Original Paper

Effect of iron oxide Nanoparticles coated with chitosan on renal functional indeces in rats

Salehi M (B.Sc)¹, Fatahian S (Ph.D)*², Shahanipour K (Ph.D)²

¹M.Sc Student in Biochemistry, Falavarjan Branch, Islamic Azad University, Isfahan, Iran.
²Assistant Professor, Department of Biochemistry, Falavarjan Branch, Islamic Azad University, Isfahan, Iran.

Abstract

Background and Objective: Iron oxide nanoparticles have wide applications such as MRI contrast agent and drug delivery. Nevertheless, their effects on human health have not been fully investigated yet. After cellulose, chitin is one of the most abundant organic materials in nature which is widely used in food industry, cosmetics, agriculture, medicine and the environment. This study was done to evaluate the effect of iron oxide nanoparticles coated with chitosan on renal functional indeces in rat.

Methods: In this experimental study, 60 adult female Wistar rats were allocated into 10 equal groups. Concentrations of 50, 100 and 150 mg/kg/bw from chitosan, iron oxide nanoparticles and chitosan coat ed nanoparticles were intraperitoneally injected into 9 groups and animals in control group were received normal saline. Blood samples were collected directly from the rat heart in the days 15 and 30 post after injection and renal functional indeces including urea, creatinine, uric acid, sodium, potassium and total protein were measured.

Results: There were no significant differences in the level of urea, creatinine, uric acid, sodium, potassium and total protein in the groups whom received chitosan-coated iron oxide nanoparticles compared to control. There was no mortality during the study time.

Conclusion: Short-term using of iron oxide nanoparticles coated with chitosan does not create any toxicity in the rat kidney.

Keywords: Toxicity, Chitosan, Nanoparticles, Iron oxide, Urea, Creatinine, Kidney, Rat

* Corresponding Author: Fatahian S (Ph.D), E-mail: fatahian@iaufala.ac.ir

Received 7 Nov 2015 Revised 10 Feb 2016 Accepted 29 Feb 2016