

Abstract

Nanomedicine covers a broad area involving the application of nanotechnology to the prevention, treatment, and diagnosis purposes. In this context strenuous attention is paid to the understanding of nanoparticle interaction to biological systems for their optimization in theragonsitic efficacy. Apart from the use of nanomedicine special attention is paid to drug designing specifically for Central nervous system (CNS) in neurological disorders. Efforts are therefore invested by researchers to design CNS targeted medicine capable to permeate across the blood brain barrier. This project was designed to see the impact of various nano metal oxides (NMOs) on cellular uptake in brain ischemia/ cerebrovascular accidents. NMOs synthesized by co-precipitation route were initially characterized to analyze their properties. Various tools were used to study NMOs i.e. differential scanning calorimetry-thermo gravimetric analysis (DSC-TGA), X-Ray diffraction (XRD), scanning electron microscope (SEM), transmission electron microscope (TEM), electron dispersive X-ray spectroscopy (EDXS), fourier transform infrared spectroscopy (FTIR) and ultra violet visible spectroscopy (UV/Vis). Thermal transitions and respective weight loss was observed through DSC-TGA to estimate annealing temperature. Degree of purity, crystallinity and crystallite size was determined by XRD. Structural characteristics and elemental compositions were investigated utilizing SEM, TEM and EDXS. FTIR was employed to study the presence of impurities and each NMO was identified by its characteristic vibrational modes. Bio-distribution/ toxicity analysis of NMOs towards brain cells/tissues as well as its trends towards MRI applications were studied in model rats. The specific antigen bindings to these MNOs were also studied individually. Histopathological findings show noxious toxic profile in kidney, liver and brain in order of severity. Moreover, immunofluorescence studies were examined on conjugations of NMOs with different immunoglobins in the brain section and perceived that had some degree of bindings with the antigens.