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Nanobionics - Nanoscale View of a Biological System

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Abstract: *Nanobionics is covering all the future scientific domains by studying biological system at nano scale. This technology is employed in various disciplines such as agriculture, textile, mycology and medicine. Nanobionics plays a platform for scientists to fabricate specific nanoparticles that can be easily embedded in a biological system to enhance its functioning and performance.*

Keywords: *Lipid exchange envelops penetration; vascular infusion; Plant nanobionics: Polyurethane textile.*

1. Introduction

As we know that science is benefiting our life beyond our imaginations. Nanobiotechnology is an emerging field of science which is concern with the study of nanosized particles of size1-100 nm [1]. When an atom is reduced to nanoscale, this nanomanipulation affects their physical and chemical properties [2].

Nan bionics is an alternative approach of Nan biotechnology [3]. The word bionics composed of two words, bio means life and onics means electronics [4]. In simple words, nanobionics is the study of biological system at nanoscale [5]. Nanobionics is the manipulation of nonmaterial's, to be used in various applications like in plants, clothing, and fungi and in medical field [6].

1.1. Nanobionics Helps to

- Increase surface area
- More active sites
- More and faster reactions
- Higher productivity
- Faster switching speeds
- Changes in surface energy
- Changes in protein adhesion
- Changes in cellular interactions
- Control cascade of molecular and cellular events [7, 8, 9, 10] etc

2. Applications of Nanobionics

2.1. Plant Nanobionics

With nanobiotechnology advancement, plants are capable of imaging objects in their environment [11], Self-powering themselves as light sources [12], with infrared communication devices [13] and having self-powered groundwater sensors developed [14].

2.2. Engineering Electronic Systems into Plants

The main goal of plant nanobionics is to introduce nanoparticles into plants to enhance its functioning [15]. Thus designing a perfect nano particle which directly interfere with plants cells and organelle to enhance its functions such as boost plants photosynthesis process in plants by the incorporation of DNA coated carbon nano tubes into their leaves [16, 17].It was reported that incorporation of carbon nanotubes into chloroplasts, enhances chloroplast's photo synthetic activity by 49% [18].These nanotubes expand the light capturing function of plants [19].

Another method known as LEEP (lipid exchange envelop penetration) used for delivering nanoparticles like DNA coated carbon nanotubes into the plants which aids penetration into fatty membranes of chloroplast [20]. Another nanobionics technique known as vascular infusion in which sensors are placed in mesophyll cells of plants for the detection of pollutants [21].

2.3. Clothing Nanobionics

Using nanobionics in clothing is an efficient method to get rid of disease caused by free radicals [22]. These special cloths emit infrared rays and can reduce free radical levels is peripheral blood mononuclear cell (PBMCs) [23].

They use polyurethane textile loaded with mineral oxide and coated on a microfiber which helps body to absorb thermal emission and transform it into far infrared rays [24].

2.4. Medical Nanobionics

As nanobionics is haling in medical field. it can be used in artificial muscles by using electrochemical actuators which stores electric energy and convert it into mechanical energy by using carbon nanotubes, metal oxides, N-doping and nanosheet [25,26,27]. Nanobionics also works for vagus nerve stimulation, eye and ear treatment [28].

3. Conclusion

Nanobionics and its applications is a revolutionary science which is enhancing and improving our lives the future we see in science fiction movies, seems to be a reality now with the help of this technology.

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