

Biocompatible amifostine nanoemulsion via expression of nephrin in nephrotoxic experimental rat

Nadia Mohamed Ahmed Mohamed

National Research Centre, Egypt

Abstract

Drug-induced kidney injury is the causative of acute kidney failure. Amifostine loaded silica nanoemulsion was synthesized using water/oil emulsion with the help of ultra-sonication waves. The nanoemulsion was prepared using Tetraethyl Orthosilicate [TEOS], Cetyltrimethylammonium Bromide [CTAB], Castor Oil [CAO] and Amifostine [AMF] as a source for silica, surfactant, extra stabilizing agent and a model drug respectively. The as synthesized nanoemulsion of silica and silica loaded with amifostine [SiNPs@AMF] was examined via Transmission Electron Microscopy [TEM] and Dynamic Light Scattering [DLS] in terms of particles shape and hydrodynamic average size. The study was extended to investigate the protective role of this nanoemulsion model as cytoprotective drug effect against cisplatin-induced nephrotoxicity in male albino rats. It was clearly seen that the successful preparation of the as-synthesized silica nanoemulsion loaded with amifostine [SiNPs@AMF] but the particle size was marginally increased when comparing with silica nanoemulsion. Additionally, Blood Urea Nitrogen (BUN), Serum Creatinine (SC) and Urinary Total Protein (UTP) were increased and the level of Creatinine Clearance (CrCl) was decreased. All those were met with disorders in oxidative stress and down regulation in expression of nephrin gene. Also, histopathologic changes of the kidney tissue were observed. These changes back to normal by treatment with silica nanoparticles loaded amifostine [SiNPs@AMF]. Oil/water nanoemulsion of [SiNPs@AMF] showed a protective and promising preventive strategy against nephrotoxicity due to their cytoprotective and antioxidant effects.



Biography:

Nadia Mohamed Ahmed Mohamed is currently working as a Professor in the field of Medical biochemistry. He has completed his Graduation from Ain Shams University with Bachelors of Science in Biochemistry.

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