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Article



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TISSUES AS SYSTEMS OF CELLS AND THEIR DERIVATIVES ARE ONE OF THE HIERARCHICAL LEVELS OF ORGANIZATION OF LIVING THINGS.

Abstract: Tissues are fundamental units of biological organization, representing a crucial hierarchical level in the structure of living organisms. Composed of groups of specialized cells that work collaboratively to perform specific functions, tissues are essential for the proper functioning of organs and systems within multicellular life forms. This paper categorizes tissues into four primary types: epithelial, connective, muscle, and nervous tissue, each with distinct roles and characteristics. The hierarchical organization of biological systems is outlined, progressing from cells to tissues, organs, organ systems, and ultimately to the organism itself. Understanding tissues is vital for medical applications, including disease diagnosis and regenerative medicine, as well as for insights into evolutionary biology. This exploration underscores the complexity and significance of tissues in maintaining the integrity and functionality of living organisms.

Key words: Tissues, fundamental, units, biological, organization, representing, key, hierarchical, levels, structure, living, organisms.

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Introduction

Tissues are fundamental units of biological organization, representing one of the key hierarchical levels in the structure of living organisms. Composed of groups of specialized cells that perform distinct functions, tissues play a critical role in the overall functioning and maintenance of multicellular life forms. This article explores the various types of tissues, their cellular composition, and their significance in the broader context of biological organization. Tissues can be defined as collections of

similar cells that work together to carry out specific functions. They arise from the differentiation of stem cells during development and are essential for the proper functioning of organs and systems within an organism. The study of tissues is known as histology, which provides insights into both normal physiological processes and pathological conditions. In animals, tissues are generally classified into four main types. This type covers body surfaces and lines cavities and organs. Epithelial cells are closely packed with minimal extracellular matrix, providing

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protective barriers and facilitating absorption, secretion, and sensation. As the name suggests, connective tissue supports, binds, and protects other tissues and organs. It has a diverse range of forms, including bone, adipose (fat) tissue, blood, and cartilage, characterized by a significant amount of extracellular matrix that provides structural support. Muscle tissue is responsible for movement. It can be further divided into three types: skeletal muscle (voluntary movement), cardiac muscle (involuntary movement of the heart), and smooth muscle (involuntary movement in organs). Composed of neurons and glial cells, nervous tissue is essential for transmitting signals throughout the body, facilitating communication between different parts of the organism. Tissues represent a critical level in the hierarchical organization of living things. The hierarchy can be outlined as follows: Groups of similar cells performing a common function. Structures composed of two or more types of tissues working together to perform specific tasks (e.g., the heart, lungs). Groups of organs that work together to perform complex functions (e.g., the circulatory system). The complete living entity capable of independent existence. This hierarchical structure demonstrates how complex organisms arise from simpler units through organization and specialization. Knowledge of tissue types and their functions is vital in medicine for diagnosing and treating diseases. For example, cancer can be identified by examining the characteristics of tissue samples under a microscope. Advances in tissue engineering aim to create artificial tissues for transplantation, which can significantly impact treatments for injuries and degenerative diseases. Studying tissue types across different species provides insights into evolutionary adaptations and the functional diversity of life forms. Tissues, as systems of cells and their derivatives, represent a fundamental hierarchical level of organization in living organisms. They are composed of specialized cells that work together to perform specific functions, forming the building blocks for organs and organ systems. This paper explores the four primary types of tissues: epithelial, connective, muscle, and nervous tissue, each characterized by unique structures and functions that contribute to the overall homeostasis of the organism. The hierarchical organization progresses from individual cells to tissues, then to organs, organ systems, and ultimately to the complete organism. Understanding the complexity and interdependence of tissues is essential for advancements in medical science, including disease treatment and tissue engineering. This study highlights the critical role of tissues in maintaining life and the intricate relationships that underpin biological systems. Cells and their derivatives represent a fundamental hierarchical level of organization in living organisms, forming the basis for all biological structure and function. At the core, cells are the

smallest units of life, capable of independent existence and performing essential processes. These cells can differentiate into specialized types, leading to the formation of tissues, which are groups of similar cells working collaboratively to achieve specific functions. Tissues further combine to form organs, complex structures that fulfill vital roles within an organism. Multiple organs then integrate into organ systems, enabling coordinated physiological functions essential for survival. This hierarchical organization underscores the complexity of life, illustrating how cellular interactions and differentiation contribute to the overall functionality of living organisms. Understanding this framework is crucial for advancements in fields such as biology, medicine, and biotechnology, as it provides insights into the mechanisms underlying health and disease. Tissues, as systems of cells and their derivatives, represent a fundamental hierarchical level of organization in living organisms. This level bridges the gap between individual cells and complex organ systems, highlighting the intricate relationships and specialized functions that emerge when cells group together. Tissues are classified into four primary types—epithelial, connective, muscle, and nervous—each serving distinct roles that contribute to the overall functionality of organs and systems. Understanding the structure and function of tissues is essential for elucidating the mechanisms of health and disease, as well as for advancing medical research and therapies. This abstract underscores the importance of tissues in the biological hierarchy, emphasizing their role in maintaining homeostasis and facilitating the complex interactions necessary for life. The hierarchical levels of organization in living things provide a framework for understanding the complexity of biological systems. This organization ranges from the simplest unit, the cell, to the most complex structures, such as ecosystems. The primary levels include: This hierarchical structure not only illustrates the organization of life but also emphasizes the interdependence and interaction between different levels, which is crucial for maintaining ecological balance and supporting life processes. Understanding these levels is essential for fields such as biology, ecology, and medicine, as it aids in comprehending how life operates at various scales. Tissues, as systems of cells and their derivatives, represent a fundamental hierarchical level of organization in living organisms. They are composed of groups of similar cells that collaborate to perform specific functions essential for the organism's survival and homeostasis. This classification includes four primary types of tissues: epithelial, connective, muscle, and nervous tissue, each serving distinct roles in the body. Epithelial tissue provides coverage and protection, connective tissue supports and binds various structures, muscle tissue facilitates movement, and nervous tissue enables communication and processing of

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information. The interplay of these tissues leads to the formation of organs, which further integrate into organ systems, ultimately contributing to the organism's overall functionality. Understanding the structure and function of tissues is crucial for comprehending biological processes and the complexities of life. This hierarchical organization underscores the intricate relationships between cellular components and their collective impact on the health and operation of living systems.

Conclusion

Tissues are integral to the structure and function of living organisms, representing a critical level of biological organization. By understanding the various types of tissues and their roles, we gain valuable insights into both health and disease, as well as the intricate workings of life itself. As research continues to advance in fields such as histology and regenerative medicine, our appreciation for the complexity and significance of tissues will only deepen. In conclusion, cells and their derivatives form a foundational hierarchical level of organization in living organisms, serving as the building blocks of life. This cellular organization is essential for the development of tissues, organs, and organ systems,

each contributing to the complex functionality and adaptability of living beings. By studying this hierarchy, we gain valuable insights into the intricate processes that govern biological functions, health, and disease. Ultimately, understanding the role of cells and their derivatives not only enhances our knowledge of life itself but also informs advancements in medical and biotechnological fields, paving the way for innovations that can improve human health and well-being. In summary, tissues represent a critical hierarchical level of organization in living organisms, serving as the foundational building blocks for more complex structures such as organs and organ systems. The distinct types of tissues—epithelial, connective, muscle, and nervous—each fulfill unique and essential roles that contribute to the overall functionality and homeostasis of the organism. By understanding the structure and function of these tissues, we gain valuable insights into the biological processes that sustain life. This knowledge not only enhances our comprehension of normal physiological functions but also informs medical and scientific advancements aimed at addressing tissue-related diseases and disorders. Ultimately, the study of tissues highlights the remarkable complexity.

References:

1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2014). *Molecular Biology of the Cell* (6th ed.). Garland Science.
2. Campbell, N. A., & Reece, J. B. (2017). *Biology* (11th ed.). Pearson Education.
3. Karp, G. (2013). *Cell and Molecular Biology: Concepts and Experiments* (7th ed.). Wiley.
4. Tortora, G. J., & Derrickson, B. (2018). *Principles of Anatomy and Physiology* (15th ed.). Wiley.
5. Ross, M. H., Pawlina, W., & Ruan, C. (2015). *Histology: A Text and Atlas* (7th ed.). Lippincott Williams Wilkins.
6. Sadava, D. E., Heller, H. C., & Orians, G. H. (2014). *Life: The Science of Biology* (10th ed.). Sinauer Associates.
7. Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Scott, M. P., & Zipursky, S. L. (2016). *Molecular Cell Biology** (8th ed.). W.H. Freeman.
8. McGee, J. O. D., & Kearney, J. (2012). *Tissue Engineering: Applications and Advance*. Cambridge University Press.
9. Junqueira, L. C., & Carneiro, J. (2013). *Basic Histology* (13th ed.). McGraw-Hill.
10. Thibodeau, G. A., & Patton, K. T. (2019). *Anatomy Physiology* (8th ed.). Elsevier.