

## عنوان مقاله:

Preparation ,Characterization and Applications of Nanoparticles using Nanotechnology toward Advancing  
Personalized NanoMedicine

## محل انتشار:

کنگره ملی شیمی و نانو شیمی از پژوهش تا توسعه ملی (سال: 1396)

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## خلاصه مقاله:

Nanotechnology offers many potential benefits to medical research by making pharmaceuticals more efficacious and by decreasing their adverse side-effects. Preclinical characterization of nanoparticles intended for medical applications is complicated – due to the variety of materials used, their unique surface properties and multifunctional nature. Prior to an involved discussion of protocols for nanotechnology, a definition of terms is in order. The SI prefix nano means a billionth ( $10^{-9}$ ) part, and a nanometer is thus a billionth of a meter (about one hundred thousandth the thickness of a sheet of paper). An object is nanoscale, then, when it is of a size convenient to measure in nanometers – generally less in size than a micron. The nanoscale is also the size scale at which the properties of a material are often different than they are for the bulk (or macroscale) phase. For many materials, this is approximately in the 1–300 nm size range. In this size range, properties change because as things become very small, their surfaces shrink more slowly than their volumes, causing nanoscale materials ( nanomaterials ) to have far larger surface-to-volume ratios than larger objects. More surface area can mean that nanomaterials have higher reactivity; different elastic, tensile, and magnetic properties; increased conductivity; or increased tendency to reflect and refract light. The Food and Drug Administration (FDA) and pharmaceutical industry have used standards to assess material biocompatibility, immunotoxicity, purity, and sterility (as well as many other properties) for several decades. Nanotechnology offers the potential to significantly transform diagnostics and therapeutics. The ability to manipulate the biological and physicochemical properties at the macromolecular size-scale allows for efficient drug targeting and delivery, which result in greater potency and decreased adverse side effects. Nanoparticles intended for clinical applications consist of a wide variety of materials, for which preclinical characterization is particularly challenging. Most nanoparticle formulations include surfactants to promote dispersion (i.e., prevent agglomeration) of the primary particles. These compounds too can interfere with conventional characterization methods. Impurities and contaminants which adsorb to nanoparticle surfaces can also contribute to ambiguous analytical results. These difficulties tend to hamper the development of standards for characterization and the subsequent clinical application of nanoparticles. A rational ... characterization strategy for biomedicine

## کلمات کلیدی:

Nanoparticles, Nanoemulsions, Nanocrystals, Nanoprecipitation, Gene Delivery, Brain Delivery, Ocular Drug Delivery ,  
Tumor-Targeted ,Dynamic light scattering, TEM, SEM, Zeta potential, Media milling, Morphology, EPR effect,  
Mycoplasma , Microbial contamination, Immunological potential , Toxicity

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