Short Communication

iMedPub Journals
www.imedpub.com

Nano Research & Applications
ISSN 2471-9838

2020
Vol.6 No.2:4

History and Future of Nanotechnology

Anusha KJ*

Department of Biotechnology, Dayananda Sagar University, Bengaluru, India

Received: July 15, 2020; **Accepted:** July 24, 2020; **Published:** July 31, 2020

***Corresponding author:** Anusha KJ

anushakj28@gmail.com

Department of Biotechnology, Dayananda Sagar University, Bengaluru, India.

Citation: Anusha KJ (2020) Health and Environmental Impact of Nanotechnology. Nano Res Appl Vol.6 No.2:4

Short Communication

Human dreams and imagination often give rise to new science and technology. Nanotechnology, a 21st-century was born out of such dreams. Nanotechnology is defined as the understanding and control of matter at dimensions between 1 and 100 nm where unique phenomenal enable novel applications. Besides human exposure to nanoparticles has occurred throughout human history, it has dramatically increased during the industrial revolution. The study of nanoparticles is not new. The concept of a "nanometer" was first proposed by Richard Zsigmondy, the 1925 Nobel Prize Laureate in chemistry. He coined the term nanometer explicitly for characterizing particle size and he was the first to measure the size of particles such as gold colloids using a microscope.

History of Nanotechnology

Almost 15 years after Feynman's lecture, a Japanese scientist, Norio Taniguchi, was the first to use "nanotechnology" to describe semiconductor processes that has been occurred on the order of a nanometer. He mentioned that nanotechnology consisted of the processing, separation, consolidation, and deformation of materials by one atom or one molecule. The golden era of nanotechnology began in the 1980s when Kroto, Smalley, and Curl discovered fullerenes and Eric Drexler of Massachusetts Institute of Technology (MIT) used ideas from Feynman's "There is Plenty of Room at the Bottom" and Taniguchi's term nanotechnology in his 1986 book titled, "Engines of Creation: The Coming Era of Nanotechnology." Drexler proposed the idea of a nanoscale "assembler". Drexler's vision of nanotechnology is also called "molecular nanotechnology." The science of nanotechnology was advanced further when Iijima, another Japanese scientist, developed carbon nanotubes.

The beginning of the 21st century saw an increased interest in the emerging fields of nanoscience and nanotechnology. In the United States, Feynman's stature and his concept of manipulation of matter at the atomic level played an important role in shaping national science priorities. President Bill Clinton advocated for funding of research in this emerging technology during a speech at Caltech on January 21, 2000. later, President George W. Bush signed into law the 21st Century Nanotechnology Research and Development. The legislation made nanotechnology research a national priority and created the National Technology Initiative (NNI). Today, the NNI is managed within a framework at the top of which the President's Cabinet-level National Science and Technology Council (NSTC) and its Committee on Technology. The Committee's Subcommittee on Nanoscale Science, Engineering, and Technology (NSET) is responsible for planning, budgets, implementation, and review of the NNI and it is comprised of representatives from 20 US departments and independent agencies and commissions [1-3].

Future of Nanotechnology

In a timeframe of approximately half a century, nanotechnology has become the foundation for remarkable industrial applications and exponential growth. Nanotechnology had a profound impact on medical devices such as diagnostic biosensors, drug delivery systems, and imaging probes. In the food and cosmetics industries, the use of nanomaterials has increased dramatically for improvements in production, packaging, shelf life, and bioavailability. Zinc oxide quantum dot nanoparticles show antimicrobial activity against food-borne bacteria, and nanoparticles are now used as food sensors for detecting the food quality and safety [4-6].

Today, nanotechnology impacts human life every day. The potential benefits are many and diverse. However, because of extensive human exposure to nanoparticles, there is a significant concern about the potential health and environmental risks. These concerns led to the emergence of additional scientific disciplines including nanotoxicology and nanomedicine. Nanotoxicology is the study of potential adverse health effects of nanoparticles. Nanomedicine, which includes subsectors such as tissue engineering, biomaterials, biosensors, and bioimaging, was developed to study the benefits and risks of nanomaterials used

in medicine and medical devices. Some of the potential benefits of medical nanomaterials include improved drug delivery, antibacterial coatings of medical devices, reduced inflammation, better surgical tissue healing, and detection of circulating cancer cells. However, due to lack of reliable toxicity data, the potential to affect human health continues to be a major concern.

References

1 Colvin VL (2003) The potential environmental impact of engineered nanomaterials. Nature Biotechnology 21(10): 1166–1170.

2 Dagani R (2003) Nanomaterials: Safe or unsafe? Chem & Eng News pp. 30 – 33.

3 Du Bois RM, Holroyd KJ, Saltini C, Crystal RG (1991) Granulomas process. In: The Lung, pp. 1925 – 1938. R.G. Crystal, J. B. West, P. J. Barnes, N. S. Cherniack, E. R. (Eds) Weibel, Published by Raven Press, NY, USA.

4 Masciangioli T, Zhang WX (2003) Environmental technologies and the nanoscale. American Chemical Society. Environmental Science & Technology. 102A – 108A.

5 Maynard AD, Baron PA, Shvedova AA, Kisin ER, Catranva V (2003) Exposure to carbon nanotube material 1: Aerosol release during the handling of unrefined single walled carbon nanotube material. Jour. Toxicology and Environmental Health. In press.

6 Murray CB, Kagan CR, Bawendi MG (2000) Synthesis and characterization of monodisperse nanocrystals and close-packed nanocrystal assemblies. Annu Rev Mater Sci 30: 545–610.