Therapeutic Potential of Zinc as Complementary Therapy to Prevent Bone Loss Induced by Type 1 Diabetes

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Introduction: Type 1 diabetes mellitus (T1DM) has been associated with low bone turnover. Despite the insulin therapy has a known osteoanabolic effect, in the last decades, has been emerging the investigation by others potential agents against bone loss. Zinc is an essential element in bone metabolism, acting as a cofactor for several enzymes and stimulating gene expression of proteins necessary for bone mineralization and collagenous structure development. **Objectives:** We performed a comparative analysis between the effects of insulin therapy and zinc supplementation in STZ-induced diabetic rats. **Material and Methods:** Male Wistar rats were used to induced T1DM (STZ, 40 mg/Kg i.v). The diabetic animals were treated with insulin or supplemented with zinc and their beneficial effects were compared with control and diabetics rats without treatment, through biochemistry analysis, tibia histormophometric and biomechanical parameters, and femur mRNA expression. **Results and Discussion:** The comparative analysis showed a similar anabolic and protective effect by zinc and insulin therapy in diabetes-induced bone loss. Firstly, it was evidenced by high ALP activity in both treated groups when compared to non-treated groups. Similarly, the zinc and insulin treatment showed a beneficial effect in the maintenance of bone architecture, which was evidenced by increased TbWi and Bar, as well as reduced TbSp. Regarding biomechanical analysis, the zinc supplementation and hormone therapy showed an important maintenance of strength (ultimate stress) and flexibility (Young's modulus) parameters. Finally, the bone mRNA expression evidenced, in both treated groups, an upregulation of *osteocalcin* mRNA, which is an important bone formation marker, supporting thus the maintenance on bone architecture and mechanical. **Conclusions:** Our analysis showed a similar effect between zinc supplementation and insulin therapy in molecular and non-molecular parameters, suggesting that zinc may represent an important complementary therapy against T1DM-induced bone loss.

Key words: Zinc supplementation and insulin therapy; T1DM-induced bone loss; Molecular and non-molecular analyses.

Acknowledgement: CNPq and CAPES