



Research article

Amifostine-based nanoemulsion as promising protective agent for nephrotoxicity

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Key words: Drug nephrotoxicity, Silica nanoparticles, Amifostine, Cisplatin.

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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], cetyltrimethyl ammonium 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 work was extended to achieve the target of the current work target to investigate the protective role of this nanoemulsion model as cytoprotector 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 and serum creatinine were increased after cisplatin injection with disorders in oxidative stress and rising of serum KIM-1 and urinary 8-hydroxyguanosine levels. Also, histopathological 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.