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Use and therapeutic application of nanocarriers (smart drugs) for prevention and remediation of cardiovascular diseases

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This work focuses on the potential of nanotechnology in nanomedicine, mainly cardiovascular pharmacology discipline, including the highlighted rational approaches in design, manufacturing, development, and applications of nanodevices (smart drugs) containing nanoparticles that acts as nanocarriers to control and direct for site-specific targeted smart drug delivery into human body using artificial receptors and unique nanoparticle systems for diagnostics, screening, medical imaging, prevention, and correction of cardiovascular pathologies therapy after administration routes. Our aim is to develop the most efficient pathways for nanomedicine so that biomolecular and cellular techniques, tools and method with the nanotechnology knowledge base can be merged, as it specifically relates to the development of nanoparticles for enabling and improving targeted delivery of the therapeutic agents and; developing novel and more effective diagnostic and screening techniques to extend the limits of molecular diagnostics providing point-of-care diagnosis and more personalized medicine.

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Influence of Mg^{2+}, Ca^{2+} and Sr^{2+} ions doping on the band gap energy of ZnO nanoparticle

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Nanocrystalline materials have attracted a wide attention for application in nanodevice fabrication due to their unique properties and immense potential. Among various nanocrystalline materials ZnO nanoparticles have shown great potential for numerous applications. Owing to the unique properties of the ZnO nanoparticle, this study was conducted to investigate the lowering of the band gap energy and optical property doped with Mg^{2+}, Ca^{2+} and Sr^{2+} ions. ZnO nanoparticle was synthesized by adding zinc acetate to aqueous NaOH solution and subjected to ultrasonic irradiation for 2 hr, after that a white precipitate was obtained which was filtered and washed with ethanol and de-ionized water, and dried in an oven at 600C for 3 hr. The dried white powder was then calcined at 4000C for 2 hr and subjected to UV-Vis spectrophotometer to characterize the synthesized ZnO nanoparticle. The band gap energy of ZnO undoped and doped with Mg^{2+}, Ca^{2+} and Sr^{2+} ions was determined. From all dopants 0.006 M Mg^{2+} doped ZnO nanoparticles was found to be narrowing band gap more. A significant change in optical property was also observed in synthesized ZnO nanoparticle.

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