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Short Communication

Applications of Nanobiotechnology in Daily Life

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DESCRIPTION

In the field of nanobiotechnology, instruments from nanotechnology are created and used to investigate biological phenomena. Nanotechnology is viewed as a subfield of each of chemistry, physics, and biology, and these disciplines frequently collaborate with one another with equal contributions. Nanobiotechnology is a hybrid discipline that incorporates biological starting materials, biological design principles, or has biological or medical applications as one outcome [1]. While biotechnology focuses on the metabolic and other physiological functions of biological entities, such as bacteria, nanobiotechnology can play a significant role in the creation and application of numerous valuable tools for the study of life.

Role of nanobiotechnology in developing new drugs

Drug research and development have greatly benefited by nanobiotechnology, notably the usage of nanoparticles. Small compounds can be attached to nanoparticles in a multivalent fashion to boost their specific binding affinities and disclose novel biological capabilities. Antiviral and anti-inflammatory drugs produced *via* multivalent drug design are several orders of magnitude more potent than monovalent drugs. Some medications are being created using nanomaterials in addition to the use of nanobiotechnology for drug development. These include dendrimers, fullerenes, and nanobodies, which are well-known examples [2]. Recently, there has been an increase in interest in dendrimer conjugation with low-molecular-weight pharmaceuticals to enhance pharmacokinetics, target medications to particular locations, and facilitate cellular uptake. The fullerene molecules' multiple places of attachment, which enable accurate, grafting of active chemical groups in three-dimensional (3D) orientations, are a crucial property.

APPLICATIONS

Nanobiotechnology in medicine

The simplest approach to describe the function of nanobiotechnology (sometimes referred to as nanobiology) in medicine is to say that it allows present practice to move beyond the treatment of symptoms and toward the development of treatments and the regeneration of biological tissues [3]. Animal researches have shown that a uterus may be produced outside the body and subsequently implanted inside the body to give birth. The human heart's ailments have been treated by stem cell therapies. In the field of brain research, there is a lot of work being done with nanotechnology. For instance, nanotechnology is being used to heal the brain, to electrically stimulate neural stem cells, and to create nanomaterial-neural interfaces for signal creation.

Sensors and diagnostics

A target input may cause changes in molecular conformation, charge distribution, optical absorbance and emission, or electrical conductivity along or across simple or complex-shaped molecules, all of which fall within the broad category of molecular sensing and molecular electronics. A transduction system that delivers a quantifiable and intended change in response to a particular or range of inputs can incorporate any of these ways [4]. Biocompatibility with other systems can be achieved to varied degrees by integrating such transduction mechanisms with biomolecules or by using biomolecules as the source of such materials.

Nanobiotechnology in the food sector

The advancement of nanotechnology in food and agriculture has given rise to nanobiotechnology applications, such as biosensors for the detection and quantification of pathogens, organic compounds, other chemicals, and changes in the composition of foods, as well as high-performance sensors (such as an electronic tongue and nose) and edible thin films for the preservation of fruit [5].

Nanobiotechnology in agriculture

Herbicide-containing nanocapsules had previously been shown to effectively pass through tissues and cuticles, allowing for a steady release of the active ingredients. A trend to reduce fertilizer use and environmental degradation through precision farming is described in other publications as being nano-encapsulated slow

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release fertilizers. These are just a few instances among many research projects that may present fascinating potential for the use of nanobiotechnology in agriculture [6]. Additionally, before using this type of tailored nanoparticle application to plants, the amount of amicability should be taken into consideration.

CONCLUSION

In recent years, nanobiotechnology has grown in significance in the fields of immunology, drug delivery, and nanomedicine. In order to expand the applications of nanobiotechnology in health, numerous innovative and promising technologies and procedures for the synthesis of nanoparticles are being created through chemical modification, biological reduction, and scaffolding. To develop the uses of nanomedicine, nevertheless, more thorough study and clinical studies are required. Before using nanomedicine *in vivo* on humans, moral, ethical, and regulatory considerations as well as difficulties such nanoparticle toxicity and side effects must be resolved. The methods are currently being utilized to create nanoparticles-physical, chemical, and biological.

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