and Psychology at the Univer-sity of California School of Medicine, San Diego, andResearch Career Scientist at the Veterans AffairsMedical Center, San Diego. He investigates the organi-zation and neurological foundations of memory. He isa former President of the Society for Neuroscience andis a member of the National Academy of Sciences andthe Institute of Medicine.Darwin K. Berg is Distinguished Professor in theDivision of Biological Sciences at the University ofCalifornia, San Diego. He has been chairman of theBiology Department and currently serves as Councilorof the Society for Neuroscience and as a Board memberof the Kavli Institute for Brain and Mind. His researchis focused on the roles of nicotinic cholinergic signal-ing in the vertebrate nervous system.Floyd Bloom is Professor Emeritus in the Molecularand Integrative Neuroscience Department （MIND） at The Scripps Research Institute. His recent awardsinclude the Sarnat Award from the Institute of Medi-cine and the Salmon Medal of the New York Academyof Medicine. He is a former President of the Society forNeuroscience and is a member of the NationalAcademy of Sciences and the Institute of Medicine. Sascha du Lac is an Investigator of the HowardHughes Medical Institute and an Associate Professorof Systems Neurobiology at the Salk Institute for Bio-logical Studies. Her research interests are in the neu-robiology of resilience and learning, and her laboratoryinvestigates behavioral, circuit, cellular, and molecularmechanisms in the sense of balance. Anirvan Ghosh is Stephen Kuffler Professor in theDivision of Biological Sciences at the University of California, San Diego and Director of the graduateprogram in Neurosciences. His research interestsinclude the development of synaptic connections inthe central nervous system and the role of activity-dependent gene expression in the cortical develop-ment. He is recipient of the Presidential Early CareerAward for Scientists and Engineers and the Society forNeuroscience Young Investigator Award. Nicholas C. Spitzer is Distinguished Professor inthe Division of Biological Sciences at the University of California, San Diego. His research is focusedon neuronal differentiation and the role of electricalactivity and calcium signaling in the assembly ofthe nervous system. He has been chairman ofthe Biology Department and the Neurobiology Section,a trustee of the Grass Foundation, and served as Councilor of the Society for Neuroscience. He is amember of the American Academy of Arts and Sci-ences and Co-Director of the Kavli Institute for Brainand Mind.

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书籍目录

章节摘录

插图：Acetylcholinesterases are glycoproteins synthesizedin the soma and carried to the terminals via antero-grade axonal transport. They are inserted into thepresynaptic membrane and the basal lamina. They dis-play an important structural polymorphism （Figure6.12b）: they have a globular form （G） or an asymmetricform （A）. These different forms have distinct localiza-tions. Globular forms （G） are anchored in the pre- orpostsynaptic membrane （these are ectoenzymes） andare secreted as a soluble protein into the synaptic cleft.Asymmetric forms （A） are anchored in the basal lam-ina （Figure 6.12c）. The molecules of acetylcholine,released in the synaptic cleft when the neuromuscularjunction is activated, cross the basal lamina through itsloose stitches. But a part of the acetylcholine moleculesis also degraded before being fixed to postsynapticreceptors, by the acetylcholinesterase inserted in thebasal lamina. The other part is quickly degraded afterits fixation. Acetylcholinesterases hydrolyze acetyl-choline into acetic acid and choline. Choline is takenup by presynaptic terminals for the synthesis of newmolecules of acetylcholine. This degradation system ofacetylcholine is a very efficient system for inactivationof a neurotransmitter.6.3.3 Nicotinic receptors for acetylcholine are abundant in the crests of the folds in the postsynaptic membrane　The plasma membrane of muscle cells, the sar-colemma, presents numerous folds in mammalian neu-romuscular junctions. By using a radioactive ligand for atype of acetylcholine nicotinic receptor, c-bungarotoxinlabelled with a radioactive isotope or a fluorescent mole-cule, it has been shown that the radioactive materialaccumulates predominantly in the crests of the folds inthe sarcolemma. Immunocytochemical techniques pro-duce similar results. Other studies have shown that theyare anchored to the underlying cytoskeleton （see thefollowing section）.　The nicotinic receptor is a transmembrane glycopro-tein comprising four homologous subunits assembledinto a heterologous 2B8 pentamer. It is a receptorchannel permeable to cations whose activation resultsin the net entry of positively charged ions and in depolar-ization of the postsynaptic membrane. The structureand functional characteristics of the muscular icotinicreceptors are given in Chapter 8.6.3.4 Mechanisms involved in the accumulation of postsynaptic receptorsin the folds of the postsynaptic muscular membrane　The acetylcholine nicotinic receptors are, in theadult neuromuscular junction, present in high density（about 10,000 molecules per itm） in the postsynapticregions and occur in a much lower density in thenonsynaptic membrane （extrajunctional membrane）.Under the nerve terminal, the muscle cell is free of themyofimanents actin and myosin. At this level, four toeight cell nuclei are found, the fundamental nuclei （Ranvier 1875）. The myonuclei located outside the post-synaptic region （extrasynaptic） are the sarcoplasmicnuclei. The formation of this well organized subsynapticdomain - which concerns not only the nicotinic recep-tors but also the Golgi apparatus and the cytoskeleton（it also comprises the organization of the basal laminaand the distribution of the asymmetric form of acetyl-cholinesterase in the synaptic cleft） - occurs in numer-ous steps during maturation of the neuromuscularjunction （Figure 6.13a）:　There is an increase in the number of nicotinicreceptors （1 and 2） during fusion of the myoblasts to form myotubes, owing to the neosynthesis of these receptors. They have an even distribution over the membrane surface. This phenomenon is independent of the neuromuscular activity since it is not affected by the injection in ovo of nicotinic antagonists such as curare.~　There is formation of aggregates of nicotinic receptors under the nerve terminal （3-5） and disappearance of extrajunctional receptors （5）.

编辑推荐

《细胞和分子神经生理学(第3版)(导读版·原版引进)》是建立神经生理学基本概念和知识的精品读物。
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