OPEN ACCESS Freely available online

ISSN: 2167-7956
Journal of Biomolecular Research & Therapeutics

Commentary

Nanotechnology Transforming Medicine in Biomolecules

Werida Juliee*

Department of Molecules, Columbia University, New York, USA

DESCRIPTION

Nanotechnology stands as humanity's remarkable process in scientific inquiry and technological innovation [1]. Operating at the Nano scale dimensions smaller than 100 nanometers in interdisciplinary field has open up of possibilities that span across various sectors from electronics and medicine to materials science and energy. At its core the concept of nanotechnology revolves around the manipulation and engineering of materials at the Nano scale. The term itself is derived from the nanometer unit [2]. The seed of nanotechnology germinated from a merger of various scientific disciplines chemistry, physics, biology and engineering. This amalgamation laid the foundation for understanding and harnessing the unique properties that emerge when materials are manipulated at the nanoscale [3]. This quantum realm grants researchers unparalleled precision, control, and versatility in designing materials and devices. Nanotechnology is a nanomaterial substances deliberately engineered with dimensions spanning the nanoscale. These materials deviate from the norm due to their elevated surface area-to-volume ratio and quantum mechanical behavior. One notable example is carbon nanotubes, cylindrical structures composed of carbon atoms arranged in a hexagonal pattern [5]. Their exceptional mechanical strength, electrical conductivity and thermal properties have led to their integration into diverse applications ranging from advanced electronics to cutting-edge composite materials.

Similarly, graphene a single layer of carbon atoms organized in a two-dimensional has captured widespread attention. Its exceptional electrical conductivity, mechanical resilience and flexibility have ignited interest in fields as diverse as electronics, energy storage and biomedicine. Nanoparticles, characterized by their infinitesimal size exhibit properties dictated by their nanoscale dimensions [6]. Silver nanoparticles for instance boast potent antibacterial properties positioning them as indispensable components in medical devices and antimicrobial coatings. Quantum dots, semiconductor nanoparticles renowned for their ability to emit light across the color spectrum based on their size, find application in displays, imaging techniques and even novel cancer therapies [7]. Nanomedicine, an offshoot of nanotechnology leverages nanoparticles and nanomaterials to revolutionize diagnostics, drug delivery and disease treatment. Nanoparticles engineered to transport drugs directly to target cells has the potential to maximize therapeutic efficacy while minimizing side effects [8]. Moreover nanoscale sensors can detect disease biomarkers at incredibly early stages, propelling the era of personalized medicine. Gold nanoparticles coated with antibodies can be directed to cancer cells where focused laser irradiation raises their temperature and obliterates malignant cells sparing healthy tissues a innovative technique known as photothermal therapy [9]. Additionally, nanoparticle-based contrast agents have elevated the precision of imaging modalities like Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) scans. As nanotechnology pushes the boundaries of innovation, it also presents multifaceted challenges. The meticulous manufacturing of nanoscale materials and devices with consistent quality and scalability poses significant hurdles. Ensuring the safety of nanoparticles, particularly in medical applications, remains a critical concern. Their minute size could potentially lead to unintended interactions with biological systems and ecosystems [10]. Nanotechnology stands at the precipice of an awe-inspiring future. Nanotechnology in biomolecules marks a convergence of scientific disciplines, fostering innovation that transcends the boundaries of traditional healthcare approaches. The precision of nanoscale manipulation with the intricacies of biomolecular interactions researchers and scientists propel healthcare into an era of personalized medicine, targeted therapies and transformative diagnostics. As nanotechnology advances its potential to reshape the landscape of medicine and biology remains boundless potential a future where health challenges are met with unparalleled precision and possibilities.

REFERENCES

1. Ramirez-Peña M, Sotano AJ, Pérez-Fernandez V, Abad FJ, Batista M. Achieving a sustainable shipbuilding supply chain under I4. 0 perspective. J. Clean. Prod. 2020;244:118789.

Correspondence to: Werida Juliee, Department of Molecules, Columbia University, New York, USA, E-mail: juliee@gmail.com

Received: 28-Jul-2023, Manuscript No. BOM-23-22791; **Editor assigned:** 31-Jul-2023, Pre QC No. BOM-23-22791(PQ); **Reviewed:** 15-Aug-2023, QC No. BOM-23-22791; **Revised:** 23-Aug-2023, Manuscript No. BOM-23-22791(R); **Published:** 31-Aug-2023, DOI: 10.35248/2167-7956.23.12.321

Citation: Juliee W (2023) Nanotechnology Transforming Medicine in Biomolecules. J Biol Res Ther. 12:321.

2. Dastbaz M. Industry 4.0 (i4. 0): The hype, the reality, and the challenges ahead. In Industry 4.0 and engineering for a sustainable future 2019;1(1):1-11. Springer, Cham.
3. Alcácer V, Cruz-Machado V. Scanning the industry 4.0: A literature review on technologies for manufacturing systems. Eng. Sci. Technol. an Int. J. 2019;22(3):899-919.
4. Qin J, Liu Y, Grosvenor R. A categorical framework of manufacturing for industry 4.0 and beyond. Procedia cirp. 2016; 52:173-8.
5. Reinhard G, Jesper V, Stefan S. Industry 4.0 Building the Digital Enterprise. 2016;1(1):1-39.
6. Leyh C, Bley K, Schäffer T, Forstenhäusler S. SIMMI 4.0-a maturity model for classifying the enterprise-wide it and software landscape focusing on Industry 4.0. In 2016 federated conference on computer science and information systems (fedcsis) 2016; 11: 1297-1302.
7. Vanston L. Forecasts for internet/online access. Forecasting the internet. 2002:45-58.
8. Dias MO, Junqueira TL, Cavalett O, Cunha MP, Jesus CD, Rossell CE, et.al. Integrated versus stand-alone second generation ethanol production from sugarcane bagasse and trash. Bioresour. Technol. 2012; 103(1):152-161.
9. Alvira P, Tomás-Pejó E, Ballesteros M, Negro MJ. Pretreatment technologies for an efficient bioethanol production process based on enzymatic hydrolysis: a review. Bioresour. Technol. 2010; 101(13): 4851-4861.
10. Duval A, Lawoko M. A review on lignin-based polymeric, micro-and nano-structured materials. React. Funct. Polym. 2014; 85:78-96.