



1st International Congress of Veterinary Pharmacology & Pharmaceutical Sciences (1st ICVPS)

October 4 - 5, 2008 Tehran - Iran

Time Dependent Inhibition of Cow Serum Peroxidase Activity by Zinc Ion

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Zinc is an essential trace element required for the action of more than 200 metallo enzymes and plays an important role in polymeric organization of macromolecules like DNA and RNA, protein synthesis and cell division. For clarifying some possible mechanism of zinc toxicity in animals, the effect of increasing amounts of Zn²⁺ ion on peroxidase activity was investigated in vitro in serum of cow. The H₂O₂-mediated oxidation of o-dianisidine was used to assess the peroxidase activity. Results show that after preincubation of serum with 0.2-30 mM Zn²⁺ concentration for 5 minutes, peroxidase activity was inhibited compared to the control and decreased rapidly with increasing metal concentrations. The enzyme was completely inhibited after 5 minutes preincubation in 30 mM Zn²⁺. When the preincubation of serum and Zn²⁺ was prolonged to 30 and 60 minutes, the enzymatic activity decreased more rapidly with increasing metal concentration. For example, in the presence of 5 mM Zn²⁺ ion after 5, 30 and 60 minutes, serum peroxidase activity reduced by 19%, 25% and 29%, respectively. By considering of long biological half-life of metals in body of animals, it suggested that the damage caused by exposure to Zn²⁺ ion is often not only dose-dependent, but also time-dependent. Even though detoxifying enzymes may not show any effect after brief exposure to low concentrations of Zn²⁺ ion, prolonged incubation will affect the enzymatic activity, leading eventually to complete inactivation.

Keywords: Zinc, Time dependent, Peroxidase activity, Serum, Cow

Evaluation of the pharmacokinetic parameters of *Hemiscorpius lepturus* antivenom following intramuscularly injection in rat

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Hemiscorpius lepturus is one of the most fatal scorpions in Khuzestan province and injection of antivenom intramuscularly is the usual way for treatment of envenomed patients. There is not clear data about pharmacokinetic parameters of this treatment. After radiolabelling of 300µl of scorpion antivenom, using chloramine-T method, sephadex G50 column was used to extract the iodinated venom from free iodine. The radiolabelled antivenom (0.2 ml) was injected into 18 Wister rats (average weight 200g). Three rats were sacrificed at each of the following time points: 10, 40, 60, 120, 210 and 360 minutes. Blood samples were collected from the right atrium. Radioactivity was measured by gamma counter within one minute of blood collection and the amount of venom at each time point was calculated in relation to the radioactivity of stock control value. The results were following: T_{max} Minute 120 C_{max} Unit/ml 7.2 AUC_{last min} × {unit/ml} 2184 HL_{λ_z} min 308 V_z F_{observed} ml 10.2 Cl_F observed ml/min 0.02 F: is bioavailability Regarding to long time of T_{max} and also the amount of C_{max}, intramuscular injection of scorpion antivenom is not the best way for immediate treatment of envenomed patients and also by way of intravenous injection the amount of F must be estimated by (Mean AUC_{SC} / Mean AUC_{IV}) for actual estimation of clearance and also volume of distribution of scorpion antivenom. It should be noted that degradation of the toxins might occur in vivo and that degraded toxins could still be quantified by radioactivity, so by decreasing the time interval of our blood samples and also using of another precise methods like ELISA the actual results will be clarified.

Keywords: Clearance, Half Life Time, Pharmacokinetic Parameters, *Hemiscorpius lepturus*, Antivenom, Rat