

Cerebral Cortex Vol 8a Comparative Structure And Evolution Of Cerebral Cortex Part I

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Comparative Vertebrate Neuroanatomy Ann B. Butler 2005-09-02 Comparative Vertebrate Neuroanatomy Evolution and Adaptation Second Edition Ann B. Butler and William Hodos The Second Edition of this landmark text presents a broad survey of comparative vertebrate neuroanatomy at the introductory level, representing a unique contribution to the field of evolutionary neurobiology. It has been extensively revised and updated, with substantially improved figures and diagrams that are used generously throughout the text. Through analysis of the variation in brain structure and function between major groups of vertebrates, readers can gain insight into the evolutionary history of the nervous system. The text is divided into three sections: * Introduction to evolution and variation, including a survey of cell structure, embryological development, and anatomical organization of the central nervous system; phylogeny and diversity of brain structures; and an overview of various theories of brain evolution * Systematic, comprehensive survey of comparative neuroanatomy across all major groups of vertebrates * Overview of vertebrate brain evolution, which integrates the complete text, highlights diversity and common themes, broadens perspective by a comparison with brain structure and evolution of invertebrate brains, and considers recent data and theories of the evolutionary origin of the brain in the earliest vertebrates, including a recently proposed model of the origin of the brain in the earliest vertebrates that has received strong support from newly discovered fossil evidence Ample material drawn from the latest research has been integrated into the text and highlighted in special feature boxes, including recent views on homology, cranial nerve organization and evolution, the relatively large and elaborate brains of birds in correlation with their complex cognitive abilities, and the current debate on forebrain evolution across reptiles, birds, and mammals. Comparative Vertebrate Neuroanatomy is geared to upper-level undergraduate and graduate students in neuroanatomy, but anyone interested in the anatomy of the nervous system and how it corresponds to the way that animals function in the world will find this text fascinating.

Biology, Conservation and Sustainable Development of Sturgeons Ramón Carmona 2008-11-09 Sturgeons are considered "living fossils", sharing many morphological and biological features with ancestral fish. Furthermore, sturgeons are of the utmost interest from an economic perspective, not only for the caviar but for the flesh. However, the wild populations of the majority of the species are at serious risk of extinction all over the world. So, it is urgent to develop strategies for both farming culture and conservation and recovery in natural habitats. This book provides a comprehensive view of the biology and sustainable development of sturgeons putting emphasis on the Southern Europe autochthonous species such as *Acipenser naccarii* and *Acipenser sturio* that share geographical distribution. Other relevant species (such as *Huso huso*, *A. oxyrinchus*, *A. ruthenus*, *A. stellatus*) and areas (Germany, Russia, North America) are also considered. The contents are organized in three sections: Taxonomy and Biogeography (including the morphological and genetic analyses that clarify the taxonomy and phylogeny of sturgeons, focused on those from Southern Europe), Biology and Aquaculture (where several aspects of the developmental biology, feeding, and reproduction are considered in relation to the improvement of sturgeon farming), and Recovery and Conservation (that collates and analyses different recovery research actions, the ecology of the rivers for restoration as well as the problems related to the trade of caviar).

Computational Neuroscience: Trends in Research 2000 J.M. Bower 2000-07-12 This volume includes papers originally presented at the 8th annual Computational Neuroscience meeting (CNS'99) held in July of 1999 in Pittsburgh, Pennsylvania. The CNS meetings bring together computational neuroscientists representing many different fields and backgrounds as well as experimental preparations and theoretical approaches. The papers published here range across vast levels of scale from cellular mechanisms to cognitive brain studies. The subjects of the research include many different preparations from invertebrates to humans. In all cases the work described in this volume is focused on understanding how nervous systems compute. The research described includes subjects like neural coding and neuronal dendrites and reflects a trend towards forging links between cognitive research and neurobiology. Accordingly, this volume reflects the breadth and depth of current research in computational neuroscience taking place throughout the world.

Physiology of Elasmobranch Fishes: Structure and Interaction with Environment Robert E. Shadwick 2015-11-16 Fish Physiology: Physiology of Elasmobranch Fishes, Volume 34A is a useful reference for fish physiologists, biologists, ecologists, and conservation biologists. Following an increase in research on elasmobranchs due to the plight of sharks in today's oceans, this volume compares elasmobranchs to other groups of fish, highlights areas of interest for future research, and offers perspective on future problems. Covering measurements and lab-and-field based studies of large pelagic sharks, this volume is a natural addition to the renowned Fish Physiology series. Provides needed comprehensive content on the physiology of elasmobranchs Offers a systems approach between structure and interaction with the environment and internal physiology Contains contributions by leading experts in their respective fields, under the guidance of internationally recognized and highly respected editors Highlights areas of interest for future research, including perspective on future problems

The Barrel Cortex of Rodents Alan Peters 1995-01-31 Volume 11 examines the many methodologies that researchers use to investigate the barrel cortex.

Mathematical Modelling & Computing in Biology and Medicine V. Capasso (Ed) 2003

Phylogeny and Development of Catecholamine Systems in the CNS of Vertebrates Wilhelmus J. A. Smeets 1994-10-13 In this book, the structure, function, and development of brain systems using the catecholamines are comprehensively described for members of all living vertebrate classes. The first part of the book deals with comparative morphology and consists of an introductory chapter on methodology and limitations of catecholamine research followed by surveys of the anatomy and function of catecholamine systems for each vertebrate class. These chapters provide information on the distribution of catecholamines and their synthetic enzymes and on their relationships with specific functional systems and other neurotransmitter systems. In the second part of the book, special attention is paid to the first appearance of enzyme- and catecholamine-immunoreactivity in specific brain regions, to the maturation of catecholaminergic cells and fibers, and to

relationships with other developmental events. In the final chapter, the morphological and developmental information is synthesized and major evolution implications and basic principles of organization and function are pointed out. The contributors provide an excellent overview of the current knowledge on organization and evolution of the catecholaminergic systems of the brain and emphasize that brain catecholamine systems are very ancient and appear to be one of the backbones of the brain.

The Amygdala Barbara Ferry 2012-12-19 Among the components of the limbic system, the amygdala is a fascinating structure that is involved in the processes of liking and disliking and in the ways our emotions drive our actions and affect the strength of our memories. Combined with new conceptual breakthroughs, the very latest data obtained by leading world experts in amygdala function that are reviewed in this book have helped to understand how the amygdala contribute to these processes and also to a variety of neurological and neuropsychiatric pathologies. Of course, due to the rate of research advancement, all the chapters presented here correspond to precise questions addressed by experts using highly specific techniques. Therefore, each chapter should be viewed as pieces of a puzzle that represent all the different research areas that have to be taken into consideration in discussing the role of the amygdala in emotion and memory. Although the primary goal of this book is to inform experts and newcomers of some of the latest data in the field of brain structures involved in mechanisms underlying emotional learning and memory, we hope it will also help to stimulate discussion on the functional role of the amygdala and connected brain structures in these mechanisms.

Comparative Structure and Evolution of Cerebral Cortex Edward G. Jones 1990-10-31 The cerebral cortex, especially that part customarily designated "neocortex," is one of the hallmarks of mammalian evolution and reaches its greatest size, relatively speaking, and its widest structural diversity in the human brain. The evolution of this structure, as remarkable for the huge numbers of neurons that it contains as for the range of behaviors that it controls, has been of abiding interest to many generations of neuroscientists. Yet few theories of cortical evolution have been proposed and none has stood the test of time. In particular, no theory has been successful in bridging the evolutionary gap that appears to exist between the pallium of nonmammalian vertebrates and the neocortex of mammals. Undoubtedly this stems in large part from the rapid divergence of non mammalian and mammalian forms and the lack of contemporary species whose telencephalic wall can be seen as having transitional characteristics. The monotreme cortex, for example, is unquestionably mammalian in organization and that of no living reptile comes close to resembling it. Yet anatomists such as Ramon y Cajal, on examining the finer details of cortical structure, were struck by the similarities in neuronal form, particularly of the pyramidal cells, and their predisposition to laminar alignment shared by representatives of all vertebrate classes.

Perspectives in Ethology N.S. Thompson 1995-05-31 'A book rich and various in ideas and substance...It belongs on the shelf of anyone wanting to keep up with what is happening in ethology.'-Bioscience, from a review of an earlier volume Beginning with Volume 11, Nicholas S. Thompson takes over the editorship of this remarkable series. For this volume, contributors bring fresh perspectives to the subject of natural design.

Adult Neurogenesis: Beyond Rats and Mice Luca Bonfanti 2019-02-11 Researchers working on adult neurogenesis have focused largely on inbred laboratory rodents. While this provides a strong advantage of restricting genetic variation in the group, it also narrows our perspective on adult neurogenesis as a biological phenomenon. Many unsolved issues and open questions cannot be resolved without the contribution of comparative studies spanning through widely different species: how did adult neurogenesis evolve, what is the link between adult neurogenesis and brain complexity, how do adult neurogenesis and animal behavior influence each other, how does adult neurogenesis contribute to brain plasticity, cognition and, possibly, repair, and how do experimental conditions affect adult neurogenesis. The main message from the comparative approach to adult neurogenesis is that the relative exclusive focus on laboratory rodents can result in a bias on how we think about this biological process.

Information Processing in the Cortex Ad Aertsen 2012-12-06 There is a tradition of theoretical brain science which started in the forties (Wiener, McCulloch, Turing, Craik, Hebb). This was continued by a small number of people without interruption up to the present. It has definitely provided main guiding lines for brain science, the development of which has been spectacular in the last decades. However, within the bulk of experimental neuroscience, the theoreticians some times had a difficult stand, since it was felt that the times were not ripe yet and the methods not yet available for a development of a true theoretical speciality in this field. Thus theory remained in the hands of a fairly small club which recruited its members from theoretical physicists, mathematicians and some experimentalists with amateurish theoretical leanings. The boom of approaches which go by the name of 'computational neuroscience', 'neuronal networks', 'associative memory', 'spinglass theory', 'parallel processing' etc. should not blind one for the fact that the group of people professionally interested in realistic models of brain function up to the present date remains rather small and suffers from a lack of professional organization. It was against this background that we decided to organize a meeting on Theoretical Brain Science. The meeting was held April 18 - 20, 1990 and took place at Schloss Ringberg, West-Germany, a facility sponsored by the Max-Planck-Society.

Infectious Diseases and Pathology of Reptiles Elliott R. Jacobson 2020-08-15 Infectious Diseases and Pathology of Reptiles, Second Edition provides definitive information on every aspect of the anatomy, pathophysiology, and differential diagnosis of infectious diseases affecting reptiles. It features stunning high-quality color photos of normal anatomy and histology, as well as gross, light, and electron microscopic images of infectious diseases of reptiles. Editor Elliott Jacobson draws on his own photography collection, and his wealth of experience spanning over 40 years in the research of infectious diseases and veterinary care of reptiles. Already a comprehensive reference, a new volume covering noninfectious diseases of reptiles has now been added to create a two-volume set, Diseases and Pathology of Reptiles. Beginning with a thorough review of the biology, anatomy, and histology of reptiles, Volume 1 covers all major systems and provides the most complete single source for color images of reptile histology, hematology, and cytology. Volume 1 addresses the mechanism of reptile immunology and the response to pathogens, and explains how immunological response is key to differential diagnosis. It provides an overview of electron microscopy, complete with electron micrographs of reptile pathogens, and introduces the necessity of molecular methods for diagnosis. Finally, this volume devotes several chapters to the viral, bacterial, fungal, and parasitic diseases known to reptiles, and methods for isolating these pathogens. With up-to-the-minute data, an array of sharp and high-quality images, and a panel of expert contributors, this new edition of Infectious Diseases and Pathology of Reptiles is the definitive resource for veterinary pathologists, zoo or wildlife veterinarians, and the increasing number of private practice veterinarians seeing reptiles kept as exotic pets. It is also ideal reading for veterinary students specializing in exotics, candidates for ACZM accreditation, and private breeders and hobbyists.

The Human Frontal Lobes, Second Edition Bruce L. Miller 2013-11-18 Now in a revised and expanded second edition, this authoritative work synthesizes the rapidly growing knowledge base on the human frontal lobes and their central role in behavior, cognition, health, and disease. Leading contributors address neuroanatomy, neurochemistry, and normal neuropsychological functioning, and describe the nature and consequences of frontal lobe dysfunction in specific neurological and psychiatric conditions. Second edition features include a new section on structural and functional neuroimaging and substantially expanded coverage of frontotemporal dementia and related disorders. Other new topics include self-consciousness, competence, and personality; new testing approaches; bipolar disorder; and adult-onset genetic disorders of the frontal lobes. The book is illustrated with nearly 100 figures.

Cerebral Cortex Philip S. Ulinski 2012-12-06 This volume is devoted to mathematical models of the cortex. Computational

models of individual neurons and ensembles of neurons are increasingly used in research on cortical organization and function. This is, in part, because of the now ubiquitous presence of powerful and affordable computers. The volume begins with a short history of models of cortical neurons and circuitry that introduces the principal modeling styles. An attempt has been made throughout the volume to make it accessible to readers with minimal mathematical backgrounds.

Diseases and Pathology of Reptiles Elliott Jacobson 2021-08-29 This two-volume set represents a second edition of the original *Infectious Diseases and Pathology of Reptiles* alongside a new book that covers noninfectious diseases of reptiles. Together, these meet the need for an entirely comprehensive, authoritative single-source reference. The volumes feature color photos of normal anatomy and histology, as well as gross, light, and electron microscopic images of infectious and noninfectious diseases of reptiles. The most detailed and highly illustrated reference on the market, this two-volume set includes definitive information on every aspect of the anatomy, pathophysiology, and differential diagnosis of infectious and noninfectious diseases affecting reptiles.

Comparative Structure and Evolution of Cerebral Cortex Edward G. Jones 1990-10-31 The cerebral cortex, especially that part customarily designated "neocortex," is one of the hallmarks of mammalian evolution and reaches its greatest size, relatively speaking, and its widest structural diversity in the human brain. The evolution of this structure, as remarkable for the huge numbers of neurons that it contains as for the range of behaviors that it controls, has been of abiding interest to many generations of neuroscientists. Yet few theories of cortical evolution have been proposed and none has stood the test of time. In particular, no theory has been successful in bridging the evolutionary gap that appears to exist between the pallium of nonmammalian vertebrates and the neocortex of mammals. Undoubtedly this stems in large part from the rapid divergence of nonmammalian and mammalian forms and the lack of contemporary species whose telencephalic wall can be seen as having transitional characteristics. The monotreme cortex, for example, is unquestionably mammalian in organization and that of no living reptile comes close to resembling it. Yet anatomists such as Ramon y Cajal, on examining the finer details of cortical structure, were struck by the similarities in neuronal form, particularly of the pyramidal cells, and their predisposition to laminar alignment shared by representatives of all vertebrate classes.

Encyclopedia of Paleontology Ronald Singer 2019-06-04 First Published in 2000. Routledge is an imprint of Taylor & Francis, an informa company.

The Design of Animal Communication Marc D. Hauser 1999 Based on the approach laid out in the 1950s by Nobel laureate Nikolaas Tinbergen, this book looks at animal communication from the four perspectives of mechanisms, ontogeny, function, and phylogeny.

The Parallel Brain Eran Zaidel 2003 An overview of the central role in cognitive neuroscience of the corpus callosum, the bands of tissue connecting the brain's two hemispheres.

Origin and Evolution of the Vertebrate Telencephalon, with Special Reference to the Mammalian Neocortex Francisco Aboitiz 2007-06-20 How could a structure as complex as the vertebrate brain develop from the simplest multicellular animals? Natural selection offers an impeccable mechanism for the gradual transformation of species, but even Darwin sometimes expressed doubts about the origin of highly complex structures. Following an approach that has been termed "developmental evolutionary genetics," this book seeks to establish a correspondence between embryological processes and the phylogenetic history of an organism.

The Central Nervous System of Vertebrates Rudolf Nieuwenhuys 2014-11-14 This comprehensive reference is clearly destined to become the definitive anatomical basis for all molecular neuroscience research. The three volumes provide a complete overview and comparison of the structural organisation of all vertebrate groups, ranging from amphioxus and lamprey through fishes, amphibians and birds to mammals. This thus allows a systematic treatment of the concepts and methodology found in modern comparative neuroscience. Neuroscientists, comparative morphologists and anatomists will all benefit from: * 1,200 detailed and standardised neuroanatomical drawings * the illustrations were painstakingly hand-drawn by a team of graphic designers, specially commissioned by the authors, over a period of 25 years * functional correlations of vertebrate brains * concepts and methodology of modern comparative neuroscience * five full-colour posters giving an overview of the central nervous system of the vertebrates, ideal for mounting and display This monumental work is, and will remain, unique; the only source of such brilliant illustrations at both the macroscopic and microscopic levels.

Methods and Models in Neurophysics Ecole d'Été de Physique 2005 1. E. Marder, Experimenting with theory -- 2. A. Borysuk and J. Rinzel, Understanding neuronal dynamics by geometrical dissection of minimal models -- 3. D. Terman, Geometry singular perturbation analysis of neuronal dynamics -- 4. G. Mato, Theory of neural synchrony -- 5. M. Shelley, Some useful numerical techniques for simulating integrate-and-fire networks -- 6. D. Golomb, Propagation of pulses in cortical networks: the single-spike approximation -- 7. M. Tsodyks, Activity-dependent transmission in neocortical synapses -- 8. H. Sompolinsky and J. White, Theory of large recurrent networks: from spikes to behavior -- 9. C. van Vreeswijk, Irregular activity in large networks of neurons -- 10. N. Brunel, Network models of memory -- 11. P. Bressloff, Pattern formation in visual cortex -- 12. F. Wolf, Symmetry breaking and pattern selection in visual cortical development -- 13. A. Treves and Y. Roudi, On the evolution of the brain -- 14. E. Brown, Theory of point processes for neural systems ...

Cognitive Biology Luca Tommasi 2009 An overview of current research at the intersection of psychology and biology, integrating evolutionary and developmental data and explanations. In the past few decades, sources of inspiration in the multidisciplinary field of cognitive science have widened. In addition to ongoing vital work in cognitive and affective neuroscience, important new work is being conducted at the intersection of psychology and the biological sciences in general. This volume offers an overview of the cross-disciplinary integration of evolutionary and developmental approaches to cognition in light of these exciting new contributions from the life sciences. This research has explored many cognitive abilities in a wide range of organisms and developmental stages, and results have revealed the nature and origin of many instances of the cognitive life of organisms. Each section of Cognitive Biology deals with a key domain of cognition: spatial cognition; the relationships among attention, perception, and learning; representations of numbers and economic values; and social cognition. Contributors discuss each topic from the perspectives of psychology and neuroscience, brain theory and modeling, evolutionary theory, ecology, genetics, and developmental science. Contributors Chris M. Bird, Elizabeth M. Brannon, Neil Burgess, Jessica F. Cantlon, Stanislas Dehaene, Christian F. Doeller, Reuven Dukas, Rochel Gelman, Alexander Gerganov, Paul W. Glimcher, Robert L. Goldstone, Edward M. Hubbard, Lucia F. Jacobs, Mark H. Johnson, Annette Karmiloff-Smith, David Landy, Lynn Nadel, Nora S. Newcombe, Daniel Osorio, Mary A. Peterson, Manuela Piazza, Philippe Pinel, Michael L. Platt, Kristin R. Ratliff, Michael E. Roberts, Wendy S. Shallcross, Stephen V. Shepherd, Sylvain Sirois, Luca Tommasi, Alessandro Treves, Alexandra Twyman, Giorgio Vallortigara

The New Evolutionary Sociology Jonathan H. Turner 2018-03-09 For decades, evolutionary analysis was overlooked or altogether ignored by sociologists. Fears and biases persisted nearly a century after Auguste Comte gave the discipline its name, as did concerns that its effect would only reduce sociology to another discipline - whether biology, psychology, or economics. Worse, apprehension that the application of evolutionary theory would encourage heightened perceptions of racism, sexism, ethnocentrism and reductionism pervaded. Turner and Machalek argue instead for a new embrace of biology and evolutionary analysis. Sociology, from its very beginnings in the early 19th century, has always been concerned with the study of evolution, particularly the transformation of societies from simple to ever-more complex forms. By comprehensively reviewing the original ways that sociologists applied evolutionary theory and examining the recent renewal and expansion of

these early approaches, the authors confront the challenges posed by biology, neuroscience, and psychology to distinct evolutionary approaches within sociology. They emerge with key theoretical and methodological discoveries that demonstrate the critical - and compelling - case for a dramatically enriched sociology that incorporates all forms of comparative evolutionary analysis to its canon and study of sociocultural phenomena.

Evolutionary Anatomy of the Primate Cerebral Cortex Dean Falk 2001-04-19 Studies of brain evolution have moved rapidly in recent years, building on the pioneering research of Harry J. Jerison. This book provides reviews of primate (including human) brain evolution. The book is divided into two sections, the first gives new perspectives on the developmental, physiological, dietary and behavioural correlates of brain enlargement. It has long been recognized, however, that brains do not merely enlarge globally as they evolve, but that their cortical and internal organization also changes in a process known as reorganization. Species-specific adaptations therefore have neurological substrates that depend on more than just overall brain size. The second section explores these neurological underpinnings for the senses, adaptations and cognitive abilities that are important for primates. With a prologue by Stephen J. Gould and an epilogue by Harry J. Jerison, this is an important reference work for all those working on brain evolution in primates.

Computational Neuroscience: Cortical Dynamics Peter Erdi 2004-12-27 This book presents thoroughly revised tutorial papers based on lectures given by leading researchers at the 8th International Summer School on Neural Networks in Erice, Italy, in October/November 2003. The eight tutorial papers presented provide competent coverage of the field of cortical dynamics, consolidating recent theoretical and experimental results on the processing, transmission, and imprinting of information in the brain as well as on important functions of the cortical area, such as cortical rhythms, cortical neural plasticity, and their structural basis and functional significance. The book is divided in two topical sections on fundamentals of cortical dynamics and mathematical models of cortical dynamics.

Acetylcholine in the Cerebral Cortex Université de Montréal. Centre de recherche en sciences neurologiques. International Symposium 2004 Comprehensive exposé, by leading neuroscientists, of current knowledge on the neurotransmitter acetylcholine in the cerebral cortex. All aspects of the subject are covered, from its most elementary, at the molecular and cellular levels, to its systemic and holistic implications, including its role in cognition and involvement in human diseases and therapeutics. The twenty-two chapters are grouped under four main headings : I. Functional Morphology of the Acetylcholine Innervation in Cerebral Cortex (Including Hippocampus); II. Modes of Action of Acetylcholine in the Cerebral Cortex; III. Cortical Properties and Functions Modulated by Acetylcholine, and IV. Clinical, Pathological and Therapeutic Implications. This broad perspective updates the reader on recent advances and future trends in the study of a major neuromodulatory system in brain.

Neuron—Glia Interrelations During Phylogeny Antonia Vernadakis 1995-07-20

Cerebral Cortex Kathleen S. Rockland 2013-11-11 Over the last twenty-five years, there has been an extensive effort, still growing for that matter, to explore and understand the organization of extrastriate cortex in primates. We now recognize that most of caudal neocortex is visual in some sense and that this large visual region includes many distinct areas. Some of these areas have been well defined, and connections, neural properties, and the functional consequences of deactivations have been studied. More recently, non invasive imaging of cortical activity patterns during visual tasks has led to an expanding stream of papers on extrastriate visual cortex of humans, and results have been related to theories of visual cortex organization that have emerged from research on monkeys. Against this backdrop, the time seems ripe for a review of progress and a glance at the future. One caveat important to emphasize at the very onset is that the reader may be puzzled or confused by the use of different terminologies. Individual investigators commonly tend to favor different terminologies, but in general some prove more advantageous than others. As discussed by Rowe and Stone (1977) as well as by others, there is an unfortunate tendency for role-indicating names to lead to fixed ideas about function, in contrast to those that are more neutral and adaptable to new findings.

Cerebral Cortex Alan Peters 1999-09-30 This volume of Cerebral Cortex is dedicated to Sir John Eccles, who was an active member of the advisory board for the series until his death in May 1997. His input as to what topics should be covered in future volumes of this series will be sorely missed. The present volume is concerned with neurodegenerative disorders and age related changes in the structure and function of the cerebral cortex, a topic that has attracted increasing interest as longevity and the number of aged individuals in the population increase. Although much of the research on the neurodegenerative effects of aging has been centered on Alzheimer's disease, most of the aging population will not be afflicted by this disease. They will, however, be affected by the consequences of normal aging, so the first few chapters of this volume are concerned with that topic. Chapter 1, by Marilyn S. Albert and Mark B. Moss, gives an account of the cognitive changes that accompany normal human aging. Chapter 2, by Mark B.

Neural Network Models of Cognition J.W. Donahoe 1997-09-26 This internationally authored volume presents major findings, concepts, and methods of behavioral neuroscience coordinated with their simulation via neural networks. A central theme is that biobehaviorally constrained simulations provide a rigorous means to explore the implications of relatively simple processes for the understanding of cognition (complex behavior). Neural networks are held to serve the same function for behavioral neuroscience as population genetics for evolutionary science. The volume is divided into six sections, each of which includes both experimental and simulation research: (1) neurodevelopment and genetic algorithms, (2) synaptic plasticity (LTP), (3) sensory/hippocampal systems, (4) motor systems, (5) plasticity in large neural systems (reinforcement learning), and (6) neural imaging and language. The volume also includes an integrated reference section and a comprehensive index.

Proceedings of the 1993 Connectionist Models Summer School Michael C. Mozer 2014-03-05 The result of the 1993 Connectionist Models Summer School, the papers in this volume exemplify the tremendous breadth and depth of research underway in the field of neural networks. Although the slant of the summer school has always leaned toward cognitive science and artificial intelligence, the diverse scientific backgrounds and research interests of accepted students and invited faculty reflect the broad spectrum of areas contributing to neural networks, including artificial intelligence, cognitive science, computer science, engineering, mathematics, neuroscience, and physics. Providing an accurate picture of the state of the art in this fast-moving field, the proceedings of this intense two-week program of lectures, workshops, and informal discussions contains timely and high-quality work by the best and the brightest in the neural networks field.

Bioinspired Approaches for Human-Centric Technologies Roberto Cingolani 2014-06-04 The present book discusses topics related to research and development of materials and devices at nanoscale size and their respective application in medicine and biomedicine. The individual chapters give a detailed state of the art overview to the distinct topic. Apparently disconnected fields - life sciences, biomedicine, chemistry, physics, medicine and engineering - will be bridged with a highly interdisciplinary view onto each subject.

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lack of contemporary species whose telencephalic wall can be seen as having transitional characteristics. The mono treme cortex, for example, is unquestionably mammalian in organization and that of no living reptile comes close to resembling it. Yet anatomists such as Ramon y Cajal, on examining the finer details of cortical structure, were struck by the similarities in neuronal form, particularly of the pyramidal cells, and their predisposition to laminar alignment shared by representatives of all vertebrate classes.

The Laboratory Fish Gary Ostrander 2000-08-29 Provides interested readers with a current understanding of the biology of fishes as it relates to their utility in the laboratory.

Developmental Psychopathology, Developmental Neuroscience Donald J. Cohen 2006-02-17 This volume applies multiple levels of analysis to neurobiological developmental organization, and functioning in normality and psychopathology. It also covers topics central to a developmental perspective on neuroscience.

The Biology of Lungfishes Jordan Morup Jorgensen 2016-04-19 The Biology of Lungfishes presents an up-to-date collection of reviews on some of the most important aspects of the life of lungfishes. The book draws on contributions from well-known experts with a long record of scientific work within their respective fields. The general natural history of the three genera of lungfishes, the fascinating fossil story, and modern ideas of lungfish phylogeny form the main part of the text. The book also covers the morphology and physiology of various organs.

The Barrel Cortex of Rodents Edward G. Jones 2013-06-29 The barrel area is a unique specialization of the cerebral cortex, shared by many species of rodents and some marsupials, in which the somatotopic map of the body surface receives direct morphological expression. Here, the homogeneous sheet of layer IV granule cells seen in most mammals is fractured into large archipelagos, each representing one of the larger subdivisions of the contra lateral half-body. Within these larger domains are smaller aggregates of granule cells that contain the concentrated terminations of thalamocortical fibers bearing messages emanating from constellations of receptors located in finer subdivisions of a body part. These smaller aggregates are particularly well-defined in the representation of the face, where they form a one-to-one representation of the sinus hairs or vibrissae and where they have been given the name barrels. The first inklings of the unique structure of the parietal cortex of rodents came in the study of Droogleever-Fortuyn (1914), who remarked on the presence in it of clouds of granule cells 0.5-1 mm in diameter, which he thought were in some way associated with concentrations of nerve fibers. Little attention, however, was paid to his observations. Lorente de N 6 (1922) later observed dense focal concentrations of afferent fiber ramifications in Golgi preparations of the mouse cortex, calling them glomeruli, and these can now be seen as the structures that form the hearts of the barrels and around which the granule cells concentrate.

Comparative Structure and Evolution of Cerebral Cortex, Part I Edward G. Jones 2013-06-29 The cerebral cortex, especially that part customarily designated "neocortex," is one of the hallmarks of mammalian evolution and reaches its greatest size, relatively speaking, and its widest structural diversity in the human brain. The evolution of this structure, as remarkable for the huge numbers of neurons that it contains as for the range of behaviors that it controls, has been of abiding interest to many generations of neuroscientists. Yet few theories of cortical evolution have been proposed and none has stood the test of time. In particular, no theory has been successful in bridging the evolutionary gap that appears to exist between the pallium of nonmammalian vertebrates and the neocortex of mammals. Undoubtedly this stems in large part from the rapid divergence of non mammalian and mammalian forms and the lack of contemporary species whose telencephalic wall can be seen as having transitional characteristics. The mono treme cortex, for example, is unquestionably mammalian in organization and that of no living reptile comes close to resembling it. Yet anatomists such as Ramon y Cajal, on examining the finer details of cortical structure, were struck by the similarities in neuronal form, particularly of the pyramidal cells, and their predisposition to laminar alignment shared by representatives of all vertebrate classes.