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EVOLUTIONARY NEUROSCIENCE? What does EVOLUTIONARY NEUROSCIENCE mean?

Hyman's Comparative Vertebrate Anatomy

Comparative Vertebrate Neuroanatomy Evolution And

* 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

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Comparative Vertebrate Neuroanatomy: Evolution and ...

Comparative Vertebrate Neuroanatomy: Evolution and Adaptation
Ann B. Butler , William Hodos This is a valuable text for understanding the why's and wherefore's of neuroanatomy in vertebrates and a great resource for research in cognitive neuroscience and behavioral neurobiology when comparing neuroanatomy within and across species.

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Comparative Vertebrate Neuroanatomy: Evolution and Adaptation
2nd Edition. Comparative Vertebrate Neuroanatomy 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

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used generously throughout the text.

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vertebrates that has received strong support from newly discovered
fossil evidence

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This ambitious evolutionary approach to the vertebrate nervous
system gives the student all the tools needed to proceed with the
advanced (3-volume)works of Crosby, et al (paleo) and Niuwenhuys,
et al (neo). The text is well organized and has only a slight amount
of redundancy.

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Comparative Vertebrate Neuroanatomy: Evolution and ...

Although comparative neurobiologists have been relatively successful in establishing what changes characterize brain evolution in vertebrates, and even when these changes occurred, there has been little progress in understanding how and why such changes occurred. This is in part due to an erroneous approach to assessing these changes.

Understanding Vertebrate Brain Evolution 1 - OUP Academic

Evolutionary neuroscience is the scientific study of the evolution of nervous systems. Evolutionary neuroscientists investigate the evolution and natural history of nervous system structure, functions and emergent properties. The field draws on concepts and findings from both neuroscience and evolutionary biology. Historically, most empirical work has been in the area of comparative neuroanatomy

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Evolutionary neuroscience - Wikipedia

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Since many DA cell clusters are well conserved in craniates, the roots of the evolution of the vertebrate DA systems have to be searched outside vertebrates. Previous studies in the two sister groups of non-craniate chordates, i.e., urochordates (ascidians and larvaceans) and cephalochordates (amphioxus), have shown that the two groups exhibit DA-containing cells in their CNS (Moret et al ...

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

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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.

Evolution of Nervous Systems, Second Edition is a unique, major reference which offers the gold standard for those interested both in evolution and nervous systems. All biology only makes sense when seen in the light of evolution, and this is especially true for the nervous system. All animals have nervous systems that mediate their behaviors, many of them species specific, yet these nervous systems all evolved from the simple nervous system of a common ancestor. To understand these nervous systems, we need to know how they vary and how this variation emerged in evolution. In the first edition of this important reference work, over 100 distinguished neuroscientists assembled the current state-of-the-art knowledge on how nervous systems have evolved throughout the animal kingdom. This second edition remains rich in detail and broad in scope, outlining the changes in brain and nervous system organization that

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occurred from the first invertebrates and vertebrates, to present day fishes, reptiles, birds, mammals, and especially primates, including humans. The book also includes wholly new content, fully updating the chapters in the previous edition and offering brand new content on current developments in the field. Each of the volumes has been carefully restructured to offer expanded coverage of non-mammalian taxa, mammals, primates, and the human nervous system. The basic principles of brain evolution are discussed, as are mechanisms of change. The reader can select from chapters on highly specific topics or those that provide an overview of current thinking and approaches, making this an indispensable work for students and researchers alike. Presents a broad range of topics, ranging from genetic control of development in invertebrates, to human cognition, offering a one-stop resource for the evolution of nervous systems throughout the animal kingdom Incorporates the expertise of over 100 outstanding investigators who provide their conclusions in the context of the latest experimental results Presents areas of disagreement and consensus views that provide a holistic view of the subjects under discussion

The brain of each animal shows specific traits that reflect its phylogenetic history and its particular lifestyle. Therefore, comparing brains is not just a mere intellectual exercise, but it helps understanding how the brain allows adaptive behavioural strategies to face an ever-changing world and how this complex organ has evolved during phylogeny, giving rise to complex mental processes in humans and other animals. These questions attracted scientists since the times of Santiago Ramon y Cajal one of the founders of comparative neurobiology. In the last decade, this discipline has undergone a true revolution due to the analysis of expression patterns of morphogenetic genes in embryos of different animals. The papers of this e-book are good examples of modern comparative neurobiology, which mainly focuses on the following four Grand Questions: a) How are different brains built during

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ontogeny? b) What is the anatomical organization of mature brains and how can they be compared? c) How do brains work to accomplish their function of ensuring survival and, ultimately, reproductive success? d) How have brains evolved during phylogeny? The title of this e-book, *Adaptive Function and Brain Evolution*, stresses the importance of comparative studies to understand brain function and, the reverse, of considering brain function to properly understand brain evolution. These issues should be taken into account when using animals in the research of mental function and dysfunction, and are fundamental to understand the origins of the human mind.

Comprehensive and authoritative, *The Wiley Handbook of Evolutionary Neuroscience* unifies the diverse strands of an interdisciplinary field exploring the evolution of brains and cognition. A comprehensive reference that unifies the diverse interests and approaches associated with the neuroscientific study of brain evolution and the emergence of cognition Tackles some of the biggest questions in neuroscience including what brains are for, what factors constrain their biological development, and how they evolve and interact Provides a broad and balanced view of the subject, reviewing both vertebrate and invertebrate anatomy and emphasizing their shared origins and mechanisms Features contributions from highly respected scholars in their fields

Aimed at advanced undergraduate and graduate students, this textbook describes some of the basic principles affecting brain evolution. The author refers to data from a wide array of

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vertebrates while minimizing technical jargon. Particular attention has been paid to the ways in which changes in brain structure impact function and behavior. The volume concludes with a discussion on how mammal brains diverged from other brains and how *Homo sapiens* evolved a very large and special brain.

The nervous system is particularly fascinating for many biologists because it controls animal characteristics such as movement, behavior, and coordinated thinking. Invertebrate neurobiology has traditionally been studied in specific model organisms, whilst knowledge of the broad diversity of nervous system architecture and its evolution among metazoan animals has received less attention. This is the first major reference work in the field for 50 years, bringing together many leading evolutionary neurobiologists to review the most recent research on the structure of invertebrate nervous systems and provide a comprehensive and authoritative overview for a new generation of researchers. Presented in full colour throughout, *Structure and Evolution of Invertebrate Nervous Systems* synthesizes and illustrates the numerous new findings that have been made possible with light and electron microscopy. These include the recent introduction of new molecular and optical techniques such as immunohistochemical staining of neuron-specific antigens and fluorescence in-situ-hybridization, combined with visualization by confocal laser scanning microscopy. New approaches to analysing the structure of the nervous system are also included such as micro-computational tomography, cryo-soft X-ray tomography, and various 3-D visualization techniques. The book follows a systematic and phylogenetic structure, covering a broad range of taxa, interspersed with chapters focusing on selected topics in nervous system functioning which are presented as research highlights and perspectives. This comprehensive reference work will be an essential companion for graduate students and researchers alike in the fields of metazoan neurobiology, morphology, zoology, phylogeny and evolution.

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This book provides a series of comprehensive views on various important aspects of vertebrate photoreceptors. The vertebrate retina is a tissue that provides unique experimental advantages to neuroscientists. Photoreceptor neurons are abundant in this tissue and they are readily identifiable and easily isolated. These features make them an outstanding model for studying neuronal mechanisms of signal transduction, adaptation, synaptic transmission, development, differentiation, diseases and regeneration. Thanks to recent advances in genetic analysis, it also is possible to link biochemical and physiological investigations to understand the molecular mechanisms of vertebrate photoreceptors within a functioning retina in a living animal. Photoreceptors are the most deeply studied sensory receptor cells, but readers will find that many important questions remain. We still do not know how photoreceptors, visual pigments and their signaling pathways evolved, how they were generated and how they are maintained. This book will make clear what is known and what is not known. The chapters are selected from fields of studies that have contributed to a broad understanding of the birth, development, structure, function and death of photoreceptor neurons. The underlying common word in all of the chapters that is used to describe these mechanisms is “ molecule ” . Only with this word can we understand how these highly specific neurons function and survive. It is challenging for even the foremost researchers to cover all aspects of the subject. Understanding photoreceptors from several different points of view that share a molecular perspective will provide readers with a useful interdisciplinary perspective.

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