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Perspective

Biomolecular Techniques and its Importance in Biomolecular Engineering

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DESCRIPTION

In the context of the relationships between their structures, functions and properties as well as their applicability to such fields as developing novel biomaterials, bio sensing, bio imaging, clinical diagnostics and therapeutics with the use of biomolecular engineering it is possible to deliberately alter biomolecules including peptides, proteins, nucleic acids and lipids. Nanotechnology can also be used to manufacture and modify the sizes, shapes, properties and abilities of nanoparticles. Both nanotechnology and biomolecular engineering focus on the structure and behaviour of materials at the nanoscale or smaller hence there are many areas of overlap between the two disciplines. As a result, it is anticipated that biomolecular engineering would combine with nanotechnology to expand the domains of Nano bio or bio nanotechnology and aid in the creation of new Nano biomaterials, nanobiodevices and nanobiosystems. Merged with functional nanomaterials in applications for treatments, diagnostics, biosensing, bioanalysis and biocatalysts in Nano bio or bio nanotechnology. The development of next-generation platforms for bioelectronics, biosensors, biocatalysts, molecular imaging modalities, biological actuators and biomedical applications is projected to be driven by precisely tailored Nano biomaterials, nanobiodevices, and nanobiosystems.

The primary technology of the twenty-first century is nanotechnology, which involves the synthesis and use of materials devices and systems through the control of matter on the Nano scale. The rapidly expanding fields of Nano biotechnology and bionanotechnology which are fusion research fields of nanotechnology and biotechnology were created by the ability to exploit the structures, functions and processes of biological molecules and nanosystems to generate innovative functional biological materials with nanostructures. Despite the fact that these terms are widely used they are utilized in this review in the following terminologically unique manner. In terms of how nanotechnology is applied to produce new materials, tools and systems for researching biological systems and creating new biological assay, diagnostic, therapeutic, information storage and computer systems, among other things, nanobiotechnology is utilized. These systems make use of nanotechnology to enhance biological sciences' objectives. Some Nano biotechnologies progress vertically, moving from microfluidics to nanofluidic biochips. Other nanobiotechnologies build up from the bottom to create nanoscale hybrid materials, like complexes of Nanoparticles (NPs) and biological molecules, which are very beneficial for biosensing, bioimaging, diagnostic and therapeutic applications in healthcare.

Biological molecules are essential building blocks for creating useful nanomaterials, nanodevices and nanosystems, whether using Nano biotechnology or bio nanotechnology. However, biological materials found in nature always have sufficient functions and qualities from the perspective of using them in nanotechnology. Genetic engineering is one of the most recent biomolecular engineering advancements. Self-assembly technology, site-specific chemical and enzymatic conjugation, protein engineering, DNA and RNA engineering and huge High-Throughput Screening (HTS) techniques have all allowed us to enhance, stabilize, incorporate and modify the characteristics and activities of biological materials. As a result it is possible to develop engineered biological materials with features and capabilities that are tailored for use in a variety of applications in the fields of molecular imaging, biological actuators, drug delivery systems, bioelectronics, biosensors, biocatalysis, tissue engineering and regenerative medicine.

Advances in a variety of sectors, including life science, health, electronics, engineering and biotechnology have been made possible to bionanotechnology. Numerous biological applications have investigated the use of Nano scale materials in combination with diverse modified biological molecules. Nano biomaterials are fundamentally distinct from the analogous bulk materials due to their novel and distinctive features and functionalities such as high volume to surface ratio, enhanced solubility, quantum size, macroscopic quantum tunnel and multifunctionality, nanobiomaterials for cell and organ chips, bioelectronic devices and biological separation have advanced

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the development of nanobiomaterials for applications in therapy, diagnostics, biosensing, bioanalysis and biocatalysis.

Recent advances in the field of bio nanotechnology studies have included the use of functional nanomaterials and engineered biological molecules in the areas of therapy, diagnosis, biosensing, bioanalysis, and biocatalysis. It is also concentrated on new developments in nucleic acid engineering, gene engineering, protein engineering, chemical and enzymatic conjugation technologies. Biomolecule manipulation techniques particularly for nucleic acids, peptides, enzymes and proteins, were described on the basis of inventive chemical and biological technologies.