World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:18, No:11, 2024

Nanopharmaceutical: A Comprehensive Appearance of Drug Delivery System

Authors : Mahsa Fathollahzadeh

Abstract : The various nanoparticles employed in drug delivery applications include micelles, liposomes, solid lipid nanoparticles, polymeric nanoparticles, functionalized nanoparticles, nanocrystals, cyclodextrins, dendrimers, and nanotubes. Micelles, composed of amphiphilic block copolymers, can encapsulate hydrophobic molecules, allowing for targeted delivery. Liposomes, vesicular structures made up of phospholipids, can encapsulate both hydrophobic and hydrophilic molecules, providing a flexible platform for delivering therapeutic agents. Solid lipid nanoparticles (SLNs) and nanostructured lipid carriers (NLCs) are designed to improve the stability and bioavailability of lipophilic drugs. Polymeric nanoparticles, such as poly(lactic-co-glycolic acid) (PLGA), are biodegradable and can be engineered to release drugs in a controlled manner. Functionalized nanoparticles, coated with targeting ligands or antibodies, can specifically target diseased cells or tissues. Nanocrystals, engineered to have specific surface properties, can enhance the solubility and bioavailability of poorly soluble drugs. Cyclodextrins, doughnut-shaped molecules with hydrophobic cavities, can be complex with hydrophobic molecules, allowing for improved solubility and bioavailability. Dendrimers, branched polymers with a central core, can be designed to deliver multiple therapeutic agents simultaneously. Nanotubes and metallic nanoparticles, such as gold nanoparticles, offer real-time tracking capabilities and can be used to detect biomolecular interactions. The use of these nanoparticles has revolutionized the field of drug delivery, enabling targeted and controlled release of therapeutic agents, reduced toxicity, and improved patient outcomes.

Keywords : nanotechnology, nanopharmaceuticals, drug-delivery, proteins, ligands, nanoparticles, chemistry
Conference Title : ICC 2024 : International Conference on Chemistry
Conference Location : Toronto, Canada
Conference Dates : November 25-26, 2024