

what are steroids in biology

What Are Steroids in Biology: Understanding Their Role and Importance

what are steroids in biology is a fascinating question that opens the door to exploring a crucial class of organic compounds essential for life. Steroids play diverse roles in living organisms, from acting as hormones to forming structural components of cell membranes. Although many people often associate steroids with athletic performance or medical treatments, their biological significance extends far beyond that. Let's dive into the world of steroids to uncover what they are, how they function, and why they matter so much in biology.

Defining Steroids in Biological Contexts

At its core, a steroid is a type of lipid molecule characterized by a specific chemical structure composed of four fused carbon rings. This core framework, known as the steroid nucleus, typically consists of three six-membered cyclohexane rings and one five-membered cyclopentane ring. This unique configuration differentiates steroids from other lipids like fats or phospholipids.

Steroids are hydrophobic, meaning they don't dissolve well in water, but they are soluble in organic solvents. This property is key to their function in biological membranes and signaling pathways. In biology, steroids encompass a broad group of molecules, including cholesterol, sex hormones, corticosteroids, and bile acids.

Basic Structure and Variations

Although all steroids share the four-ring core, the differences in their functions arise from variations in the side chains and functional groups attached to these rings. These modifications influence how steroids interact with receptors and enzymes within cells. For instance, the presence of hydroxyl groups (-OH), ketones (=O), or methyl groups can drastically alter a steroid's biological activity.

The Biological Roles of Steroids

Steroids are incredibly versatile molecules that contribute to many vital biological processes. Their roles range from maintaining cellular integrity to regulating metabolism and reproduction.

Cholesterol: The Building Block

One of the most well-known steroids in biology is cholesterol. Far from being just a health concern, cholesterol is a fundamental component of animal cell membranes. It helps maintain membrane fluidity and stability, allowing cells to function properly under varying temperatures and environmental stresses.

Cholesterol also serves as the precursor molecule for synthesizing other important steroids, including hormones and vitamin D. Without cholesterol, organisms would struggle to produce these essential compounds.

Steroid Hormones: Chemical Messengers

Steroid hormones are chemical messengers derived from cholesterol that regulate numerous physiological functions. These hormones include:

- **Androgens** (e.g., testosterone): Influence male characteristics and reproductive functions.
- **Estrogens** (e.g., estradiol): Regulate female reproductive development and cycles.
- **Glucocorticoids** (e.g., cortisol): Control metabolism, immune response, and stress.
- **Mineralocorticoids** (e.g., aldosterone): Manage electrolyte and water balance.

Steroid hormones are lipid-soluble, allowing them to easily pass through cell membranes and bind to intracellular receptors. This ability enables them to directly influence gene expression and cellular activity, making them powerful regulators of biological processes.

Other Steroid Functions

Beyond hormones and cholesterol, steroids participate in other essential biological roles, such as:

- **Bile acids**: Produced in the liver, these steroids help emulsify fats during digestion.
- **Vitamin D**: A steroid-derived molecule crucial for calcium homeostasis and bone health.
- **Pigments and signaling molecules**: Certain steroids function in coloration and cellular communication in some organisms.

How Steroids Are Synthesized in Living Organisms

The biosynthesis of steroids is a complex, multi-step process that typically begins with acetyl-CoA, a fundamental metabolic intermediate. Through a series of enzymatic reactions, acetyl-CoA is converted into mevalonate, then into the hydrocarbon squalene, which eventually cyclizes to form the steroid nucleus.

The Pathway from Cholesterol to Hormones

After cholesterol is formed, specialized enzymes modify it to produce various steroid hormones. For example, the conversion of cholesterol to pregnenolone marks the first step in the synthesis of glucocorticoids, mineralocorticoids, and sex hormones. These conversions involve hydroxylation, oxidation, and changes in side chains, tailoring the molecules for their specific functions.

Understanding these pathways is critical in fields like endocrinology and pharmacology because disruptions can lead to hormonal imbalances or diseases.

The Impact of Steroids on Human Health and Medicine

Steroids have a significant role in human health beyond their natural biological functions. Scientists and doctors harness their properties to treat various medical conditions.

Therapeutic Uses of Steroids

- **Corticosteroids**: Synthetic versions of glucocorticoids are used to reduce inflammation in conditions like asthma, arthritis, and autoimmune diseases.
- **Anabolic steroids**: These mimic androgens and are sometimes prescribed to promote muscle growth and recovery in wasting diseases.
- **Hormone replacement therapy**: Estrogen and testosterone steroids help manage symptoms related to menopause or hormonal deficiencies.

However, misuse of anabolic steroids, especially in sports, has led to controversies due to potential side effects such as liver damage, hormonal imbalances, and cardiovascular problems.

Natural vs. Synthetic Steroids

While naturally occurring steroids are essential for normal body functions, synthetic steroids are designed to maximize therapeutic benefits or minimize side effects. Researchers continually develop new steroid-based drugs to target specific pathways with greater precision.

Steroids in Plants and Other Organisms

Steroids are not exclusive to animals. Plants and fungi also produce steroid-like compounds called phytosterols and ergosterols, respectively. These molecules serve similar structural and signaling roles in their cells.

Phytosterols in Plants

Phytosterols help maintain plant cell membrane integrity and participate in growth regulation. They are also studied for their cholesterol-lowering effects when consumed in the human diet, making them popular in functional foods and dietary supplements.

Ergosterol in Fungi

Ergosterol is a critical component of fungal cell membranes and is often targeted by antifungal drugs. Its presence distinguishes fungi from animals and plants at the biochemical level.

Why Understanding Steroids Matters

Grasping what steroids are in biology unlocks a deeper appreciation for how life operates at the molecular level. These molecules influence everything from our physical development to how our bodies respond to stress and illness. Moreover, as research progresses, steroids continue to inspire new medical treatments and nutritional strategies.

Whether you're a student, a health enthusiast, or simply curious, knowing about steroids helps demystify many aspects of biology and medicine. It highlights the intricate chemistry that sustains life and underscores the importance of balance and regulation within living systems.

Frequently Asked Questions

What are steroids in biology?

Steroids are a class of organic compounds characterized by a core structure of four fused carbon rings. They are important biological molecules involved in various physiological functions.

What is the basic structure of steroids?

Steroids have a core structure consisting of three six-membered cyclohexane rings and one five-membered cyclopentane ring fused together, known as the cyclopentanoperhydrophenanthrene ring system.

What are some common types of steroids found in biology?

Common biological steroids include cholesterol, steroid hormones like testosterone and estrogen, corticosteroids like cortisol, and bile acids.

What role do steroids play in the human body?

Steroids regulate a variety of physiological processes such as metabolism, immune response, inflammation, salt and water balance, and sexual function through their role as hormones.

How are steroid hormones different from other hormones?

Steroid hormones are lipid-soluble molecules derived from cholesterol that can pass through cell membranes and bind to intracellular receptors to regulate gene expression.

What is the function of cholesterol as a steroid?

Cholesterol serves as a structural component of cell membranes, providing fluidity and stability, and is also a precursor for the synthesis of other steroids like steroid hormones and bile acids.

How are steroids synthesized in the body?

Steroids are synthesized from cholesterol through enzymatic reactions primarily in the adrenal glands, gonads, and placenta.

What is the difference between anabolic steroids and biological steroids?

Biological steroids refer to naturally occurring steroids in the body, whereas anabolic steroids are synthetic derivatives designed to promote muscle growth and enhance athletic performance.

Why are steroid hormones important for reproduction?

Steroid hormones such as estrogen, progesterone, and testosterone regulate the development and function of reproductive organs and secondary sexual characteristics.

Can steroids affect gene expression?

Yes, steroid hormones bind to specific intracellular receptors that act as transcription factors, directly influencing the expression of target genes.

Additional Resources

****Understanding Steroids in Biology: Structure, Function, and Significance****

what are steroids in biology is a foundational question that intersects biochemistry, physiology, and molecular biology. Steroids are a diverse class of organic compounds characterized by a specific molecular structure, playing critical roles in cellular function, signaling, and metabolism across various life forms. Their significance extends from fundamental biological processes to medical applications, making them a focal point in both scientific research and clinical practice.

The Chemical Nature of Steroids

Steroids belong to the larger group of lipids but are distinct due to their unique tetracyclic cyclopentanoperhydrophenanthrene ring system. This core structure consists of three six-membered cyclohexane rings and one five-membered cyclopentane ring fused together. Variations in functional groups attached to this backbone generate the myriad steroid compounds found in nature.

The hydrophobic nature of steroids allows them to integrate into cell membranes, influencing membrane fluidity and permeability. This characteristic is vital for their roles in cellular signaling and structural integrity. Cholesterol, a well-known steroid, exemplifies this function by modulating membrane dynamics and serving as a precursor for other steroids.

Biological Roles of Steroids

Steroids fulfill several essential biological functions, ranging from structural components to signaling molecules. Their roles can be broadly categorized as follows:

1. Structural Components

Cholesterol is the primary steroid involved in maintaining cell membrane structure. It stabilizes the membrane by preventing extremes of fluidity, crucial for cell survival and function. Without cholesterol, membranes would become too permeable or too rigid, impairing cellular processes.

2. Hormonal Signaling Molecules

Steroid hormones are among the most significant biological steroids, acting as potent signaling molecules that regulate physiology and development. These include:

- **Glucocorticoids:** Involved in metabolism regulation and immune response modulation (e.g., cortisol).
- **Mineralocorticoids:** Regulate electrolyte and water balance (e.g., aldosterone).
- **Androgens:** Male sex hormones influencing reproductive functions (e.g., testosterone).
- **Estrogens:** Female sex hormones critical for reproductive system development (e.g., estradiol).
- **Progestogens:** Important in pregnancy and menstrual cycle regulation (e.g., progesterone).

These hormones operate through intracellular receptors, modulating gene expression and thereby altering cellular activity over time.

3. Metabolic Precursors and Derivatives

Steroids also serve as precursors for bile acids, vitamin D, and other bioactive molecules. Bile acids, derived from cholesterol, are essential for fat digestion and absorption. Vitamin D synthesis involves steroid precursors that undergo photochemical transformation in the skin, playing a vital role in calcium homeostasis and bone health.

Steroid Biosynthesis and Metabolism

Steroid biosynthesis begins primarily with cholesterol, which undergoes enzymatic transformations in various tissues. The adrenal glands, gonads, and placenta are major sites of steroid hormone production. Enzymes such as cytochrome P450 oxidases catalyze key steps, including hydroxylation and side-chain cleavage, crucial for generating specific steroids.

The metabolism of steroids involves phase I and phase II enzymatic reactions, increasing their solubility for excretion. These metabolic pathways are tightly regulated, with disruptions leading to pathological conditions such as congenital adrenal hyperplasia or steroid hormone imbalances.

Comparative Aspects of Steroids in Different Organisms

Steroids are ubiquitous across eukaryotic life, but their types and functions vary:

- **Animals:** Predominantly synthesize cholesterol and steroid hormones crucial for homeostasis and reproduction.
- **Plants:** Produce phytosterols like sitosterol and stigmasterol, which contribute to membrane structure and serve as precursors to brassinosteroids—plant hormones regulating growth and development.
- **Fungi:** Contain ergosterol instead of cholesterol, a target for antifungal drugs due to its unique presence in fungal membranes.

This diversity highlights the evolutionary adaptation of steroids to specific biological roles.

Medical and Pharmaceutical Relevance of Steroids

The biological significance of steroids is mirrored in their extensive use in medicine. Synthetic steroids have been developed to mimic or modulate natural steroid functions, offering therapeutic benefits in a range of conditions.

Therapeutic Uses

- **Anti-inflammatory agents:** Corticosteroids like prednisone are widely used to suppress inflammation and autoimmune responses.
- **Hormone replacement therapy:** Estrogens and androgens are administered to address hormonal deficiencies or imbalances.

- **Anabolic steroids:** Synthetic derivatives of testosterone used therapeutically to promote muscle growth and recovery in wasting diseases, though often misused in sports.

Risks and Side Effects

While beneficial, steroid use carries risks including hormonal imbalances, immune suppression, and metabolic disturbances. Long-term corticosteroid therapy can lead to osteoporosis, adrenal insufficiency, and increased infection susceptibility. Anabolic steroid misuse is associated with cardiovascular, hepatic, and psychiatric complications.

These considerations underscore the need for careful clinical management and awareness of steroid pharmacodynamics.

Advancements in Steroid Research and Applications

Recent research has expanded understanding of steroids at molecular and systemic levels. Innovations include:

- **Selective steroid receptor modulators:** Designed to target specific receptor subtypes, minimizing side effects.
- **Biotechnological synthesis:** Engineering microbial systems for steroid production, improving efficiency and sustainability.
- **Steroidomics:** An emerging field employing high-throughput techniques to profile steroid metabolites, aiding disease diagnosis and personalized medicine.

These developments hold promise for enhancing the therapeutic potential and safety of steroid-based interventions.

The exploration of steroids in biology reveals a complex interplay between structure, function, and application. From fundamental cellular components to powerful hormones, steroids continue to be central to understanding life's biochemical fabric and advancing medical science.

[What Are Steroids In Biology](#)

what are steroids in biology: The Biology of Cholesterol and Related Steroids N. B. Myant, 2014-04-24 The Biology of Cholesterol and Related Steroids focuses on the study of sterols in relation to living organisms. The publication first takes a look at the analysis of sterols and related steroids and the distribution of sterols and related steroids in nature, as well as the processes of

extraction and separation and presence of sterols in plants, fungi, vertebrates, and invertebrates. The text then ponders on biosynthesis of sterols and metabolism of cholesterol. Topics include formation of fatty acid esters of cholesterol, steroid hormones, biosynthetic pathway to sterols, reaction mechanisms, and comparative aspects of sterol synthesis. The manuscript examines the developmental aspects of cholesterol metabolism and sterols in biological membranes. The book also reviews cholesterol synthesis in animal tissues, sterol metabolism in isolated cells, and epidemiology of the plasma cholesterol. Discussions focus on selection of statistical populations, genetic influences, regulation of sterol synthesis, general aspects of sterol metabolism, and removal of cell cholesterol in vivo. The publication is a dependable source of data for biochemists and readers interested in the biology of cholesterol and steroids.

what are steroids in biology: *Chemistry and Biological Activity of Steroids* Jorge António Ribeiro Salvador, Maria Manuel Cruz Silva, 2020-02-26 The steroid scaffold continues to be the structural basis of new drugs for a variety of targets and diseases. Indeed, steroids interact with enzymes and receptors in a strikingly specific manner. *Chemistry and Biological Activity of Steroids* aims to provide an updated overview of recent advances in the medicinal chemistry of steroids. Novel synthetic methods in the steroids field, including steroid biotransformations, new steroids able to tackle steroid receptors, and steroid enzymes with clinical relevance, are critically reviewed in this book. Furthermore, the diverse physiopathological roles of oxysterols and their therapeutic value are also discussed.

what are steroids in biology: Molecular Structure and Biological Activity of Steroids Martin Bohl, 2018-01-18 *Molecular Structure and Biological Activity of Steroids* focuses on the identification of steroid structural features that control particular biological effects. Steroid geometry plays a critical role in steroid activity; therefore, the results of X-ray crystallographic, NMR spectroscopic, and theoretical studies on structure-activity relationships form an integral part of the book. Well-established observations and proposed models are presented, summarizing knowledge of molecular features (e.g., steroid backbone structures, side-chain constitutions, substitution sites, configurations, hydrogen-bonding patterns) that can affect steroid action. The book also provides overviews about recent progress in various frontier fields of steroid research, including such areas as sex steroids, glucocorticoids, aromatase inhibitors, vitamin D metabolites, brassinosteroids, neuromuscular blocking agents, and cardiostonic steroids. *Molecular Structure and Biological Activity of Steroids* is a must-have resource for biochemists, pharmacologists, endocrinologists, biophysicists, and others actively involved in steroid research.

what are steroids in biology: *Biological Activities of Steroids in Relation to Cancer* Gregory Pincus, Erwin P. Vollmer, 2013-09-17 *Biological Activities of Steroids in Relation to Cancer* covers the proceedings of the conference sponsored by the Cancer Chemotherapy National Service Center, National Cancer Institute, National Institutes of Health, and the U. S. Department of Health, Education and Welfare. The text focuses on the influence of steroids on medical approaches to the cure of cancer, including steroid chemistry, estrogen metabolism, and mammary cancer. The selection first offers information on steroids growth and cancer, advances in steroid chemistry, and the physiology and pharmacology of steroids affecting tumor growth. Discussions focus on rapid development of mammary cancer, pituitary functions, androgens, estrogens, and progestins. The book also ponders on the binding of steroid hormones by plasma proteins; the effects of steroids on the levels of the plasma 17-hydroxycorticosteroids and the serum protein-bound iodine; and the metabolism of dehydroisoandrosterone. The text evaluates studies on estrogen metabolism, biochemical parameters of estrogen action, and enzymatic transport of hydrogen by estrogenic hormones. The manuscript also elaborates on the fate of steroid estrogens in target tissues, effect of steroids on calcium dynamics, and steroids and experimental mammary cancer. The selection is a valuable source of information for readers interested in the use of steroids in treating cancer.

what are steroids in biology: Pamphlets on Biology , 1921

what are steroids in biology: Author's Handbook of Styles for Life Science Journals Michel Atlas, 1995-11-08 Let the Author's Handbook of Styles for Life Science Journals save you time and

trouble by providing a one-stop resource for all your manuscript writing requirements. No more plowing through your journal collection or wandering the library stacks to get those elusive journal pages containing instructions to authors. This unique book contains all the information you need to know: whether the journal will consider your manuscript; the journal's submission address; how to construct the abstract, illustrations, tables, and references; and specific information on copyright, multiple authorship, statistical analyses, and page charges. The Author's Handbook of Styles for Life Science Journals gives all this information for 440 of the most important English-language, life science journals. Titles were selected from the Journal Rankings by Times Cited list in the Science Citation Index Journal Citation Report. Because this report is heavily weighted toward the medical sciences, other life science journals are incorporated into the book based on general level of prestige and reputation. In addition, some new titles that promise to be important to their fields, like Nature Medicine and Emerging Infectious Diseases are also included. Organized by journal title, the handbook's entries are uniformly arranged to allow direct comparison between journals. Information is presented in an easy-to-use, easy-to-read format with clear and explicitly stated instructions. The Author's Handbook of Styles for Life Science Journals gives authors in the life sciences all the information necessary for the correct and complete compilation of a manuscript for submission to their journal of choice.

what are steroids in biology: Debating Biology Gillian Bendelow, Lynda Birke, Simon Williams, 2005-07-28 Debating Biology takes a fresh look at the relationship between biology and society as it is played out in the arena of health and medicine.

what are steroids in biology: Molecular Biology of Steroid and Nuclear Hormone Receptors Leonard Freedman, 2012-12-06 Intracellular Receptors: New Instruments for a Symphony of Signals In the late eighteenth century, it was proposed on theoretical grounds that each of the body's organs, beginning with the brain, must be a factory and laboratory of a specific humor which it returns to the blood, and that these circulating signals are indispensable for the life of the whole (Bordeu 1775). During the nineteenth century, some remarkable physiological experiments revealed the actions of humoral factors that affected the form and function of multiple tissues, organs and organ systems within the body (Berthold 1849); much later, the chemical and molecular nature of some of those factors was determined. Against this deep historical backdrop of the founding studies of intercellular signaling, molecular biology sprang into existence a mere forty years ago, rooted in the revelation of regulable gene expression in bacteria. But contemporaneous with those classical analyses of transcriptional regulation of the lactose operon, the modern era of signal transduction was inaugurated by the identification of cAMP as a second messenger -- an intracellular mediator of hormonal activation of glycogen catabolism (Sutherland and Rall 1960). Later in that same decade, it emerged that cAMP is a critical signal not only in metazoans, but even in bacteria, where it serves an analogous function as a critical switch that activates expression of genes required for catabolism of complex carbon sources, including those of the lactose operon.

what are steroids in biology: Research Grants Index National Institutes of Health (U.S.). Division of Research Grants, 1975

what are steroids in biology: Proceedings of the Society for Experimental Biology and Medicine Society for Experimental Biology and Medicine (New York, N.Y.), 1903 List of members in each volume.

what are steroids in biology: Research Awards Index, 1986

what are steroids in biology: Steroid Analysis Hugh L. J. Makin, D.B. Gower, B. Kirk, 2013-06-29 reviews of the first edition -- '...this is an excellent, comprehensive book and can be highly recommended to those who want an up-to-date reference on steroid analysis.' Analyst

what are steroids in biology: The Siberian Sturgeon (*Acipenser baerii*, Brandt, 1869) Volume 1 - Biology Patrick Williot, Guy Nonnotte, Denise Vizziano-Cantonnet, Mikhail Chebanov, 2018-04-06 The biology of the Siberian sturgeon, *Acipenser baerii* Brandt 1869, has become a very attractive subject of investigation for biologists since the 1980s. This volume 1 is part of a two-volume set devoted to the species, the second of which focuses on farming. The present volume is divided into

three parts: Biology and ecology, Biology and physiology of reproduction, and Ecophysiology, i.e. adaptation to the environment. The first part addresses a broad range of topics, such as: the ecology, including a new approach to species-specificity, a new insight on the mineralization of vertebral elements, two approaches to sex determination, transposable elements in the gonads, early ontogeny, olfaction and gustation, nutrition and swimming. The second part includes neurochemical and anatomical descriptions of the central nervous system and an updated version of the oogenesis, the characteristics of both sperm and spermatozoa, and a synthesis on gonadal steroids (synthesis, plasmatic levels and biological activities). In turn, the third part reveals how the physiology of the species changes depending on environmental factors such as oxygen, ammonia, and nitrite. Some fundamental consequences of ammonia are developed (sublethal and lethal levels, effects on gill epithelium and haematology, acid-base balance, on AA and adenyl nucleotides levels in plasma, brain and muscle tissue). In addition, the book includes two methodological chapters dealing with fish dorsal aortic cannulation and respiration physiology.

what are steroids in biology: *Encyclopedia of Cell Biology*, 2015-08-07 The Encyclopedia of Cell Biology, Four Volume Set offers a broad overview of cell biology, offering reputable, foundational content for researchers and students across the biological and medical sciences. This important work includes 285 articles from domain experts covering every aspect of cell biology, with fully annotated figures, abundant illustrations, videos, and references for further reading. Each entry is built with a layered approach to the content, providing basic information for those new to the area and more detailed material for the more experienced researcher. With authored contributions by experts in the field, the Encyclopedia of Cell Biology provides a fully cross-referenced, one-stop resource for students, researchers, and teaching faculty across the biological and medical sciences. Fully annotated color images and videos for full comprehension of concepts, with layered content for readers from different levels of experience Includes information on cytokinesis, cell biology, cell mechanics, cytoskeleton dynamics, stem cells, prokaryotic cell biology, RNA biology, aging, cell growth, cell Injury, and more In-depth linking to Academic Press/Elsevier content and additional links to outside websites and resources for further reading A one-stop resource for students, researchers, and teaching faculty across the biological and medical sciences

what are steroids in biology: Reproductive Biology of Teleost Fishes Robert J. Wootton, Carl Smith, 2014-10-17 Reproductive Biology of Teleost Fishes is the first integrated review of the reproductive biology of the bony fishes, which are the most species-rich and diversified group of vertebrates. Teleosts display remarkable variation in their modes of reproduction, and this volume is intended to provide a framework for understanding the remarkable reproductive diversity of this group. It describes their reproductive biology using, wherever possible, phylogenetic analyses and life-history theory as a means to interpret the information. The book addresses the genetic, physiological, behavioural, ecological, evolutionary and applied aspects of teleost reproduction in a comparative framework that emphasises the adaptive basis of reproductive diversity. Reproductive Biology of Teleost Fishes provides a comprehensive synthesis of fish reproduction that will be of great interest to life scientists, particularly ecologists, evolutionary biologists, physiologists and advanced undergraduates, postgraduates and research workers requiring a comprehensive overview of fish reproduction. The book is suitable for courses in fish biology and ecology, reproductive physiology and reproductive genetics. It also addresses applied questions and will be of value for courses on fisheries science and aquaculture. Libraries in all universities and research establishments where biological sciences, fisheries science and aquaculture are studied and taught should have several copies of this important book on their shelves.

what are steroids in biology: Ebook: Biology BROOKER, 2014-09-16 Ebook: Biology

what are steroids in biology: *The New Biology of Steroid Hormones* Frederick Naftolin, 1991

what are steroids in biology: Monthly Catalog of United States Government Publications United States. Superintendent of Documents, 1988 February issue includes Appendix entitled Directory of United States Government periodicals and subscription publications; September issue

includes List of depository libraries; June and December issues include semiannual index

what are steroids in biology: Monthly Catalogue, United States Public Documents , 1990

what are steroids in biology: Biology and Evolution of the Mollusca, Volume 1 Winston Frank Ponder, David R. Lindberg, Juliet Mary Ponder, 2019-11-18 Molluscs comprise the second largest phylum of animals (after arthropods), occurring in virtually all habitats. Some are commercially important, a few are pests and some carry diseases, while many non-marine molluscs are threatened by human impacts which have resulted in more extinctions than all tetrapod vertebrates combined. This book and its companion volume provide the first comprehensive account of the Mollusca in decades. Illustrated with hundreds of colour figures, it reviews molluscan biology, genomics, anatomy, physiology, fossil history, phylogeny and classification. This volume includes general chapters drawn from extensive and diverse literature on the anatomy and physiology of their structure, movement, reproduction, feeding, digestion, excretion, respiration, nervous system and sense organs. Other chapters review the natural history (including ecology) of molluscs, their interactions with humans, and assess research on the group. Key features of both volumes: up to date treatment with an extensive bibliography; thoroughly examines the current understanding of molluscan anatomy, physiology and development; reviews fossil history and phylogenetics; overviews ecology and economic values; and summarises research activity and suggests future directions for investigation. Winston F Ponder was a Principal Research Scientist at The Australian Museum in Sydney where he is currently a Research Fellow. He has published extensively over the last 55 years on the systematics, evolution, biology and conservation of marine and freshwater molluscs, as well as supervised post graduate students and run university courses. David R. Lindberg is former Chair of the Department of Integrative Biology, Director of the Museum of Paleontology, and Chair of the Berkeley Natural History Museums, all at the University of California. He has conducted research on the evolutionary history of marine organisms and their habitats on the rocky shores of the Pacific Rim for more than 40 years. The numerous elegant and interpretive illustrations were produced by Juliet Ponder.

Related to what are steroids in biology

Steroids: Types and Side-Effects - Patient Side-effects of steroids Steroids don't tend to cause significant side-effects if they're taken for a short period of time or at a low dose. Side-effects are much more common with oral

Prednisone Uses, Dosage, Side Effects, Warnings - Prednisone is used to treat allergic disorders, ulcerative colitis, psoriasis and arthritis. Learn about side effects, interactions and indications

Oral Steroids: Types and Side Effects - Patient Oral steroids (sometimes called corticosteroids) are man-made versions of steroid hormones produced by the body. They are taken by the mouth. Written by a GP

What are the side effects of steroids? - Long-term side effects of steroids: If steroids are taken daily, for long periods of time, they can cause adrenal gland suppression. This is when your body stops producing

Steroid Injections: Uses, Types, and Side-Effects - Patient Steroid injections are anti-inflammatory injections used for joint problems, rheumatoid arthritis, and conditions affecting soft tissues. Written by GP

Topical Steroids: Types, Uses and Side-effects - Patient Topical steroids are used to treat a large number of conditions that cause inflammation - for example eczema and psoriasis. Written by a GP

Prednisone Side Effects: Common, Severe, Long Term Learn about the side effects of prednisone, from common to rare, for consumers and healthcare professionals

Anabolic Steroids - Abuse, Side Effects and Safety - Learn about Anabolic Steroids including: names, uses, legal status in sports and common side effects

The Risks for Teenagers of Using Steroids - Steroids can affect your heart, increasing your

blood pressure, cholesterol levels, and the risk of heart disease or having a heart attack or stroke. Steroids can also cause liver

Prednisolone: Uses, Dosage, Side Effects, Warnings - Prednisolone is used to treat many different inflammatory conditions such as arthritis, lupus, and allergies. Learn about side effects, interactions, and indications

Related Articles

- [keenan and keyes steam tables](#)
- [gave her mother forty whacks](#)
- [wealth management client onboarding process](#)

[Back to Home](#)