Uses of Nanotechnology in the Field of Medicine

Tyler Grant*

Department of Pharmaceutics, Islamic Azad University, Qom, Iran

Commentary

Received: 03-Oct-2022, Manuscript No. JPN-22-80435; **Editor assigned:** 05-Oct -2022, Pre QC No. JPN-22-80435 (PQ); **Reviewed:** 17-Oct-2022, QC No. JPN-22-80435; **Revised:** 24-Oct-2022, Manuscript No. JPN-22- 80435 (A); **Published:** 03-Nov-2022, DOI:10.4172/23477857.10.1.005.

***For Correspondence:**
Tyler Grant, Department of Pharmaceutics, Islamic Azad University, Qom, Iran
E-mail: Tylergrat@mail.edu.ir

ABOUT THE STUDY

The use of nanotechnology in medicine is known as nanomedicine. Nanomaterials, biological devices, nanoelectronic biosensors, and even potential future uses of molecular nanotechnology, including biological machines, are all included in the field of nanomedicine. Understanding the concerns associated to toxicity and environmental impact of nanoscale materials is a current topic for nanomedicine.

Nanomaterials can be given additional functionality by interacting with biological molecules or structures. Nanomaterials can be valuable for both *in vivo* and *in vitro* biomedical research and applications since their size is comparable to that of the majority of biological molecules and structures. The combination of nanomaterials and biology has so far resulted in the creation of drug delivery systems, contrast agents, analytical tools, and diagnostic gadgets.

The use of nanoparticles to deliver medications to certain cells is now possible because of nanotechnology [1]. By placing the active pharmaceutical ingredient solely in the morbid region and in no more than the necessary dose, the overall drug intake and adverse effects may be greatly reduced. Targeted drug distribution aims to lessen therapeutic side effects while concurrently reducing drug intake and treatment costs. Additionally, by limiting unintended exposure to healthy cells, focused medication delivery lessens the negative effects associated with crude drug use. The goal of drug delivery is to increase bioavailability at specified locations and over an extended length of time in the body. This may be accomplished by the use of nanoengineered devices that target certain molecules [2-6].

The detection and eradication of unidentified diseases and other threats to human life are among the largest challenges facing humanity. The developments in mechanical science can be very beneficial in this area. Discovering the mechanical characteristics of unknown cells, bacteria, viruses and pathogens is crucial to developing treatments for diseases that have no known cure. In order to visualise and characterise the mechanical characteristics of nanoparticles as well as, in more advanced stages to change and move these particles, scientists use the Atomic Force Microscope.

Drug pharmacokinetics and bio distribution can be enhanced by the design of drug delivery systems, such as lipid- or polymer-based nanoparticles. The pharmacokinetics and pharmacodynamics of Nano medicine, however, varies greatly amongst patients. Nanoparticles can be utilised to enhance medicine delivery when they are created to escape the body's defence mechanisms. Drugs can now enter cell cytoplasm and pass through cell membranes thanks to the development of sophisticated drug delivery mechanisms. One technique to use pharmacological molecules more effectively is through activated response. Drugs that have been injected into the body only become active when a specific signal is encountered. For instance, a medicine with low solubility will be substituted by a drug delivery system that has environments that are both hydrophilic and hydrophobic, enhancing the solubility.

Using controlled drug release, lowering drug clearance rates, lowering the volume of distribution, or lowering the influence on non-target tissue are other ways that drug delivery systems can prevent tissue harm. Due to the intricate host reactions to nano and microsized materials as well as the challenge of specifically targeting certain organs in the body, the biodistribution of these nanoparticles is still not perfect. However, there is still more to be done in order to improve and comprehend the capabilities and restrictions of nanoparticulate systems. The concerns of nanotoxicity become a crucial next step in deeper knowledge of nanoparticles medicinal applications, even when research advancements show that targeting and dispersion can be enhanced by them.

REFERENCES

1. Mohanpuria P, et al. Biosynthesis of nanoparticles: Technological concepts and future applications. J Nanoparticle Res. 2008;10:507-517.
2. Domenico C, et al. Ultrasmall-in-Nano Approach: Enabling the Translation of Metal Nanomaterials to Clinics. Bioconjugate Chem 2018;29:4–16.
3. Wagner V, et al. The emerging nanomedicine landscape. Nature Biotech 2006; 24:1211–1217.
4. Freitas RA. What is nanomedicine?. Nanomed: Nanotechnol Biol Med 2005;1:2-91.
5. Ranganathan R, et al. Nanomedicine: Towards development of patient-friendly drug-delivery systems for oncological applications. Int J Nanomedicine 2012;7:1043–60.
6. Shi J, et al. Cancer nanomedicine: Progress, challenges and opportunities. Nature reviews cancer 2017;17:20-37.