

Evolution By Tumor Neofunctionalization The Role Of Tumors In The Origin Of New Cell Types Tissues And Organs Andrei P Kozlov

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Epigenetic Mechanisms of Tumor Initiation and EvolutionEpigenetic Mechanisms of Tumor Initiation and Evolution Evolution By Tumor Neofunctionalization The Description. Evolution by Tumor Neofunctionalization explores the possibility of the positive role of tumors in evolution of multicellular organisms. This unique perspective goes beyond recent publications on how evolution may influence tumors, to consider the possible role of tumors in evolution.

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Evolution by Tumor Neofunctionalization explores the possibility of the positive role of tumors in evolution of multicellular organisms. This unique perspective goes beyond recent publications on how evolution may influence tumors, to consider the possible role of tumors in evolution. Widespread in nature tumors represent a much broader category than malignant tumors only. The majority of tumors in humans and other animals may never undergo malignant transformation. Tumors may differentiate with the loss of malignancy, and malignant tumors may spontaneously regress. Cellular oncogenes and tumor suppressor genes play roles in normal development. Many features of tumors could be used in evolution, and there are examples of tumors that have played a role in evolution. This book will stimulate thinking on this topic by specialists in the fields of evolutionary biology, oncology, molecular biology, molecular evolution, embryology, evo-devo, tumor immunology, pathology and clinical oncology. Covers the role that tumors might play in evolution. Provides multidisciplinary approach that will appeal to a wide circle of professionals in the fields of evolutionary biology, oncology, molecular biology, and more

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Tumor progression is driven by mutations that confer growth advantages to different subpopulations of cancer cells. As a tumor grows, these subpopulations expand, accumulate new mutations, and are subjected to selective pressures from the environment, including anticancer interventions. This process, termed clonal evolution, can lead to the emergence of therapy-resistant tumors and poses a major challenge for cancer eradication efforts. Written and edited by experts in the field, this collection from Cold Spring Harbor Perspectives in Medicine examines cancer progression as an evolutionary process and explores how this way of looking at cancer may lead to more effective strategies for managing and treating it. The contributors review efforts to characterize the subclonal architecture and dynamics of tumors, understand the roles of chromosomal instability, driver mutations, and mutation order, and determine how cancer cells respond to selective pressures imposed by anticancer agents, immune cells, and other components of the tumor microenvironment. They compare cancer evolution to organismal evolution and describe how ecological theories and mathematical models are being used to understand the complex dynamics between a tumor and its microenvironment during cancer progression. The authors also discuss improved methods to monitor tumor evolution (e.g., liquid biopsies) and the development of more effective strategies for managing and treating cancers (e.g., immunotherapies). This volume will therefore serve as a vital reference for all cancer biologists as well as anyone seeking to improve clinical outcomes for patients with cancer.

This book is divided in two parts, the first of which shows how, beyond paleontology and systematics, macroevolutionary theories apply key insights from ecology and biogeography, developmental biology, biophysics, molecular phylogenetics and even the sociocultural sciences to explain evolution in deep time. In the second part, the phenomenon of macroevolution is examined with the help of real life-history case studies on the evolution of eukaryotic sex, the formation of anatomical form and body-plans, extinction and speciation events of marine invertebrates, hominin evolution and species conservation ethics. The book brings together leading experts, who explain pivotal concepts such as Punctuated Equilibria, Stasis, Developmental Constraints, Adaptive Radiations, Habitat Tracking, Turnovers, (Mass) Extinctions, Species Sorting, Major Transitions, Trends and Hierarchies – key premises that allow macroevolutionary epistemic frameworks to transcend microevolutionary theories that focus on genetic variation, selection, migration and fitness. Along the way, the contributing authors review ongoing debates and current scientific challenges; detail new and fascinating scientific tools and techniques that allow us to cross the classic borders between disciplines; demonstrate how their theories make it possible to extend the Modern Synthesis; present guidelines on how the macroevolutionary field could be further developed; and provide a rich view of just how it was that life evolved across time and space. In short, this book is a must-read for active scholars and because the technical aspects are fully explained, it is also accessible for non-specialists. Understanding evolution requires a solid grasp of above-population phenomena. Species are real biological individuals and abiotic factors impact the future course of evolution. Beyond observation, when the explanation of macroevolution is the goal, we need both evidence and theory that enable us to explain and interpret how life evolves at the grand scale.

Mr. Olsen wrote this book on human anatomy from an evolutionary perspective for college undergraduates with no previous college-level math or science. It contains an introduction to the nature of science and biological evolution in addition to a clear and comprehensive description of basic human anatomy. With over one hundred references, a detailed index, and more than 40 black-and-white illustrations and tables, this book is the perfect supplement to a standard anatomical atlas or textbook with color illustrations.

With one volume each year, this series keeps scientists and advanced students informed of the latest developments and results in all areas of the plant sciences. The present volume includes reviews on plant physiology, biochemistry, genetics and genomics, forests, and ecosystems.

A major synthesis of homology, written by a top researcher in the field Homology—a similar trait shared by different species and derived from common ancestry, such as a seal's fin and a bird's wing—is one of the most fundamental yet challenging concepts in evolutionary biology. This groundbreaking book provides the first mechanistically based theory of what homology is and how it arises in evolution. Günter Wagner, one of the preeminent researchers in the field, argues that homology, or character identity, can be explained through the historical continuity of character identity networks—that is, the gene regulatory networks that enable differential gene expression. He shows how character identity is independent of the form and function of the character itself because the same network can activate different effector genes and thus control the development of different shapes, sizes, and qualities of the character. Demonstrating how this theoretical model can provide a foundation for understanding the evolutionary origin of novel characters, Wagner applies it to the origin and evolution of specific systems, such as cell types; skin, hair, and feathers; limbs and digits; and flowers. The first major synthesis of homology to be published in decades, Homology, Genes, and Evolutionary Innovation reveals how a mechanistically based theory can serve as a unifying concept for any branch of science concerned with the structure and development of organisms, and how it can help explain major transitions in evolution and broad patterns of biological diversity.

Basics in Human Evolution offers a broad view of evolutionary biology and medicine. The book is written for a non-expert audience, providing accessible and convenient content that will appeal to numerous readers across the interdisciplinary field. From evolutionary theory, to cultural evolution, this book fills gaps in the readers' knowledge from various backgrounds and introduces them to thought leaders in human evolution research. Offers comprehensive coverage of the wide ranging field of human evolution Written for a non-expert audience, providing accessible and convenient content that will appeal to numerous readers across the interdisciplinary field Provides expertise from leading minds in the field Allows the reader the ability to gain exposure to various topics in one publication

The Theraphosidae are the most famous and diverse mygalomorph spiders, and include some of the largest arachnids on earth. Their unique defense mechanisms, predatory tactics, reproductive strategies and ecological adaptations are displayed by a wide range of terrestrial, burrowing and arboreal species. These arachnids are familiar to the general public thanks to horror movies and a growing interest in tarantulas as pets; however, scientific information on the group is scattered throughout the literature and not easily available. This book reviews all major aspects of New World Theraphosid tarantulas and provides in-depth information on their evolution, taxonomy, behavior, physiology, ecology, reproduction, conservation and biogeography. As a comprehensive guide to the biology of tarantulas, it will appeal to researchers, students and terrarium hobbyists alike.

Genes and Evolution, the latest volume in the Current Topics in Developmental Biology series, covers genes and evolution, with contributions from an international board of authors. The chapters provide a comprehensive set of reviews covering such topics as genes and plant domestication, gene networks, phenotypic loss in vertebrates, reproducible evolutionary changes, and epithelial tissue. Covers the area of genes and evolution Contains invaluable contributions from an international board of authors Provides a comprehensive set of reviews covering such topics as genes and plant domestication, gene networks, phenotypic loss in vertebrates, reproducible evolutionary changes and epithelial tissue