Journal of The Gujarat Research Society

ISSN: 0374-8588
Volume 22 Issue 1, January 2020

A REVIEW PAPER ON NANOBIOTECHNOLOGY BIOLOGICAL APPLICATIONS

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Abstract

Nanotechnology is a multidisciplinary discipline covering a broad and complex spectrum of engineering, physics, chemistry, and biological devices. Rapid developments in science and technology have opened up nanotechnology, providing new prospects for advances in the fields of medicine, electronics, food and the environment. In many biological applications (bio sensing, biological separation, molecular imaging, anti-cancer therapy), nanoscale structures and materials (nanoparticles, nanowires, nano fibers, and nano tubes) have been investigated because their novel properties and functions differ drastically from their bulk counterparts.Many new possibilities are opened up by their high volume/surface ratio, increased solubility and multi-functionality. The goal of this review is to identify in various areas the potential benefits and impacts of nanobiotechnology. Nanotechnology can be defined as the science and engineering involved in designing, synthesizing, characterizing and applying materials and devices on a nanometer scale with the smallest functional organizations in at least one dimension. This technology provides new therapeutic possibilities for many agents that cannot be used effectively as traditional formulations because their weak functionality should be addressed by the author to whom correspondence should be addressed

Keywords: *Nanobiotechnology, Nanoparticles, Biological applications, Modern technology, Development.*

I. INTRODUCTION

Formulations of nanoparticles provide protection for agents prone to degradation, denaturation at harsh pH regions, and also extend the duration of drug exposure by increasing bioadhesion retention of the formulation. Nanobiotechnology is the synthesis of engineering and molecular biology that leads to a new class of biological and chemical analysis

ISSN: 0374-8588
Volume 22 Issue 1, January 2020

multifunctional devices and systems with greater sensitivity, specificity and higher recognition rates[1].

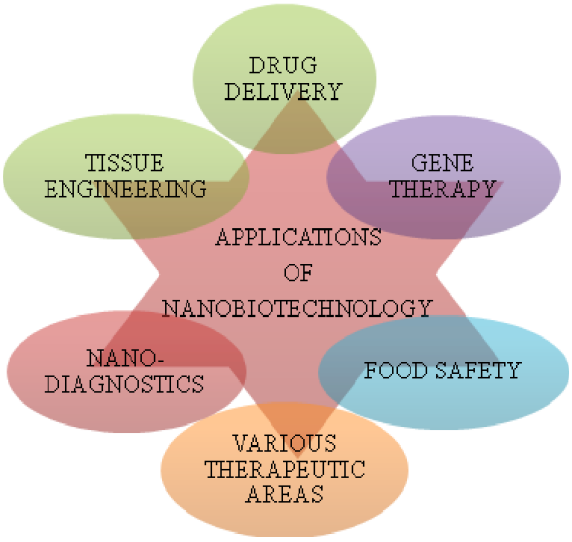

Figure 1: Illustrates the general applications of nanobiotechnology[2]

Nanotubes, nano channels, nanoparticles, nano pores, nano capacitors, and nano fibers provide nano-objects with substantial analytical applications.Relevant sectors of nanobiotechnology, including liposomes, nanoparticles for drug delivery, emulsions, imaging, biomaterials, food, optics and electronics, pathogens, biosensors and in vitro diagnostics, have been examined in a number of articles. Industry studies detailing companies and their nanobiotechnology-related products have also started to appear over the past few years. Possibly the most critical barrier to regulatory acceptance and commercialization of nano material products is the unclear health hazard potential of nano materials[3].Deleterious effects on cells and tissues can also be correlated with the unusual physical and chemical properties of nano materials (small size, increased reactivity, high surface-to-volume ratio) and are likely to provide health benefits. Nano materials have organelle-like dimensions contained in the cell and have the ability to interact with essential cellular functions, resulting in potential toxicity. The aim of this review is to identify in different areas the potential benefits and impact of nanobiotechnology[4].

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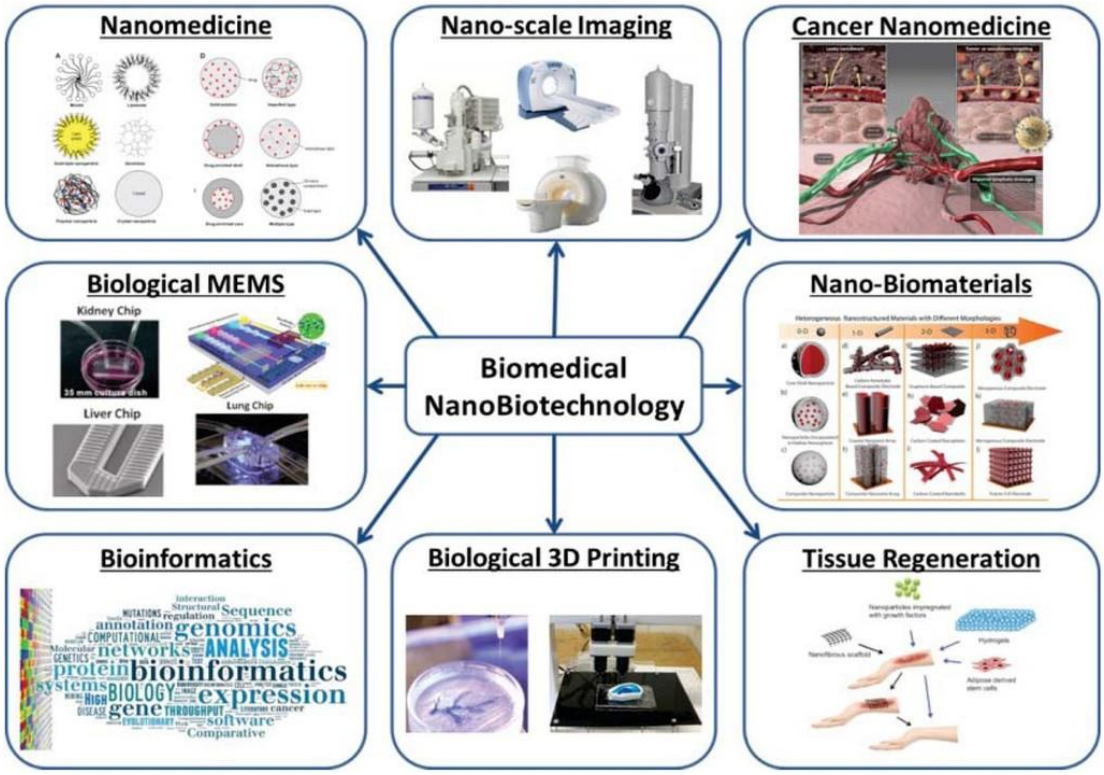

Figure 2: Depicts the nanobiotechnology medical applications[5]

The prefix "nano" derives from the word for dwarf in Greek. One nanometer (nm) is equal to one billionth of a metre, or about 6 carbon atoms or 10 molecules of water in diameter. The width of a human hair is around 7000-nm. Atoms are smaller than 1 nm, although several molecules range from 1 nm to larger, including certain proteins. Most accounts of nanotechnology's past and roots begin with the historic lecture by Richard Feynman at the California Institute of Technology in 1959 entitled "There is plenty of room at the bottom," in which he outlined the concept of constructing objects from the bottom up[6].

II. NANOBIOTECHNOLOGY BIOLOGICAL APPLICATIONS

Study in the field of food nano-biotechnology primarily includes the addition of antioxidants, antimicrobials, biosensors and other nano-materials to packaging. In order to enhance the characteristics of its products, the medical, pharmaceutical, and cosmetic industries have been using nanoparticles made from food. In recent years, nanobiotechnology in food packaging has become a focal point[7].

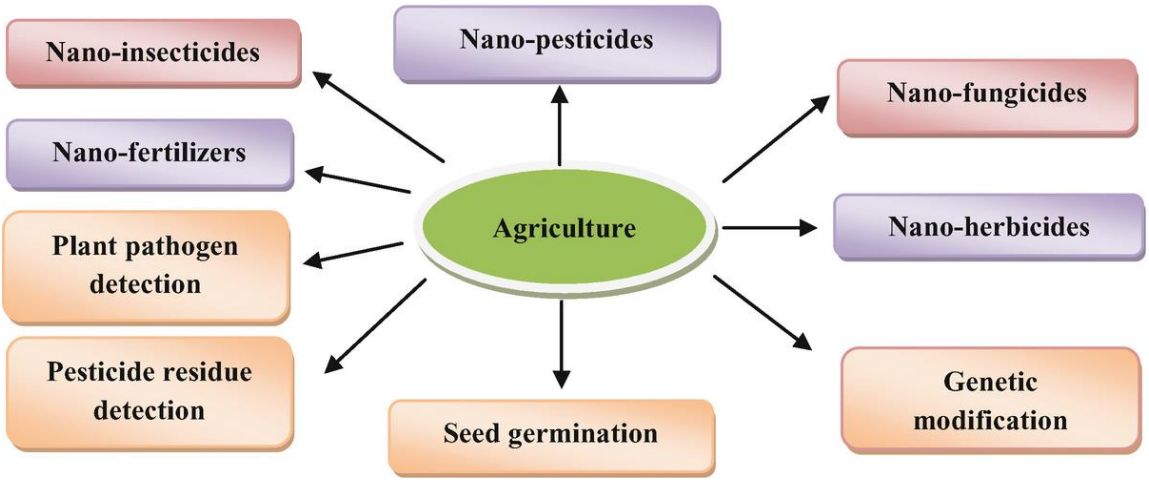

Figure 3: Illustrates the nanobiotechnology application in agriculture[8]

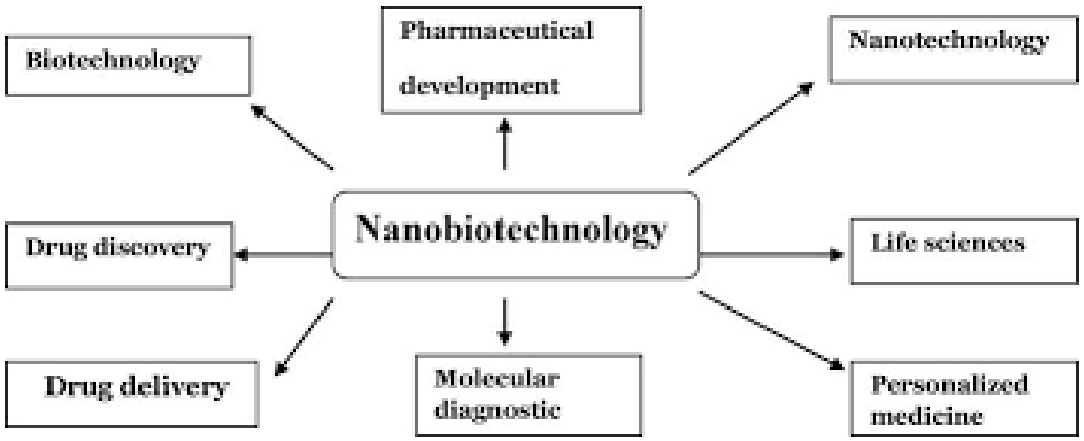

Figure 4: Illustrates the nanobiotechnology application in drug discovery[7]

Together with bio-based materials, such as edible and biodegradable nano composite films, the future prospects for bio-nano composites for food packaging applications have gained interest. Among the metal nanoparticles available, silver and related materials have been used for their antimicrobial properties in several nano-based commercial items[9]. Studies say that due to an intense surface area/reduced particle size, the antimicrobial efficiency is improved. Figure 1, illustrates the general applications of nanobiotechnology. Figure 2 depicts the nanobiotechnology medical applications. Figure 3 illustrates the nanobiotechnology application in agriculture. Figure 4 illustrates the nanobiotechnology application in drug discovery.

III. CONCLUSION

Nanotechnology is a global business that affects universities, industry, and regulators. Nanobiotechnology is still in its early stages of growth; however, it is multi-directional and fast-paced to create. Nanobiotechnology will create opportunities for new materials and

methods to be developed that will increase our ability to build analytical systems that are quicker, more accurate, and more sensitive.While there are many exciting potential biological applications of nano materials, real scientific promises from hype need to be discerned and the fundamental understanding of the interactions of nano materials with intracellular structures, the process, and the environment must be constantly improved

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