Zinc prevents hematological and biochemical alterations induced by static magnetic field in rats

Amara Salem[1], Abdelmelek Hafedh[1], Abidi Rached[2], Sakly Mohsen[1], Ben Rhouma Khémais[1]

[1]Laboratoire de Biosurveillance de l'Environnement, Faculté des Sciences de Bizerte, 7021 Jarzouna, Tunisia
[2]Service Laboratoire, Hôpital Régional de Bizerte, Tunisia

Corespondence: Sakly Mohsen, e-mail: mohsen.sakly@fsb.rnu.tn

Abstract:

The present study was undertaken in order to investigate the effect of subchronic exposure of rats to static magnetic field (SMF) and/or zinc treatment on the selected hematological and biochemical parameters. Metallothioneins (MT) and zinc content in kidney and liver were studied. The exposure of rats to SMF for 1h/day during 30 consecutive days induced an increase in hemoglobin concentration, white blood cell count (WBC), red blood cell count (RBC) and platelet number. By contrast, hematocrit remained unchanged. The same treatment also increased the serum lactate dehydrogenase (LDH), aspartate aminotransferase (AST) and alanine aminotransferase (ALT) activities. However, the creatinine and urea concentrations were similar to those of controls. On the other hand, renal and hepatic zinc levels were not altered in SMF treated-rats. SMF exposure induced MT synthesis in the liver and kidney. Zinc administration (40 mg/l for 30 consecutive days, in drinking water) had no effect on hematological and biochemical parameters. However, hepatic and renal zinc content and MT levels were increased. Zinc prevented the increase in serum transaminase activities, and WBC and platelet counts induced by SMF. However, the elevation of the LDH, hemoglobin and RBC levels induced by SMF exposure was not suppressed. MT concentrations in both tissues were potentiated by zinc administration in SMF-exposed rats.
It is suggested that zinc supplementation could prevent toxic effects of SMF probably by its anti-oxidant proprieties.

Key words:
static magnetic field, zinc, hematopoiesis, metallothioneins, biochemical parameters