

Baystate Reference Laboratories (BRL) now offers Vitamin D analysis. Vitamin D is a fat-soluble vitamin that plays a role in calcium metabolism and promoting strong bone formation. Vitamin D is produced in the skin or consumed from foods, and both sources require sunlight to convert precursors to active vitamin D. Food sources rich in vitamin D include fish (tuna, herring, salmon), eggs, fortified milk and mushrooms.

Vitamin D deficiency is associated with rickets in children and osteomalacia in adults (adult rickets). Recent studies have further linked vitamin D deficiency to osteoporosis, increased risk of cancer (breast and colon), higher risk of heart attack in men, multiple sclerosis, psoriasis and diabetes.

Vitamin D occurs in several forms. Vitamin D<sub>2</sub>, obtained from plant-derived foods, and vitamin D<sub>3</sub>, obtained from UV light conversion of 7-dehydrocholesterol in the skin, are the biologically important prohormones. These forms of vitamin D are converted to 25-hydroxy vitamin D (25-OH vitamin D) in the liver and then to 1,25 dihydroxy vitamin D (1,25-(OH)<sub>2</sub> vitamin D) in the kidneys which is the physiologically active hormone that binds Vitamin D receptor proteins in the nuclei of target cells (particularly intestine, bone, kidney, and parathyroid hormone) that regulate calcium and phosphorus metabolism.

25-OH vitamin D is the major circulating form of vitamin D and the best indicator of vitamin D status. Baystate reference laboratory offers 25-OH vitamin D testing to determine vitamin D deficiency or intoxication and assess the potential need for vitamin supplementation. Serum is the preferred specimen and at least 1 mL of sample is requested. The test is performed daily, Mondays - Fridays.

It is important to recognize that the 25-OH vitamin D test is not the same as the 1,25-(OH)<sub>2</sub> vitamin D test. The 1,25-(OH)<sub>2</sub> test is rarely needed and is a specialized, esoteric test that assists in the diagnosis of certain cases of primary hyperparathyroidism, hypoparathyroidism, pseudohypoparathyroidism, renal osteodystrophy and vitamin D resistant rickets. Both tests are not needed as a panel for interpretation. Only the 25-OH Vitamin D test should be ordered when screening for vitamin D status or monitoring vitamin supplementation. Further information about the 25-OH vitamin D test is available by calling BRL Chemistry Laboratory at (413) 794-4541 or Dr. James Nichols at (413) 794-1206.

## 25-HYDROXY VITAMIN D (TOTAL 25-OH VITAMIN D)

- **Order 25-OH Vitamin D** for routine screening of Vitamin D status and for monitoring Vitamin D therapy.
- **The 25-OH Vitamin D test is not the same as the 1, 25 Dihydroxy Vitamin D test (1, 25-(OH)<sub>2</sub>).** The latter is rarely needed and is a send-out test for different clinical indications.
- **Order 1, 25 Dihydroxy Vitamin D** to assist in the diagnosis of bone and mineral disorders, primary hyperparathyroidism, hypoparathyroidism, pseudohypoparathyroidism, renal osteodystrophy, and vitamin D resistant rickets.

### Specimen Requirements:

- **1 mL of serum**
- Fasting samples recommended but not required

### How to Order:

- In CERNER/CIS order the **25 OH Vitamin D Level**

### Clinical Indications:

- Diagnosis of vitamin D deficiency or intoxication
- Monitoring for patients on vitamin D therapy

### Background:

- Vitamin D occurs in 2 forms:
  - Vitamin D<sub>3</sub> (cholecalciferol): obtained from UV light conversion of 7-dehydrocholesterol in the skin and animal-derived foods
  - Vitamin D<sub>2</sub> (ergocalciferol): obtained from plant-derived foods (vegetables, yeast, and fungi)
- Both forms used to fortify foods and in over-the-counter supplements
- Vitamin D (D<sub>3</sub>, D<sub>2</sub>, and metabolites) is converted to 25-OH vitamin D in the liver
- 25-OH vitamin D is the major circulating form of vitamin D
  - Best indicator of vitamin D status
  - Precursor to the active form 1,25-(OH)<sub>2</sub> vitamin D

### Testing Method:

- Direct, competitive chemiluminescence immunoassay (CLIA)
- Measures TOTAL 25-OH vitamin D (25-OH vitamin D<sub>2</sub> and 25-OH vitamin D<sub>3</sub>)

### BRL Reference Range:

- **32-100 ng/mL**

### Interpretations:

- Deficiency: <10 ng/mL
- Insufficiency: 10-30 ng/mL
- Sufficiency: 30-100 ng/mL
- Toxicity: >100 ng/mL
- Causes of decreased 25-OH vitamin D:
  - Vitamin D deficiency (associated with hypocalcemia, hypophosphatemia, elevated alkaline phosphatase) due to:
    - Insufficient intake or production
    - Decreased absorption or excessive loss in the GI tract
    - Increased vitamin D metabolism
    - Impaired conversion of vitamin D to 25-OH vitamin D
- Causes of elevated 25-OH vitamin D:
  - Vitamin D intoxication
- Factors that affect 25-OH vitamin D concentrations:
  - UV light exposure, race, dietary intake, season (higher prevalence of subclinical 25-OH vitamin D deficiency during winter months)

### References:

1. LIAISON® method insert, 10/07.
2. Total 25-OH Vitamin D procedure manual, BRL, 05/08.
3. Directory of services and Interpretive Guide, Lab Corp., 2007.