

Zinc Oxide Nanoparticles Compared To Zinc Oxide and Their Influence on the Anti-Inflammatory and Gastric Activity of Ketoprofen in Rats

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Extended Abstract

Zinc oxide is known as an anti-inflammatory agent. Zinc oxide nanoparticles are widely used in drug delivery, cosmetics and medicine. In animal model of anxiety zinc oxide nanoparticles received better results than zinc oxide as showed by Torabi et al (2013). Recently more research are being concern on their potential toxicity as showed by Choi et al (2014).

The aim of the study was to evaluate the influence of multiple administration (p.o. and i.p.) of zinc oxide nanoparticles and zinc oxide on the anti-inflammatory and ulcerogenic activity of ketoprofen. Male albino Wistar rats (180-240 g) were used. Animals received p.o. and ip (intraperitoneally) zinc oxide nanoparticles or zinc oxide in doses 7 and 14 mg/kg for two weeks. On the 15th day of experiment rats were given ketoprofen in doses 5, 10 or 20 mg/kg (p.o.). The anti-inflammatory activity was determined by carrageenan-induced hind paw edema test according to Winter et al and Lence (1962). The anti-ulcerogenic activity was determined in accordance to Komatsu et al (1973). The serum zinc concentration was determined by atomic absorption spectrometry.

The results of the carrageenan-induced hind paw edema test show that zinc oxide nanoparticles administered chronically for two weeks in a dose 14mg/kg (i.p.) received better results than zinc oxide nanoparticles administered p.o. in the same dose. Zinc oxide nanoparticles administered repeatedly for two weeks in a dose 14 mg/kg i.p. caused statistically significant reduction of the edema after two hours from carrageenan injection. The percent of edema inhibition after administration of ketoprofen in a doses 5, 10, 20 mg/kg in experiment with zinc oxide nanoparticles in a dose 14mg/kg ip is higher than the percent of edema inhibition in experiment with zinc oxide administered chronically in a dose 14 mg/kg ip.

No changes in gastric mucosa were observed after administration of ketoprofen in experiments with zinc oxide nanoparticles or zinc oxide in doses 7 and 14 mg/kg i.p.

In rats receiving zinc oxide nanoparticles and zinc oxide (p.o., 7mg/kg, 14mg/kg) the serum zinc level did not differ significantly between control and groups receiving mentioned compounds. There is statistically significant difference between serum zinc concentration in control group and a group receiving zinc oxide nanoparticles (i.p.) in a doses 7 mg/kg and 14 mg/kg.

We conclude that two-week administration of zinc oxide nanoparticles (p.o., i.p.) and zinc oxide (p.o., ip) in a doses 14 mg/kg do not affect anti-inflammatory activity of ketoprofen, but may exhibit protective effect on the gastric mucosa during NSAID treatment. We may suggest that zinc oxide nanoparticles administered intraperitoneally are easier absorbed than administered p.o. We also suggest that zinc oxide nanoparticles administered i.p. are easier absorbed than zinc oxide administered also ip.

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