<<感觉和运动系统>>

图书基本信息

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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。

内容概要

本套书特色：　　内容全面——覆盖神经科学领域的各个方面，第三版增加了神经科学发展较快的领域，如树突的发育、化学感觉、小脑、眼动、睡眠和梦，以及意识等。
　　作者专业——本套书由多位美国科学院院士参与，其中两位曾经担任过神经科学学会（Society for Neuroscience）的主席，由100多位神经科学家共同编著而成。
　生动详实——全套书包含530余幅图例和照片，便于读者理解，本套书附赠光盘包含全书所有彩图。
　　结构新颖——为了使读者能够更好地理解文中内容和开阔视野，书内增加了大量背景性材料，于正文中用方框标出，包括重要的实验、病例、实验方法和概念等。
每章末尾介绍一些有关文献和进一步阅读的补充材料，供读者学习和深入钻研。

作者简介

作者：(美国)Laary Squire (美国)Darwin Berg (美国)Floyd BloomLarry 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.

书籍目录

章节摘录

PC afferents are exquisitely sensitive to vibration.They display a peak response near 200Hz with skinindentations of no more than 10nm. Yet as pointed outearlier, a single indentation of the skin surface producesonly a couple of spikes from these axons. Careful dis-section of the connective tissue that surrounds the PCaxon shows the axon itself is capable of generating asteady burst of action potentials with continued appli-cation of a blunt probe. The axon does not adapt. Rather,a change in structure of the fluid-filled capsule carriesthe energy of a continually applied probe away fromthe axon tip and closes the cation channels responsiblefor mechanical transduction. By contrast, repeatedapplication of a mechanical stimulus, such as occurswith a tuning fork vibrating at 200 Hz, produces a seriesof discrete transduction events and a series of actionpotentials. We can say with great confidence, then, thatPCs are responsive to high frequency vibration at eventhe smallest magnitude. This extreme sensitivity tovibration turns the PC afferent into a detector of remoteevents. These are the receptors, for example, thatrespond as hands gripping a steering wheel vibratewhen a car travels over a rough road. As a more commonand practical matter the minute vibrations transducedby PC afferents provide information about the textureof surfaces during the manipulation of tools.Meissner' s Corpuscles Lower frequency vibration, sometimes called flutter,produces a maximal response in RA afferents. As is thecase of PCs, the correlation between this type ofresponse and the structure of the afferent axon and itssurrounding tissue is consistent. Each RA afferentends as a stack of broad terminal disks within aMeissner's corpuscles. Both divergence and conver-gence is seen in the relationship between corpuscleand axon. Two RA afferents end in a Meissner's cor-puscle whereas each afferent innervates anywherebetween 20 and 50 separate corpuscles. In addition tothe A/~ axons, C fibers are also present in Meissner'scorpuscles of monkey glaborous skin. Whether theseaxons play a role in mechanosensation or provide theMeissner's corpuscle with nociceptive and thermore- ceptive properties is not yet known.The anatomy of the RA afferent says a great deal about what this mechanoreceptor does. Meissner's corpuscles are found in dermal pockets of the adhesive ridges, as close to the epidermis as any dermal struc- ture can be （Fig. 25.3）. And their density is extraordi- nary, approaching 50ram2 in the index fingertip of a young adult. The result is an afferent very sensitive to even the slightest stretch of skin, as happens when aslippery object moves in the hand. Yet the levels ofdivergence and convergence from a single RA afferentlead to large receptive fields （Srnm2）. That feature andthe filtering properties of the connective tissue capsulemake them inappropriate for form and texture per-ception. RA afferents are responsible, instead, for thedetection of objects slipping across the hand andfingers. They provide the sensory information thatleads to the adjustment of grip force.

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