**Trace metals in cells**

Heavy metals are usually present in trace amounts in living organisms (ppm). Trace metals are classified into essential and non-essential elements. Zinc (Zn), copper (Cu), chromium (Cr), iron (Fe), magnesium (Mg), manganese (Mn), molybdenum (Mo), nickel (Ni), selenium (Se) and cobalt (Co) are essential nutrients that are required for various biochemical and physiological functions. They are important constituents of several key enzymes and proteins. Inadequate supply of these micro-nutrients results in a variety of deficiency diseases. Excess amount of essential metals produces cellular damage leading to a variety of adverse effects and human diseases.

Cadmium, arsenic, lead, mercury are considered among the non-essential elements which are highly toxic to biota.Environmental contaminations are originated from anthropogenic activities such as mining, industrial, domestic and agricultural use of metals. Natural phenomena such as weathering and volcanic eruptions have also been reported to significantly contribute to heavy metal pollution. Metal ions have been found to interact with cell components causing DNA damage (carcinogenesis), membrane functions, enzyme inhibitions, hormones disruption, nervous system diseases as Parkinson diseases.

Heavy metals are well-known environmental pollutants due to their toxicity, persistence in the environment, and bioaccumulative nature.

The bioavailability of metals is influenced by many factors such as temperature, adsorption, complexation, chemical forms, solubility …..

Humans and animals are exposed to various chemical forms of mercury in the environment. These include elemental mercury vapor (Hg0) and inorganic mercury (Hg+1, Hg+2), and the organic mercury compounds such as as methyl mercury (CH3)2Hg.

