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S1. IMPORTANCE OF GENETIC SUSCEPTIBILITY TO METAL POISONING IN FORENSIC TOXICOLOGY

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Living organisms require varying amounts of essential metals like iron, calcium, chromium, copper, manganese, molybdenum, and zinc. Heavy metals such as arsenic, cadmium, lead and mercury, have no vital or beneficial effect on organisms. All of these metals are toxic at different concentrations and their accumulation of human body can cause chronic toxic effects and serious illness. Human organism accumulates heavy metals as a result of lifestyle and environmental pollution. Toxic metals disrupt metabolic functions by accumulating in vital organs and displace of essential elements. Transporter proteins and metabolism enzymes play significant role in the detoxification of metals. Genetic polymorphisms of these proteins and the enzymes change toxicokinetics of trace element and toxic metal body burden. This presentation includes overview of our results about the effect of gene variants on metal levels of human blood and tissues. Our researchs cover the following gene variants: Metal binding proteins, membrane carrier proteins and xenobiotic metabolizing enzymes which are playing a significant role in metal toxicokinetics. We studied metal levels of exposed and non exposed human blood, autopsy tissues and placenta. Arsenic, lead and cadmium levels were quantified using Zeeman Graphite Atomic Absorption Spectrometry, mercury were analyzed using cold vapor atomic absorption spectrometry, copper and zinc analysis were carried out a dual atomic absorption spectrophotometer system. Our results suggest that genetic variation in proteins and enzymes detoxifying metals, influence toxic metal levels in human blood and tissues. This situation should be taken into consideration determining the threshold toxic metal poisoning.

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