

# Lead

**Lead** (*Plumbum*) is an element with atomic number 82 and chemical symbol **Pb**. It is a heavy and toxic metal to humans (young children are the most sensitive), which can damage connections in the nervous system in minute amounts. Poisoning is often accompanied by nephropathy and colicky pain. Because of its negative health effects, its presence in paints and fuels is restricted.

Lead is a dull grey, heavy, well malleable metal (the metal of Saturn). Lead dissolves well in gastric juice. The inorganic salts of lead are relatively poorly soluble in water, but the soluble (and therefore more toxic) ones include the oxides, acetate and nitrate.



Lead (*Plumbum*)

In practice, intoxication by inorganic or organic forms of lead is possible. Inorganic intoxication is much more common, most often in the work environment. In practice, intoxication by inorganic or organic forms of lead is possible. Inorganic intoxication is much more common, most often in the work environment.

## Professional exposure

- production and repair of car batteries;
- casting in smelters (production of lead, bronze, brass);
- soldering (lead-tin alloy);
- production of lead glass, hubs, glazes (PbO) and pigments (Pb<sub>3</sub>O<sub>4</sub>);
- rarely from lead glazes on ceramic ware (hot tea with lemon - releases lead), or swallowing diabolos (ammunition).

Lead is absorbed either by respiration or from the GIT. Lead is absorbed respiratorially in the form of vapour and dust (about 40% absorbed), while about 8% is absorbed from the GIT. Lead is better absorbed if it remains in the stomach longer. In children, up to 50 % is absorbed.

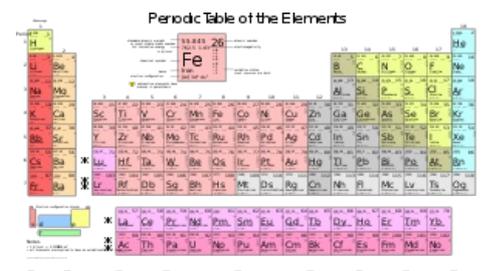
Higher absorption of lead occurs in calcium and iron deficiency and during fasting. After absorption, lead binds to haemoglobin, distributes throughout the body and is deposited in the bones, brain (especially in children), kidneys, liver, muscles and skin. Most of the lead is deposited in the bones, where it replaces calcium (in practice this causes higher bone contrast on X-ray), from where lead can be released back into the circulation during fever or pH changes. Lead is 80% excreted in the urine. The half-life of lead in the blood is 30 days. It is excreted from bone over 5-10 years.

## Symptoms

**Manifestations of acute lead poisoning** – after ingestion of lead, symptoms from GIT irritation dominate - vomiting, diarrhea, colic.

### Manifestations of chronic lead intoxication

- gradual development of anaemia - fatigue, exertional breathlessness, apathy, muscle and joint pain;
- grey rim on gums;
- constipation;
- saturnine colic (diffuse colicky pains in the abdomen) which respond poorly to spasmolytics;
- in more severe intoxications, liver enzymes and bilirubin may be elevated (Pb is deposited in the liver);
- nephropathy with proximal tubular damage is rare;
- very rarely - hypertension, neuropathy (most often the *nervus radialis* is damaged).



Periodic table

Laboratory tests make differential diagnosis relatively easy, the most important thing is to think about the possibility of lead intoxication. Otherwise, lead poisoning may be confused with anaemia of unclear aetiology (in chronic poisoning) or sudden abdominal distress (in acute poisoning).

## Therapy

Treatment is carried out with chelating agents - they chelate lead ions, the chelates are excreted in the urine:

- **EDTA** - a classic drug, it is applied in a slow infusion (it is slightly nephrotoxic, therefore 500 ml of saline or 5% glucose is administered with it);
- **DMSA** - dimercaptoacetic acid, applied in tablets, preferred mainly in children.

## Links

## Related articles

- Intoxication
- Anaemia