



# L a b o r a t o r y *News*

VOL. 36, NO. 4 - MARCH 11, 2013

## Inside This Issue

NEW THIAMINE  
(VITAMIN B1) TESTING  
AVAILABLE AT MARSHFIELD  
LABS .....1

**NEW THIAMINE (VITAMIN B1) TESTING AVAILABLE AT MARSHFIELD LABS**

JOYCE L. FLANAGAN, PHD, DABCC, FACB

Beginning on March 12, 2013, Marshfield Labs will perform Thiamine (Vitamin B1) testing.

**HOW TO ORDER:**

- Clinic: Thiamine (Vit B1), whole blood
- Hospital: Thiamine (Vit B1), whole blood
- Portal: Thiamine (Vit B1), whole blood
- Lab Test Code: TOTHIA
- CPT Code: 84425
- Reference Range: 100 - 205 nmol/L

**SPECIMEN:**

Whole blood collected in EDTA lavender top tube (LTT) and protected from light.

**REQUIREMENT:**

Fasting for at least nine hours.

**MINIMUM:**

1.0 mL whole blood (LTT)

**AVAILABLE:**

Twice/week

**STORAGE:**

Stable at room temperature up to two hours. Samples are rejected when stored greater than two hours at room temperature. Samples should be frozen at or below -18°C before shipping to Marshfield Labs.



**BACKGROUND:**

Thiamine is a water-soluble and essential vitamin that is obtained from foods rich in thiamine such as yeast, wheat, breads, cereals, nuts, meats, and some vegetables. It is readily absorbed by the small intestine and phosphorylated in the jejunal mucosa, liver, and kidney to thiamine monophosphate (TMP), thiamine diphosphate (TDP), and thiamine triphosphate (TTP). TDP, also known as thiamine pyrophosphate (TPP), is the principal biologically active form and is a required coenzyme in the catabolism of carbohydrates and amino acids. TDP is almost exclusively found in cellular components, i.e., blood cells. Approximately eighty to ninety percent of the total thiamine in whole blood is TDP. Direct measurement of thiamine in whole blood or washed red cells is generally recognized as useful as an index of thiamine status.

Thiamine deficiency is frequently caused either by a diet inadequate in thiamine rich foods, genetically impaired absorption, over consumption of thiaminase rich foods (raw fish) or food high in anti-thiamine factors (tea and coffee), or general malnutrition.

The clinical manifestations of thiamine deficiency depend on the degree of depletion. Mild thiamine deficiency is common among elderly persons and alcoholics, and more recently, patients who underwent bariatric surgery. Moderate deficiency can affect intellectual performance and well-being without showing any apparent clinical symptoms. Severe thiamine deficiency can result in Beriberi or Wernicke-Korsakoff syndrome.

Thiamine deficiency is an underdiagnosed, yet easily treatable, disorder in the United States. The response to thiamine therapy in deficient patients is usually rapid and it appears that no conditions are directly attributable to thiamine excess that may result from treatment.

Marshfield Labs recently completed the validation of an inhouse total thiamine (vitamin B1) test in whole blood by ultra-high pressure liquid chromatography tandem mass spectrometry (UPLC/MSMS) to replace the current sendout thiamine test (Testcode: THIASO), an HPLC method with fluorometric detection of a thiochrome derivative of TDP. It has been reported that total thiamine or thiamine diphosphate correlates well with the indirect transketolate-based measurements of thiamine status. Due to the method change, we conducted a reference range study. The new reference range for our method is 100 – 205 nmol/L versus 70 – 180 nmol/L by the sendout method. The differences between the reference ranges are consistent with the reported studies that TDP accounts for approximately eighty to ninety percent of total thiamine stored in erythrocytes.

If you have questions please contact:

Joyce L. Flanagan, PhD at 1-6310, or 715-221-6 310.

**REFERENCES:**

1. Lonsdale D. "A review of the biochemistry, metabolism and clinical benefits of thiamine and its derivatives". *Evid Based Complement Alternat Med*, 2006 Mar; 3(1):49-59.
2. Sajberlich HE, editor. "Laboratory tests for the assessment of nutritional status". 2nd ed. Boca Raton: CRC Press; 1999. 486 p.
3. Lu J, Frank EL. "Rapid HPLC measurement of thiamine and its phosphate esters in whole blood". *Clin Chem*, 2008; 53:5, 901-906. 