

Tentative Outline

Special Thematic Issue for the journal *Current Pharmaceutical Biotechnology*

Title of the Thematic Issue: "Nanomaterials in integrated diagnosis and treatment of diseases"

Guest Editor: Dr. Tianjiao Wang

- **Scope of the Thematic Issue:**

Nanomaterials are materials with the size of nanoscale and are widely used for therapeutic drug delivery, medical imageology, and device design. Nanomaterials commonly possess several properties, such as enhanced electrical conductivity, high surface-to-volume ratio, superparamagnetic behavior, unique fluorescence properties, and spectral shift of optical absorption. In the medical research area, nanomaterials are well-studied for drug transportation and controlled release. Nanomaterials can assemble with biomolecules or residues, therefore encapsulating the drugs or attaching the molecules to the surface, which enhances the biosafety, biocompatibility, bioavailability, specificity, and targeting ability of drugs and reduce their toxicity to normal cells. Besides, suitable modification and functionalization enable the increased permeability of nanomaterials to cross biological barriers such as the blood-brain barrier (BBB) and intestinal mucosal barrier. Nanomaterials can be divided into multiple types, such as organic materials and inorganic materials, nanoparticles, nanoemulsions, dendrimers, quantum dots, which differ in structure, composition, magnetism, hydrophobicity, and immunogenicity et al. For example, quantum dots are profoundly studied as biomedical imaging probes owing to their special electronic and optical characteristics. Nanoparticles, including polymeric nanoparticles (PNPs), extracellular vesicles, antibody nanoparticles, and metallic nanoparticles, are broadly researched nanoparticles for the delivery of therapeutic drugs and imaging molecules for the treatment and diagnosis of a large disease spectrum, including bacterial infection, cardiovascular diseases, neurological diseases, cancers, and regenerative medicine. However, the cytotoxicity and immune system response largely restrained the application of nanomaterials. Compared to the multitudinous amount of research, only a limited number of nanomaterial-based drugs are successfully applied in clinical. Therefore, more effort should be taken to overcome the toxicity and illuminate the permeability and retention mechanisms of nanomaterials in the human body. This Special Issue encourages research concerning the synthesis, modification and application of nanomaterials for diagnosis and treatment of various diseases. We encourage original research and review articles.

Keywords: nanomaterials, diagnosis, treatment, therapeutic targets, imaging molecules, drug delivery, molecular mechanism.

Sub-topics:

- Synthesis of nanomaterials for disease treatment and drug delivery
- Designing of novel drug delivery systems and imaging materials for diseases.
- Functionalization of nanomaterials to increase the ability cross the biological barriers
- Modification of nanomaterials to reduce the cytotoxicity and immune response
- Coating and encapsulation of drugs and imaging probes to nanomaterials
- The clinical application of nanomaterials
- The combined application of nanomaterials and other drugs
- The targets and mechanisms of nanomaterials in different diseases

Tentative titles of the articles:

- Nanotechnology-based Drug Delivery Systems for Targeted Cancer Therapy: From Bench to Bedside
- Nanostructured composite materials for targeted antibacterial therapy in regenerative medicine
- Nanotechnology-enabled biosensors for rapid diagnosis of infectious diseases
- Biomimetic nanostructured scaffolds for stem cell therapy in tissue engineering applications
- Design and synthesis of novel biodegradable polymer-based nanomaterials for controlled release of therapeutics in biomedical applications
- Nanoparticle-based drug delivery for targeted therapy in neurodegenerative diseases

- Nanomedicine-based combination therapy for cancer: recent advances and future perspectives
- Design and characterization of novel polymeric nanocomposites for biomedical applications
- Recent advances in the development of nanostructured materials for biomedical applications: a review of material science, pharmacology, and pharmacotherapy
- Nanotechnology-enabled drug delivery for improved cancer therapy: a multidisciplinary approach

Schedule:

- Thematic issue submission deadline: **3/09/2023**

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