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EFFECT OF ENVIRONMENTAL LEAD ON HUMAN HEALTH

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ABSTRACT

Lead is a abundant metal in nature, occuring in lead mineral. Lead intake is by diet, air and water each day in living beings.This Pb effect the heme synthesis of the bloodwhich causes hematological disruption of respiratory pigments such as cytochromes, aneaemia, kidney disfunctioning and brain damage.This can be cured by chelating agents

KEYWORDS: Lead(Pb), toxic, biochemical.

INTRODUCTION

There are lots of chemicals in the environment. Many of these are toxic and the others are non-toxic. The toxic chemicals are discharge y industries into air, water and soil.They get into human food chain form the environment. As they enter in the biological system, they disturb the biochemicals processess, leading to fatal results. Chemical toxicology is the science that deals with the study of toxic chemicals and their mode of action.Many metals as environmental hazards are essential dietary trace elements required for normal growth and development of animal and human beings. These metals are Al, Sb, As, Ba, Bi, Be, Cd, Co, Cu, Ce, In, Pb, Hg, Mo, Ag, Te, Tl, Sn, Ti, W, U and Zn.

The well known toxic elements As, Pb and Cd are required in the trace quantities for the growth of animals. The so-called biologically intret Al causes different types of diseases

Toxic Chemicals in Air:

As a matter of fact , thousand of chemicals pose the problems of health hazards so that it is necessary to excerise strict control on those which offer the most serious threats during manufacture and handling

Toxic Chemicals in Water:

A list of toxic trace elemants found in natural water and wsate water given in Table 1.

Some of these are essential at low levels, serving as nutrients for animals and plants life, but are toxic at higher levels.

The major souce of air borne Pb is the combustion of leaded petrol/gasoline.Pbis added in the form of tetra alkyl lead, primarily Pb (CH8)4 and Pb(C2H5)4, together with the scavengers 1,2-dichloroethane and 1,2-dichloroethane. In common with other particulate pollutants, Pb is removed from the atmosphere by wet and dry

Table 1 : Toxic trace elements in natural water and waste water

Element	Sources	Effects and Significance
Lead	Industry, mining, plumbing, coal, gasoline	Toxic (anaemia, kidney disease, nervous disorders, wild-life destroyed

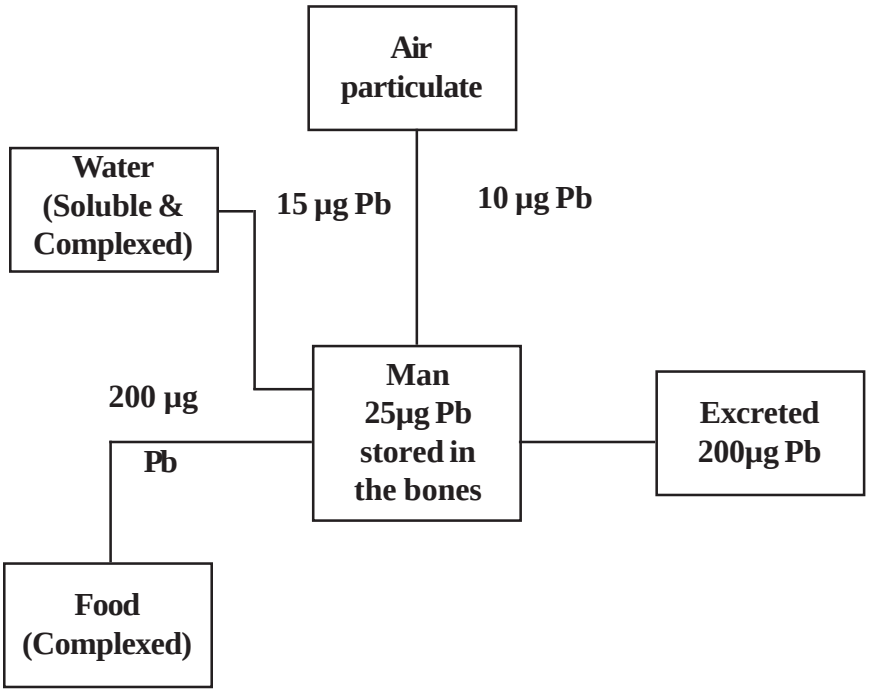
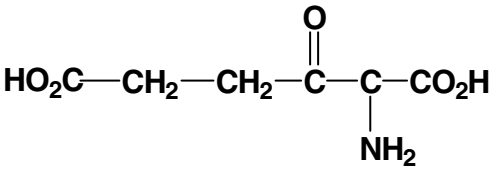
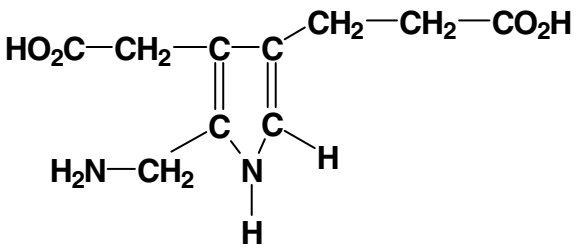


Fig. : Daily lead balance for a city resident

The major biochemical effect of Pb is its interference with heme synthesis, which leads to hematological damage. Pb inhibits several of the key enzymes involved in the overall process of heme synthesis whereby the metabolic intermediates accumulate. One such intermediate is delta-amino levulinic acid. An important phase of heme synthesis is the conversion of delta-aminolevulinic acid to prophobilinogen.



delta-aminolevulnic acid
(ALA dehydrase: cytoplasm)



porphobilinogen

deposition proces. As a result, street dusts and roadside soils becomes enrished with Pb, concentrations typically of the order 1000-4000mg kg-1 on busy streets.

It is noted that most of the Pb intake by a tpyical city dweller is from diet (about 200-300ug per day), air and water addinga futher 10-15 ug per day each .Of this total intake, 200 ug of Pb is excreted while 25 ug is stored in the bones each day.

RESULTS AND DISCUSSION

The overall effect is the disruption of the synthesis of haemoglobin as well as other respiratory pigments, such as cytochromes, which require heme. Finally, Pb does not permit utilization of O_2 and glucose for life-sustaining energy production. This interference can be detected as a head level in the blood of about 0.3ppm. The detection of (I) provides a sensitive test for Pb in the body at higher levels of Pb in the blood (>0.8 ppm) there will be symptoms of anaemia due to the deficiency of haemoglobin. Elevated Pb levels (>0.5-0.8 ppm) in the blood cause kidney dysfunction and finally brain damage.

Due to the chemical analogy of Pb^{2+} with Ca^{2+}, bones actas repositories for Pb accumulated b the body. Subsequently, this Pb may be remobilized along with phosphates from the bones which exert a toxic effect when transported to soft tissues.

Lead poisoning can be cured by treatment with chelating agents which strongly bind Pb^{2+}. Thus, calcium chelate in solution is fed to the victim of lead poisoning; Pb^{2+} displaces Ca^{2+} from the chelate and the resulting Pb^{2+} chelate is rapidly excreted in the urine.

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