

Application of Biomaterials

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ABSTRACT

Biomaterials must be compatible with the body, and there are often issues of biocompatibility, which must be resolved before a product can be placed on the market and used in a clinical setting. Because of this, biomaterials are usually subjected to the same requirements as those undergone by new drug therapies. All manufacturing companies are also required to ensure traceability of all of their products, so that if a defective product is discovered, others in the same batch may be traced. Biomaterials are additionally utilized any day in dental applications, surgery, and drug delivery. For example, a put together with impregnated pharmaceutical products can be placed into the body, which permits the prolonged roll out of a drug more than an extended period of time. A biomaterial may additionally be an autograft, allograft or xenograft utilized as a transplant material.

Introduction

Biomaterials can be derived either from nature or synthesized in the laboratory utilizing a variety of chemical approaches using metallic components, polymers, ceramics or composite materials. They're repeatedly utilized and/or adapted for a medical application, and therefore include complete or portion of a living structure or biomedical contrivance which performs, augments, or replaces a commonplace function. Such operates may be moderately passive, love being utilized for a heart valve, or perhaps bioactive with a more interactive functionality for example hydroxy-apatite coated hip implants. Biomaterials are additionally utilized any day in dental applications, surgery, and drug delivery. For example, a put together with impregnated pharmaceutical products can be placed into the body, which permits the prolonged roll out of a drug more than an extended period of time. A biomaterial may additionally be an autograft, allograft or xenograft utilized as a transplant material.

Applications

- Biomaterials are used in:
- Joint replacements
- Bone plates
- Intraocular lenses (IOLs) for eye surgery
- Bone cement
- Artificial ligaments and tendons
- Dental implants for tooth fixation
- Blood vessel prostheses
- Heart valves

- Skin repair devices (artificial tissue)
- Cochlear replacements
- Contact lenses

Biomaterials used in Current Medical Practice

Doctors, researchers, and bioengineers use biomaterials for the following broad range of applications:

- Medical implants, including heart valves, stents, and grafts; artificial joints, ligaments, and tendons; hearing loss implants; dental implants; and devices that stimulate nerves.
- Methods to promote healing of human tissues, including sutures, clips, and staples for wound closure, and dissolvable dressings.
- Regenerated human tissues, using a combination of biomaterial supports or scaffolds, cells, and bioactive molecules. Examples include a bone regenerating hydrogel and a lab-grown human bladder.
- Molecular probes and nanoparticles that break through biological barriers and aid in cancer imaging and therapy at the molecular level.
- Biosensors to detect the presence and amount of specific substances and to transmit that data. Examples are blood glucose monitoring devices and brain activity sensors.
- Drug-delivery systems that carry and/or apply drugs to a disease target. Examples include drug-coated vascular stents and implantable chemotherapy wafers for cancer patients.