

EFFECTS OF ALUMINUM ON DELTA AMINOLEVULINIC ACID DEHYDRATASE *IN VIVO* AND *IN VITRO*

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Abstract. The present study examined the effect of aluminum on δ -aminolevulinic acid dehydratase (δ -ALAD) and hematocrit, and assessed the effects of zinc and selenium on activity of the enzyme affected by aluminum *in vivo* and *in vitro*. Experiments were done on white laboratory mice of (20-25) g body mass. To assess the effect of aluminum on δ -ALAD *in vivo*, mice injected i.p. with 0.5 LD₅₀ aluminum chloride (AlCl₃) (25 mg Al³⁺/kg body mass). To estimate the effect of zinc and selenium on activity of the enzyme affected by aluminum, twenty minutes before intoxication with 0.5 LD₅₀ aluminum chloride mice were injected i.p. with 0.5 LD₅₀ of sodium selenite (Na₂SeO₃) or with 1.56 mg/kg of zinc sulphate (ZnSO₄). Control animals received an injection of the same volume of saline.

Injection of mice with a single dose of aluminium significantly increased concentration of metal in blood. However, δ -ALAD activity changed only slightly. Furthermore, addition of zinc before aluminum injection was related to significant increase of aluminum content and a little enhancement of δ -ALAD activity in blood. In blood of mice where selenium additives were used no changes in aluminum concentration or δ -ALAD activity was registered, and level of hematocrit decreased.

The *in vitro* effects of aluminum on δ -ALAD activity in blood of experimental mice were investigated. Concentration causing half-maximal inhibition (IC₅₀) of enzyme activity was used to assess the effects of Al³⁺ on δ -ALAD activity in blood.

The findings suggested that low concentrations of aluminum ions slightly decrease δ -ALAD activity *in vitro*, while high concentrations of aluminum ions inhibited the enzyme. Aluminum ions are medium whereas zinc ions are weak and cadmium ions are strong catalytic poison (IC₅₀ Cd²⁺ < IC₅₀ Al³⁺ < IC₅₀ Zn²⁺). Zinc ions also showed a weak protective effect on inhibition of δ -ALAD caused by aluminum ions, but do not remove it ((IC₅₀ Al³⁺ < IC₅₀ Al³⁺ + Zn²⁺)).

Key words: aluminium, zinc, selenium, δ -aminolevulinic acid dehydratase, *in vivo*, *in vitro*.