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Commentary

Application of Nanomedicine in Environment

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DESCRIPTION

In recent years, the nanoscience and nanotechnology community has begun to integrate nanosciences and nanotechnologies with other emerging technologies and topics of interest, such as biotechnology, biomedical engineering, environmental remediation, molecular communication networks, quantum computing, and data-driven material design (materials informatics). Materials scientists are interested in the nanoinformatics and materials science modelling for several reasons: it aims to create comprehensive databases of physical and chemical properties of materials based on which Quantitative Structure-Activity Relationships (QSAR) and Quantitative Structure-Properties Relationships (QSPR) can be advanced; and it incorporates optimization methods (Monte Carlo, genetic algorithms, neural networks) and data analytics techniques (data miniaturization).

The medical application of nanotechnology has been broadly characterized as nanomedicine. A large number of human biological systems are better repaired, protected, and improved as a result of this application. Nanomedicine, or the merging of nanotechnology with medicine, offers new promise in the realm of medicine. Nanomedicine is developing as a discipline by opening up new views on crucial concerns such as optimizing medication delivery, particularly targeting tissues or cells, better managing the pace of drug release into the body, and providing early and accurate disease detection.

Nanomedicine makes use of nanodevices and nanostructures for tissue engineering, illness diagnostics, and prevention. Chemistry and chemical engineering are used in nanomedicine equipment that create "nanoparticles and nanotubes, for example". However, molecular biology, biochemistry, and other medically related areas are heavily reliant on nanomedicine devices for illness therapy. As a result, nanomedicine necessitates collaboration from a wide range of fields. Nanotechnology has opened up a huge field of research and application by interacting with biological molecules at the nanoscale level. Both in the extracellular environment and inside inside the cells of the human body, synthetic nanoscale devices and biomolecule interactions have been constructed. Physical parameters, such as the surface/volume ratio, can be examined more thoroughly at the nanoscale than they can at the microscopic size.

Nanotechnology's medical applications are extremely promising, thanks to the ability of miniaturization and ultra-miniaturization to interact with biological entities such as tissues, cells, and even molecules in a targeted manner. As a result, nanotechnology holds great promise for the development of novel medical tools for diagnosis, therapy, and patient monitoring.

Nanomedicine is currently used in several areas: diagnosis, which involves detecting specific symptoms of a disease in order to identify it; therapy, which involves the specific treatment of a disease; regenerative medicine, which aims to allow the regeneration of damaged human tissue or organs; and sensor systems, which are a set of interfaces that detect a physical phenomenon in the form of an electrical signal in order to represent it; and regenerative medicine, which aims to allow the regeneration of damaged human tissue or organs.

Nanomaterials, on the other hand, have a significant potential for environmental remediation due to their high surface area and increased reactivity. Importantly, the tiny size and associated potential for underground movement enable *in situ* remediation of contaminated locations. Various nanomaterials have been produced, characterized, and applied for the treatment of a variety of organic and inorganic pollutants in water and soils over the previous two decades. Nonetheless, there are a few areas that need to be looked at more.

CONCLUSION

Green nanoparticle synthesis using biodegradable materials, particularly phytochemicals, has emerged as a new and intriguing area of nanotechnology study. The synthesis of metal nanoparticles of various shapes and sizes is of tremendous interest due to their wide variety of uses. The phytosynthetic technique has a number of benefits, including cost-effectiveness, simplicity, greenness, eco-friendliness, and biocompatibility. However, the morphological effects of organic-coated nanoparticles on engineering and medicinal disciplines have received minimal attention. This special issue focuses on the synthesis of different nanoparticles from mortio berries, avocado leaves, cochineal, Ambrosia arborescens, curcumin, N-acetylcysteine, and other natural products, as well as their use in environmental remediation, nanomedicine, insecticides, and organic electronics.

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