K12 A New Approach in Forensic Toxicology: Dimercaptosuccinic Acid (DMSA) Provocated Urine Potential Toxic Metal Test by Inductively Coupled Plasma - Mass Spectrometer (ICP - MS)

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After attending this presentation, attendees will understand the application of dimercaptosuccinic acid (DMSA) as a heavy metal provocateur in forensic toxicology and learn the analysis of DMSA provocated urine with Inductively Coupled Plasma Mass Spectrometer (ICP-MS) in cases of chronic heavy metal intoxication.

This presentation will impact the forensic community by serving DMSA provocated urine toxic analysis as a new approach in forensic, environmental, and workplace toxicology.

DMSA is one of the agent used as a chelator in treatment of cases of acute heavy metal intoxication. There is a notable increase between the results of ICP-MS analysis of urine samples with and without DMSA provocation in the cases of heavy metal intoxication. Urine samples with DMSA provocation had high toxic metal concentration (Hg, Pb, Ni, Ar, Sn, Sb) considering to urine samples without DMSA. Also the observation of the highest potential toxic element limits in DMSA provocated urine samples of healthy individuals was notable. After this presentation, possibility and usefulness of this new application other than authentic methods in the determination of toxic metal limits will be highlighted.

Potential toxic metal analysis can be done by investigation of provocated urine samples taken from healthy individuals. Although some other provocation agents are present, DMSA should be chosen, since it is preferred also for children. However, the administered DMSA amount should be evaluated by a clinician based on her/his health condition and physical situation such as age, height, weight, etc.

The evaluation can be done among the healthy individuals exposed toxic metals for any reason whatsoever (chronic intoxication, workplace toxicity, environmental exposure, illness, etc.). Individuals may be classified according to their living regions and appropriate precautions may be taken by determination of workplace exposure limits.

A total of 36 trace and potential toxic elements were analyzed from 10 urine samples after appropriate sampling by using elemental analysis method. ICP-MS, which has wide range usage recently as a sensitive and quick and well interpretted method, was preformed in this study.

The toxic element limits between the DMSA provocated and non provocated urine samples of children and healthy individuals was compared. On the basis of data obtained from results of this comparison, authors are in the opinion of using DMSA, which representing possible new application in the field of forensic science, environmental toxicology and workplace toxicology.

DMSA, Toxic Metal Analysis, ICP-MS

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