OPEN ACCESS Freely available online

ISSN: 2167-7956
Journal of Biomolecular Research & Therapeutics

Perspective

Nano-Technology in Delivering Biomolecules for Therapeutic Applications

Maza Bleckwell*

Department of Biomolecules, University of Oxford, Oxford, UK

DESCRIPTION

Nano-technology has revolutionized several fields, including medicine by enabling the manipulation of structures on a nanometer scale. In particular the use of nano-technology in biomolecules has opened up new possibilities for the development of therapies, diagnostics and drug delivery systems. Biomolecules such as proteins, DNA and RNA play a critical role in living organisms. They carry out essential functions in the body such as catalyzing chemical reactions, transmitting genetic information and regulating gene expression. However many biomolecules are complex structures that can be difficult to manipulate and deliver to specific targets in the body. Nano-technology offers a solution to these challenges by engineering nanometer-sized particles, scientists can create platforms that can interact with biomolecules in unique ways. These interactions can enable the precise control of biomolecules, including their location, activity and stability.

One example of the use of nano-technology in biomolecules is the development of targeted drug delivery systems. Traditional drug delivery methods rely on the systemic administration of drugs, which can lead to off-target effects and reduced efficacy. Nano-technology-based drug delivery systems can overcome these limitations by targeting specific cells or tissues in the body Nanoparticles can be engineered to bind to specific receptors on the surface of cells allowing for targeted delivery of drugs to those cells. Additionally, the use of Nano-particles can enable the controlled release of drugs, which can increase their efficacy and reduce side effects. Another area where Nano-technology is having a significant impact on biomolecules is in the development of biosensors. Biosensors are devices that can detect and quantify biological molecules such as proteins, DNA and RNA. These devices have numerous applications in medicine including the detection of disease biomarkers and the monitoring of therapeutic responses. Nano-technology-based biosensors have several advantages over traditional biosensors. For example, Nano-particles can enhance the sensitivity and specificity of biosensors, enabling the detection of biomolecules at lower concentrations. Additionally Nano-particles can be engineered to interact specifically with certain biomolecules further increasing the selectivity of biosensors. One type of nano-particle that has shown promise in biosensing applications is the Carbon Nanotube (CNT). They have unique electrical and mechanical properties that make them ideal for biosensing applications. CNT-based biosensors have been used to detect a variety of biomolecules, including proteins, DNA and RNA. The sensitivity of these biosensors is due to the high surface area of CNTs which allows for the binding of large numbers of biomolecules. Additionally, CNTs can be functionalized with specific molecules such as antibodies or aptamers to enable the selective detection of biomolecules.

Another application of Nano-technology in biomolecules is the development of Nano carriers for gene therapy. Gene therapy is a promising approach for the treatment of genetic diseases, cancer and other disorders. However the delivery of therapeutic genes to target cells in the body remains a significant challenge. Nano-technology-based gene delivery systems can overcome many of the limitations of traditional gene delivery methods. Nanocarriers can protect therapeutic genes from degradation in the body and enable their targeted delivery to specific cells or tissues. Additionally the use of Nano-particles can enhance the efficacy of gene therapy by increasing the uptake of therapeutic genes by target cells. One type of nanocarrier that has shown promise in gene therapy is the Lipid Nanoparticle (LNP). LNPs are composed of a lipid bilayer surrounding an aqueous core and can encapsulate therapeutic genes. The use of LNPs in gene therapy has been demonstrated in clinical trials for the treatment of genetic disorders and cancer. The use of Nano-particles in drug delivery systems, biosensors and gene therapy has shown promise in improving the efficacy and specificity of these technologies. While there is still much to learn about the interactions between Nano-particles and biomolecules the potential benefits of these technologies. As the field of Nano-technology continues to evolve, we can expect to see more innovative approaches to manipulating and delivering biomolecules for therapeutic and diagnostic applications.

Correspondence to: Maza Bleckwell, Department of Biomolecules, University of Oxford, Oxford, UK, E-mail: bleckwell@gmail.com

Received: 03-Apr-2023, Manuscript No. BOM-23-21243; **Editor assigned:** 06-Apr-2023, Pre QC No. BOM-23-21243(PQ); **Reviewed:** 20-Apr-2023, QC No. BOM-23-21243; **Revised:** 27-Apr-2023, Manuscript No. BOM-23-21243 (R); **Published:** 05-May-2023, DOI: 10.35248/2167-7956.23.12.290.

Citation: Bleckwell M (2023) Nano-Technology in Delivering Biomolecules for Therapeutic Applications. J Biol Res Ther. 12:290.