

A Study on Nanotechnology

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ABSTRACT: *Nanotechnology presents a wide range of problems and opportunities: not just diverse issues, but different kinds of issues. These issues must be addressed by more than one kind of organization, based on more than one system of ethics. Guardian ethics, embodying force and caution, will be necessary to avoid the worst risks and dangers of nanotech. Commercial ethics, designed to maximize profit, will be most effective in funding development, solving problems, and building markets.*

This article contains research methodology, statement of the problem, Need for the study, objectives of the study, Hypothesis, Data collection, references

THEORITICAL CONCEPTS:

DEFINITION: The branch of technology that deals with dimensions and tolerances of less than 100 nanometers, especially the manipulation of individual atoms and molecules.

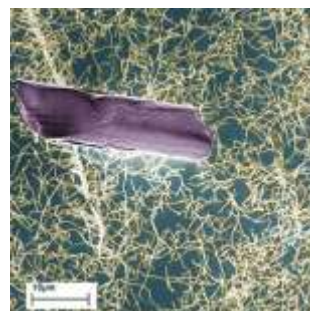
INTRODUCTION

Truly *revolutionary* nanotech products, materials and applications, such as nanorobotics, are years in the future (some say only a few years; some say many years). What qualifies as "nanotechnology" today is basic research and development that is happening in laboratories all over the world.

"Nanotech" products that are on the market today are mostly gradually improved products (using *evolutionary* nanotechnology) where some form of nano-enabled material (such as carbon nanotubes, nanocomposite structures or nanoparticles of a particular substance) or nanotech process (e.g. nanopatterning or quantum dots for medical imaging) is used in the manufacturing process.

In their ongoing quest to improve existing products by creating smaller components and better performance materials, all at a lower cost, the number of companies that will manufacture "nanoproducts" (by this definition) will grow very fast and soon make up the majority of all companies across many industries.

Evolutionary nanotechnology should therefore be viewed as a process that gradually will affect most companies and industries.



Human hair fragment and a network of single-walled carbon nanotubes

It seems that a size limitation to the 1-100 nm range, the area where size-dependant quantum effects come to bear, would exclude numerous materials and devices, especially in the pharmaceutical area, and some experts caution against a rigid definition based on a sub-100 nm size.

REVIEW OF LITERATURE:

Nanotechnology is a multidisciplinary field, as it combines the knowledge from different disciplines: chemistry, physics, and biology amongst others (Schmid, 2006; Schmid, 2010). Nanotechnology is the art and science of manipulating matter at the atomic or molecular scale and holds the promise of providing significant improvements in technologies for protecting the environment. While many definitions for nanotechnology exist, the U.S. Environmental Protection Agency (EPA) uses the definition developed by the National Nanotechnology Initiative (NNI). According to National Nanotechnology Initiative of the USA, nanotechnology is defined as: research and technology development at the atomic, molecular, or macromolecular levels using a length scale of approximately one to one hundred nm in any dimension; the creation and use of structures, devices and systems that have novel properties and functions because of their small size; and the ability to control or manipulate matter on an atomic scale (USEPA, 2007). The technology has excellent prospects for exploitation across the medical, pharmaceutical,

biotechnology, engineering, manufacturing, telecommunications and information technology markets.

HISTORY AND DEVELOPMENT OF NANOTECHNOLOGY

It is difficult to describe the history of nanotechnology which, according to R. D Booker is due to two principal reasons: (1) Ambiguity of the term “nanotechnology” and (2) Uncertainty of the time span corresponding to the early stages of nanotechnology development. The term nanotechnology is explained by a wide spectrum of various technologies that nanotechnology covers, which are based on various types of physical, chemical and biological processes, realized at nanolevel.

RESEARCH METHODOLOGY:

NEED FOR THE STUDY

"Nanotechnology" is a buzzword that the media and politicians focus on, but is not something one simply does as a career. If you interpret it as "technology at the nanometer scale," it encompasses biology, chemistry, engineering of several types, and other fields that don't immediately come to mind.

“Nanotechnology” refers to a notoriously broad range of areas of science and technology, and progress during a student’s career will open new areas, and some are yet to be imagined. Choices within this complex and changing field should reflect a student’s areas of interest and ability, current background, level of ambition, and willingness to accept risk — there is a trade-off between pioneering new directions and seeking a secure career path.

A flexible competence in nanotechnology also requires a sound understanding of chemistry and chemical synthesis, of biomolecular structure and function, of intermolecular forces, and of solids and surfaces.

STATEMENT OF THE PROBLEM:

This Information Statement defines what is meant by nanoscience and nanotechnology and reviews present and potential future applications of nanotechnology in the food industry. It examines the potential benefits and risks, and reviews present government, safety and regulatory bodies’ attitudes to nanotechnology in the food sector. Possible deficiencies in current regulations are identified and

possible solutions discussed. A case is made that safety data are needed before nanoparticles are used in foods or food packaging materials and progress towards strengthening current regulations in view of the need for such safety data are discussed. The Information Statement stresses the need to identify and address public concerns that may arise over the use of nanotechnology in food and suggests approaches that may address such fears.

OBJECTIVES OF THE STUDY

1. Support the creation of a comprehensive knowledge base for evaluation of the potential risks and benefits of nanotechnology to the environment and to human health and safety.
2. Create and employ means for timely dissemination, evaluation, and incorporation of relevant environmental, health, and safety (EHS) knowledge and best practices.
3. Develop the national capacity to identify, define, and responsibly address concepts and challenges specific to the ethical, legal, and societal implications (ELSI) of nanotechnology.
4. Incorporate sustainability in the responsible development of nanotechnology.

Hypotheses:

General:

- If nanotechnology is used to target cancer cells, then it will be effective.
- If metallofullerene nanoparticles are used to target different types of cancer, then they will be effective.
- If metallofullerene nanoparticles are used to target healthy prostate cells, then they will not be effective.

Specific:

- Dosage: As the dosage of metallofullerene nanoparticles increases when targeting any type of cancer, the number of cancer cells killed will also increase.
- Purity: If the purity of the metallofullerene nanoparticles is at 99%, then more cells will be killed than at 95% purity.

Data Collection:

Primary data: The primary data is collected by me in the form of communication and observation.

Secondary data: This is collected both internally and externally from the previous records, and research papers. This includes publication, internet.

REFERENCES:

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WEBSITES:

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2. www.nano strctures.com
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