LAB #: Sample Report
PATIENT: Sample Patient
ID:
SEX: Female
AGE: 28

CLIENT #: 12345
DOCTOR: Sample Doctor
Doctor's Data, Inc.
3755 Illinois Ave.
St. Charles, IL 60174 U.S.A.

Glutathione; Erythrocytes

	Within	Outside	Reference Range	
Glutathione*		652	> 1100	µmoles/L

Glutathione (GSH) is a tripeptide (λ-glutamyl-cysteinylglycine) synthesized in most cells. The level of GSH in erythrocytes is a sensitive indicator of intracellular GSH status, the overall health of cells, and of the ability to endure toxic challenges. GSH is the most abundant non-protein thiol in mammalian cells. It is involved in many biological processes including detoxification of xenobiotics, removal of oxygen-reactive species, regulation of the redox state of cells and the oxidative state of important protein sulfhydryl groups, and regulation of immune function. GSH levels are thousands of times higher in cells than in plasma. Plasma GSH represents primarily that synthesized and exported from the liver. Reduced GSH (rGSH) is the active form of the tripeptide and the ratio of rGSH: oxidized GSH (GSSH) is normally about 9:1. Once a blood sample is obtained, Erythrocyte rGSH is very susceptible to oxidation and the rGSH:GSSH ratio drops rapidly. Specimen handling to prevent the *ex vivo* oxidation of rGSH is impractical and direct measurement of rGSH *in vivo* is not feasible outside of a research setting. However, research clearly indicates that undesirable ratios of rGSH:GSSH are equally associated with abnormally low levels of total cellular GSH. Therefore, it is clinically meaningful to assess the level of total erythrocyte GSH as an indicator of GSH status and metabolism.

Low levels of GSH have been reported in cardiovascular disease, cancer, AIDS, autism, alcoholism, debilitating neurodegenerative diseases such as Alzhiemer's and Parkinson's, and chronic retention of potential toxic elements (mercury, lead, arsenic, cadmium manganese, iron), chemicals, and some drugs. Intracellular GSH biosynthesis and intracellular levels can be upregulated as a protective mechanism. Some factors that result in increased biosynthesis and "high normal" erythrocyte GSH levels include, but are not limited to, moderate alcohol consumption, smoking, regular physical exercise, and acute exposure to toxic metals. Under such conditions it is essential to provide the body with the key nutrients involved in GSH synthesis in order to sustain functionally appropriate levels of GSH. Magnesium and potassium are required for both energy dependent enzymatic steps in GSH synthesis; cysteine is the rate limiting amino acid. Nutritional products that have been documented to increase erythrocyte GSH/GSH biosynthesis include high quality whey protein preparations, α-lipoic acid, curcumin, oral liposomal GSH, nebulized GSH, and to a lesser extent, N-acetyl-L-cysteine.

Assessing and supporting appropriately high levels of erythrocyte GSH is important towards protecting cells, overall health and longevity, and contributes significantly to safe and effective metal detoxification.

Comments:
Date Collected: **2/3/2019**
Date Received: **2/4/2019**
Date Completed: **2/5/2019**

Collection Period:

<dl: less than detection limit
Method: Spectrophotometry

v4.09

* For research use only. Not for use in diagnostic procedures.