

## **THE CONSEQUENCES OF CHRONIC EXPOSURE TO LEAD ON LIVER, SPLEEN, LUNGS AND KIDNEY ARCHITECTONICS IN RATS**

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### **Summary**

The study carried out on 28 adult rats chronically (six months) exposed to lead acetate, as briquette, emphasized: kidney corpuscular necrosis and amiloidosis; alveolar emphysema, peribronchitis in lungs; necrosis in spleen; congestions, centro-lobular vein enlargement and necrosis in liver.

**Key words:** lead, rats, kidney, liver, spleen

Lead is a naturally occurring bluish-gray metal found in small amounts in the Earth's crust and can be found in all parts of our environment. Lead is known as an enzymatic toxicant (7, 8), is neurotoxic (7, 10, 17), hemato and cardiovascular toxic (9, 12, 17), nephrotoxic (17), immunotoxic (3), carcinogenic, teratogenic (17) and mutagenic (12).

### **Materials and methods**

The study was carried out on 28 adult male rats divided in four groups exposed to lead acetate (as briquette) as follows:

- C group: not exposed to lead acetate;
- E<sub>1</sub> group: 1000 ppm lead acetate – value representing LOAEL – AYAR et al, 1973, quoted by \*\*\* (3);
- E<sub>2</sub> group: 2000 ppm lead acetate – double LOAEL;
- E<sub>3</sub> group: 3000 ppm lead acetate – triple LOAEL.

After six months of exposure to lead acetate the rats were euthanatized and organs (liver, kidney, spleen and lungs) were drown, stained with hematoxilin - eosin and histological examined using an Olympus CX41 microscope with photo camera.

### **Results and discussions**

After six months of exposure to lead acetate the most affected organ were kidney followed by liver, lungs and spleen

In kidneys were observed: corpuscular necrosis, amiloidosis (fig. 1)

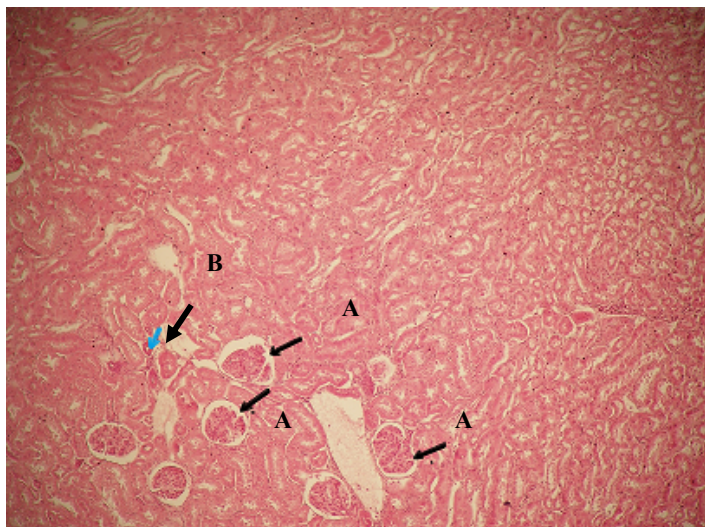


Fig. 1. Kidney section in rats chronically exposed to lead. H.E. 100 x  
A - corpuscular necrosis, B – amyloidosis

In lungs were observed: compensatory alveolar emphysema, peribronchitis with septal proliferation, pulmonary edema (Fig. 2).

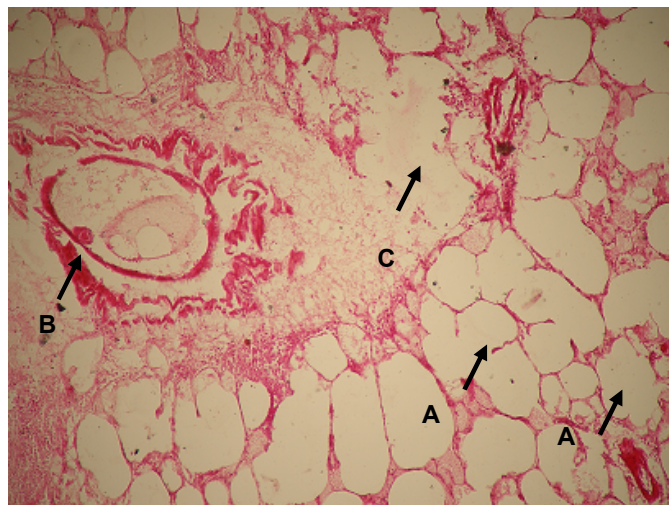


Fig. 2. Lung section in rats chronically exposed to lead. H.E. 400 x  
A - emphysema, B – peribronchitis, C - edema

In spleen were observed: small necrosis spots (Fig. 3).

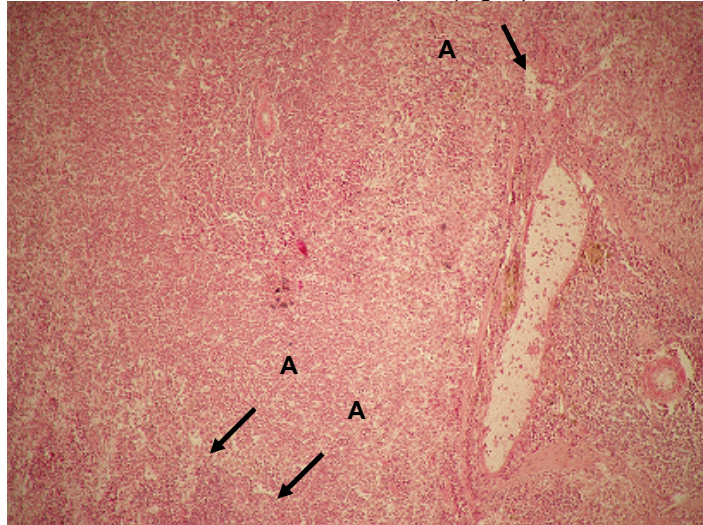


Fig. 3. Spleen section in rats chronically exposed to lead. H.E. 100 x  
A - necrosis

In liver were observed: centro-lobular vein enlargement, congestion, necrosis (Fig. 4).

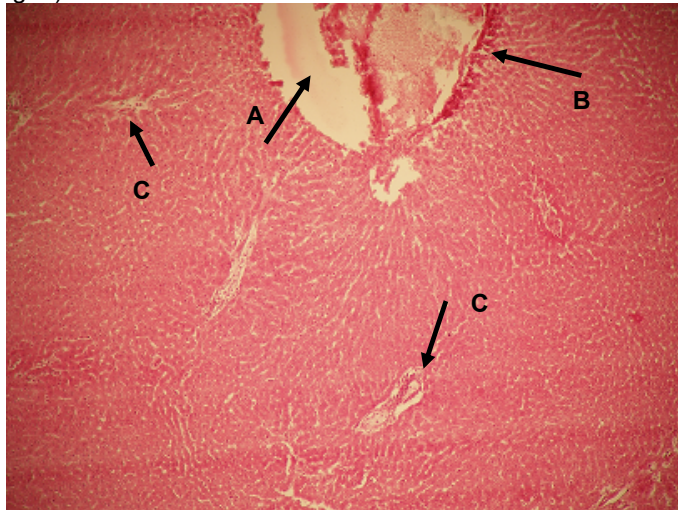


Fig. 4. Liver section in rats chronically exposed to lead. H.E. 400 x  
A – centro-lobular vein enlargement, B – congestion, C – necrosis

Almost all the studies are focused on nervous system toxicity, developmental toxicity and reproductive toxicity. A few authors pointed out the lead toxicity on kidneys, spleen and other internal organs, especially in humans exposed occupationally to lead.

The results of this study indicate that chronic exposure to lead can determine severe lesions in kidney, liver, lungs and spleen.

In kidney, liver and spleen the necrotic lesions can be a cause of oxidative stress induced by lead (2, 4, 5, 6, 11, 14, 15). In lungs chronic exposure to lead increase the blood vassal permeability leading to edema and compensatory alveolar emphysema.

The results of this study are in concordance with the other author's studies (1, 11, 13, 15, 16).

### Conclusions

Exposure to different lead acetate levels during six months determined:

- kidney corpuscular necrosis and amiloidosis;
- in lungs alveolar emphysema, peribronchitis;
- necrosis in spleen;
- congestions, centro-lobular vein enlargement and necrosis in liver.

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