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Preparation, characterization and therapeutic effects of PEGylated nanoniosomal containing N-acetylcystein on acetaminophen induced hepatotoxicity in male Wistar rats

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Aim: Acetaminophen (APAP)-induced liver damage is an important health problem and represents the most frequent cause of drug-induced liver failure in the world. N-acetylcysteine (NAC), a sulfhydryl donor is considered the antidote of choice for APAP overdose. The aim of this study is to improve the therapeutic efficacy of NAC in APAP-induced liver injury using niosomes, as a nanocarrier.

Methods: Nanoparticles were synthesized using reverse phase evaporation technique and characterized for shape morphology, zeta potential, particle size, and drug-release properties. In the part of *in vivo* study, male wistar rats were divided into seven groups. The four groups were treated with saline, empty niosomes, NAC and niosomes-NAC, respectively, as control groups. The other three groups were challenged with an oral dose of APAP (2 g/kg); then normal saline, NAC and niosome-NAC were administered to the animal 4 hours later. These animals were sacrificed 48 h post-APAP treatment. Finally, liver function and oxidative stress biomarkers were assayed in tissue and serum samples.

Results: APAP administration resulted in hepatic damage as observed by increases in serum aminotransferase enzymes and hepatic tissue levels of NO, LPO as well as decreases in TAC and TTM. Treatment of animals with niosomes-NAC was remarkable more effective than free NAC in reducing serum aminotransferase enzymes; ALT ($P<0.05$) and AST ($P<0.01$). In addition, these changes were well related with the decreasing of oxidative damages in liver tissue.

Conclusion: The efficiency of Niosomal NAC was more than free NAC in decreasing of APAP-related negative changes; therefore niosome-NAC may have further impact in the treatment of hepatotoxicity induced by APAP.

Biography

Safoura Karami is Master of Medical Toxicology candidate in Pharmaceutical Sciences Branch, Islamic Azad University, Faculty of Pharmacy. Her thesis is effect of N-acetylcystein loaded niosomes on indicators of liver toxicity in male Wistar rats were poisoned with acetaminophen, under supervision of Prof. Amir Nili-Ahmadabadi.

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