LAB #: 999999-9999
PATIENT: Sample Patient
ID: 999999999
SEX: Female
DOB: 01/01/1957 AGE: 66

CLIENT #: 999999
DOCTOR: Sample Doctor, MD
Doctor's Data, Inc.
3755 Illinois Ave.
St. Charles, IL 60174 U.S.A.

Hepatic Detox Profile; Urine

TOXIC EXPOSURE MARKERS

	RESULT per creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
D-Glucaric Acid (Phase I)	**38 nmol/mg**	40 - 400	
Mercapturic Acids (Phase II)	**160 µmol/mmol**	40 - 95	

URINE CREATININE

	RESULT mg/dL	REFERENCE INTERVAL	-2SD -1SD MEAN +1SD +2SD
Creatinine	**27**	30 - 225	

INFORMATION

The human body attempts to eliminate xenobiotics (foreign organic chemicals) through a concerted effort of enzymatic "functionalization" (phase I) and conjugation (phase II). Functionalization involves chemical modification of the xenobiotic by the cytochrome P-450 or the "mixed function oxidase" enzyme systems. Once functionalized, the altered xenobiotic can then be conjugated and excreted. Urinary D-glucaric acid, a hepatic byproduct of enzymatic response to chemical toxins (phase I), is a reliable indicator of exposure to xenobiotics. Mercapturic acids are direct, excretory end products of the functionalized xenobiotics that have been conjugated with glutathione prior to excretion. Together, the urinary levels of these metabolites provide valuable information about exposure to xenobiotics, liver disease, and quantitative assessment of the status of hepatic phase II detoxification.

D-GLUCARIC ACID LOW: The level of D-glucaric acid in this patient's urine sample is abnormally low for age and gender. Occupational and environmental exposure to toxic compounds invokes increased production of D-glucaric acid, thus urinary D-glucaric acid is considered an indirect by-product of phase I detoxification reactions. The test results for this patient may reflect: (1) dysfunction of the liver's phase I enzymatic response to foreign chemicals (possibly due to lead or other heavy metal exposure), (2) an environment unusually free of xenobiotics, or (3) severe malnutrition as in Kwashiorkor (extremely rare).

MERCAPTURIC ACIDS ELEVATED: The levels of mercapturic acids in this patient's urine sample are abnormally high for age and gender, and consistent with exposure to xenobiotics and enhanced detoxification via glutathione conjugation (phase II). Mercapturic acids are final excretory products of detoxification and include a variety of functionalized xenobiotics that have been conjugated with cysteine, or glutathione. Ideally, urinary levels of mercapturic acids should be increased with exposure to xenobiotics and enhanced phase I detoxification; mercapturic acid levels will gradually return to basal levels commensurate with successful hepatic detoxification and removal of the patient from the source of exposure. Detoxification should be supported with supplemental vitamins C, E, and lipoic acid, selenium, Mg, K, rGSH, and sulfur containing amino acids. It should be noted that falsely elevated levels of mercapturic acids can occur in patients with cystinuria, or with the use of mono- and dithiol chelators (D- penicillamine, DMSA and DMPS), and some 'thio-capto' type medications (e.g. thioridazine, captodiamine).

SPECIMEN DATA

Comments:

Date Collected: **08/28/2023**
Date Received: **08/30/2023**
Date Reported: **09/11/2023**

Methodology:
D-Glucaric: HPLC
Mercapturic: Enzymatic

v2