

# Nanotechnology Papers: Objectives Analysis

## Papers with Nanobots, Molecules, and Nanoparticles in Titles

### 1. Gold Nanoparticles Based Optical Biosensors for Cancer Biomarker Proteins: A Review of the Current Practices

**Authors:** Tai J, Fan S, Ding S, Ren L (2022)

**Journal:** Frontiers in Bioengineering and Biotechnology

**DOI:** 10.3389/fbioe.2022.877193

#### Objectives:

- To review the current practices of gold nanoparticles (AuNPs) based optical biosensors for cancer biomarker protein detection
- To analyze the distinctive optical properties of gold nanoparticles that make them suitable for biomedical research
- To examine the fabrication, biocompatibility, surface control, and stability aspects of AuNPs
- To evaluate the surface plasmonic properties of gold nanoparticles for cancer diagnosis applications
- To provide insights into early cancer detection methodologies using AuNP-based optical biosensors

### 2. Nanorobots Mediated Drug Delivery for Brain Cancer Active Targeting and Controllable Therapeutics

**Authors:** Xu M, Qin Z, Chen Z, Wang S, Peng L, Li X, et al. (2024)

**Journal:** Discover Nano

**Volume:** 19:1-26

#### Objectives:

- To explore the application of nanorobots-based drug delivery systems for brain cancer treatment
- To investigate active targeting mechanisms for brain cancer using nanorobots
- To develop controllable therapeutic approaches for brain cancer treatment
- To overcome the blood-brain barrier challenges in drug delivery
- To analyze the ability of nanorobots to encapsulate, transport, and supply therapies directly to lesion sites
- To address the limitations of conventional drug delivery systems including underdosage and toxicity issues

- To develop ultrasound-responsive nanorobots for tumor-targeted drug release

### **3. Nanoparticles for Bone Tissue Engineering**

**Authors:** Vieira S, Vial S, Reis RL, Oliveira JM (2017)

**Journal:** Biotechnology Progress

**Volume:** 33:590-611

#### **Objectives:**

- To explore the application of nanoparticles in bone tissue engineering
- To investigate tissue engineering approaches for creating functional substitutes for damaged bone tissues
- To combine medical, biological, and engineering principles for bone regeneration
- To analyze the potential of various nanoparticle systems for bone repair applications
- To evaluate the integration of nanoparticles with scaffolds and growth factors for enhanced bone regeneration
- To study the biocompatibility and effectiveness of nanoparticle-based bone tissue engineering strategies

### **4. Advanced Mesoporous Silica Nanocarriers in Cancer Theranostics and Gene Editing Applications**

**Authors:** Živojević K, Mladenović M, Djisalov M, Mundzic M, Ruiz-Hernandez E, Gadjanski I, et al. (2021)

**Journal:** Journal of Controlled Release

**Volume:** 337:193-211

#### **Objectives:**

- To develop advanced mesoporous silica nanocarriers for cancer theranostics
- To explore gene editing applications using mesoporous silica nanoparticles
- To investigate controlled drug release mechanisms using mesoporous silica systems
- To analyze the biocompatibility and targeting capabilities of mesoporous silica nanocarriers
- To evaluate the potential of mesoporous silica nanoparticles in both diagnostic and therapeutic applications
- To study the integration of gene editing technologies with nanocarrier systems
- To optimize the surface functionalization of mesoporous silica nanoparticles for enhanced therapeutic efficacy

## **5. Advances in Carbon Nanotube Based Electrochemical Sensors for Bioanalytical Applications**

**Authors:** Vashist SK, Zheng D, Al-Rubeaan K, Luong JHT, Sheu FS (2011)

**Journal:** Biotechnology Advances

**Volume:** 29:169-188

### **Objectives:**

- To review advances in carbon nanotube-based electrochemical sensors
- To explore bioanalytical applications of carbon nanotube sensors
- To analyze the electrochemical properties of carbon nanotubes for sensing applications
- To investigate the potential of carbon nanotubes in biosensor development
- To evaluate the sensitivity and selectivity of carbon nanotube-based detection systems
- To study the integration of carbon nanotubes with various bioanalytical platforms
- To assess the advantages of carbon nanotube sensors over conventional detection methods

## **6. Nanoparticle-Based Drug Delivery Systems with Platinum Drugs for Overcoming Cancer Drug Resistance**

**Authors:** Xie P, Wang Y, Wei D, Zhang L, Zhang B, Xiao H, et al. (2021)

**Journal:** Journal of Materials Chemistry B

**Volume:** 9:5173-5194

### **Objectives:**

- To develop nanoparticle-based drug delivery systems incorporating platinum drugs
- To overcome cancer drug resistance mechanisms using nanotechnology approaches
- To investigate the encapsulation and delivery of platinum-based anticancer agents
- To analyze the targeting efficiency of nanoparticle systems for cancer cells
- To evaluate the potential of nanoparticles to enhance the therapeutic index of platinum drugs
- To study the mechanisms by which nanoparticle delivery can circumvent drug resistance
- To optimize nanoparticle formulations for improved platinum drug bioavailability and reduced toxicity

## **7. Nanomedicine Approaches for the Pulmonary Treatment of Cystic Fibrosis**

**Authors:** Velino C, Carella F, Adamiano A, Sanguinetti M, Vitali A, Catalucci D, et al. (2019)

**Journal:** Frontiers in Bioengineering and Biotechnology

**Volume:** 7:504676

**Objectives:**

- To develop nanomedicine approaches for cystic fibrosis treatment
- To investigate pulmonary-targeted delivery systems for cystic fibrosis therapeutics
- To explore nanoparticle-based drug delivery to the respiratory tract
- To analyze the challenges and opportunities in pulmonary nanomedicine
- To evaluate the potential of nanotechnology to improve drug penetration in lung tissues
- To study the biocompatibility and safety of nanomedicine approaches in respiratory applications
- To develop targeted therapies that can address the underlying mechanisms of cystic fibrosis

## **8. Overcoming Tumor Microenvironment Obstacles: Current Approaches for Boosting Nanodrug Delivery**

**Authors:** Wang X, Zhang H, Chen X, Wu C, Ding K, Sun G, et al. (2023)

**Journal:** Acta Biomaterialia

**Volume:** 166:42-68

**Objectives:**

- To analyze tumor microenvironment obstacles that limit nanodrug delivery
- To develop approaches for enhancing nanodrug delivery to tumor sites
- To investigate strategies to overcome biological barriers in cancer nanotherapy
- To evaluate current methods for improving nanoparticle accumulation in tumors
- To study the interaction between nanoparticles and tumor microenvironment components
- To optimize nanodrug formulations for enhanced therapeutic efficacy
- To address the challenges of heterogeneous tumor environments in nanomedicine

## **9. Structure-Relaxivity Relationships of Magnetic Nanoparticles for Magnetic Resonance Imaging**

**Authors:** Zhou Z, Yang L, Gao J, Chen X (2019)

**Journal:** Advanced Materials

**Volume:** 31:1804567

**Objectives:**

- To investigate structure-relaxivity relationships in magnetic nanoparticles

- ♦ To optimize magnetic nanoparticles for magnetic resonance imaging (MRI) applications
  - ♦ To analyze the correlation between nanoparticle structure and MRI contrast enhancement
  - ♦ To develop high-performance MRI contrast agents based on magnetic nanoparticles
  - ♦ To study the magnetic properties of nanoparticles for improved imaging capabilities
  - ♦ To evaluate the biocompatibility and safety of magnetic nanoparticles for clinical use
  - ♦ To establish design principles for next-generation MRI contrast agents
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