

OLD LEAD, NEW CHALLENGES: IS THERE A SAFE LEVEL OF EXPOSURE?

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Lead (Pb) is one of the most important toxic metals without known physiological role. Recent data indicate that any exposure, even low, can be harmful. Therefore, safe blood lead levels, as well as tolerating daily intake, have not been identified. In adults, the most sensitive effect is increase in systolic blood pressure, while in children, the most sensitive effect is on cognition. Therefore, the aim of this study was to examine the effects of low lead doses on the central nervous and cardiovascular system in a rat model. The study was conducted on Wistar rats (n = 42; 7 groups) treated for 28 days, with increasing doses of 0.1; 0.5; 1; 3; 7; 15 mgPb/kg b.w./day to simulate real exposure. After the sacrifice, the brain and heart were isolated, in which the parameters of oxidative status, bioelements and lead levels were determined. Benchmark modelling of the dose-effect relationship was performed using PROAST 70.1 software (RIVM, Netherlands). The obtained results indicate that lead leads to the induction of oxidative stress and dishomeostasis of bioelements. The lowest value of the Benchmark dose (BMD) was obtained for increase the total oxidative status in the brain (4.49e-06 mgPb/kg/b.w./day), which is the most sensitive effect. In the case of heart, the most sensitive effect was increase in malondialdehyde (BMD: 0.000248 mgPb/kg/b.w./day). Obtained results indicate that low lead doses have toxic effects on heart and brain. Obtained BMD may be useful in assessing human health risk of low lead dose exposure.

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STARO OLOVO, NOVI IZAZOVI: POSTOJI LI BEZBEDAN NIVO IZLOŽENOSTI?

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Olovo (Pb) je jedan od najznačajnijih toksičnih metala bez poznate fiziološke uloge u organizmu. Novija istraživanja ukazuju da potencijalno svaka izloženost olovu, čak i niskim dozama, može biti štetna, te tolerišući dnevni unos, kao ni bezbedan nivo u krvi, nisu utvrđeni. Kod odraslih, kao najosetljiviji efekat izdvaja se povećanje sistolnog krvnog pritiska, dok je kod dece to poremećaj kognicije. Imajući navedeno u vidu, cilj ove studije bio je da se na animalnom modelu ispita uticaj niskih doza olova na centralni nervni i kardiovaskularni sistem, koji su do sada identifikovani kao najosetljiviji na dejstvo olova, i odrede *Benchmark* doze (BMD). Studija je sprovedena na modelu *Wistar* pacova koji su podeljeni u 7 grupa tretiranih tokom 28 dana rastućim dozama olova 0, 0,1; 0,5; 1; 3; 7; 15 mg Pb/kg t.m./dan kako bi se simulirala realna izloženost. Nakon žrtvovanja pacova, izolovani su mozak i srce u kojima su određeni olovo, bioelementi i parametri oksidativnog statusa. *Benchmark* modelovanje odnosa doza-efekat vršeno je pomoću PROAST 70.1 softvera (RIVM, Holandija). Dobijeni rezultati ukazuju da olovo dovodi do indukcije oksidativnog stresa i poremećaja homeostaze bioelemenata. Najniža BMD dobijena je za povećanje totalnog oksidativnog statusa u mozgu ($4,49e-06$ mg Pb/kg t.m./dan), što predstavlja najosetljiviji efekat, a u srcu je to povećanje koncentracije malondialdehida (BMD: 0,000248 mg Pb/kg t.m./dan). Dobijeni rezultati ukazuju da i niske doze olova mogu ispoljiti toksične efekte na srce i mozak, a dobijene BMD su od značaja za procenu rizika olova po zdravlje ljudi.

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