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Brief Study on Usage of Biomaterials as Medical Applicants

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INTRODUCTION

A substance that has been designed to interact with biological systems for a medical purpose either a therapeutic (to treat, augment, repair, or replace a tissue function of the body) or diagnostic purpose is known as a biomaterial. Biomaterials science has been around for about 50 years. Biomaterials science and engineering refer to the study of biomaterials. Over it's history, a lot of businesses have invested a lot of money in the creation of new products, resulting in steady and robust growth. Medicine, biology, chemistry, tissue engineering, and materials science are all included in biomaterials science. Keep in mind that a biological material produced by a biological system, such as bone, is not the same as a biomaterial. Due to its application-specific nature, defining a biomaterial as biocompatible requires caution. Biocompatible or suitable for one application, a biomaterial may not be biocompatible in another.

DESCRIPTION

Today, biomaterials are an important part of medicine because they help people heal from injury or disease and restore function. Biomaterials are used in medical applications to support, enhance, or replace damaged tissue or a biological function. They can be natural or synthetic. Biomaterials have been used for the first time since the ancient Egyptians used sutures made from animal sinew. Medicine, biology, physics, and chemistry are all combined in the modern field of biomaterials, as are more recent influences from tissue engineering and material science. Tissue engineering, regenerative medicine and other discoveries have contributed significantly to the field's expansion over the past 10 years. A biomaterial can be made of metals, ceramics, plastic, glass, and even living cells and tissue. For use in biomedical devices and products, they can be reengineered into coatings, fibres, films, foams, moulded or machined parts, and fabrics. Dental implants, heart valves, hip replacements, and contact lenses are examples of these. They are frequently biodegradable, and some of them are bio-absorbable, which indicates that they are gradually eliminated from the body after performing a function. Because of the various mechanisms of deformation and damage brought about by changes in spatial scale, nearly all materials can be thought of as having a hierarchical structure. However, this hierarchical organization is inherent to the microstructure of biological materials.

CONCLUSION

The early X-ray scattering work that Astbury and Woods did on the hierarchical structure of hair and wool is one of the earliest examples of this in the history of structural biology. Collagen, for instance, is the building block of the organic matrix in bone and is a triple helix with a diameter of 1.5 nm. The mineral phase (hydroxyapatite, calcium phosphate) is intercalated with these tropocollagen molecules, resulting in fibrils that curl into alternating helicoids. These "osteons," which have a volume fraction distribution of approximately 60:40 between the organic and mineral phases, are the fundamental building blocks of bones. The hydroxyapatite crystals are mineral platelets with a thickness of one nanometer and a diameter of approximately 70 nm to 100 nm, adding yet another level of complexity. They first form in the spaces between collagen fibrils. Crabs are arthropods that have a carapace made of a mineralized hard part that has brittle fractures and a soft organic part that is mostly made of chitin. The component that is brittle is arranged in a helix pattern. Approximately 60 nm diameter chitin protein fibrils are present in each of these mineral "rods." These fibrils are connected to the shell's interior and exterior by canals with a diameter of 3 nm.

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CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

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