
URINARY MMA / CREATININE RATIO TEST (UMMA)

A superior assay for the detection
of cobalamin (vitamin B12) deficiency.

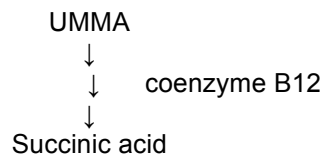
Vitamin B12 is found only in animal products so individuals consuming a vegetarian diet are at risk for developing B12 deficiency. In addition, for normal absorption of B12 a protein, intrinsic factor, produced in the stomach is required. Hence, people lacking that protein can develop B12 deficiency even though they may eat a nutritious diet and take a daily multivitamin since they cannot normally absorb B12.

Individual developing a B12 deficiency can suffer permanent neurological disability such as loss of memory similar to Alzheimer's disease (AD) and leg paralysis requiring confinement to a wheelchair. Similarly, recent research indicates B12 deficient individuals can have no obvious symptoms and still be at over double the risk for developing AD or suffering a heart attack or stroke. Identification of B12 deficiency with the UMMA test allows early treatment for prevention of permanent disability.

Examine the evidence....

A FUNCTIONAL ASSAY:

Urinary methylmalonic acid (UMMA) levels indicate tissue/cellular B12 deficiency since they are directly related to a vitamin B12 -dependent metabolic pathway.



Vitamin B12 deficiency impedes this pathway causing MMA to increase analogous to water building up behind a dam. High UMMA (positive test) identifies B12 deficiency.

Normal UMMA is less than 3.8 µg MMA/mg creatinine (3.6 µmole/mmmole creatinine)

METHOD: MMA (methylmalonic acid) is measured by selected ion monitoring isotope dilution GC/MS (gas chromatography mass spectrometry).⁸⁻²¹ The MMA value is normalized to urine creatinine to correct for urine dilution.

HIGH ACCURACY

SENSITIVE (If you have a B12 deficiency, the test is positive):

The UMMA test was found to be 100% sensitive in identifying B12 deficient hospital patients.^{17,18}

Using the UMMA test to screen non-anemic seniors, 49% of the 35 subjects identified as B12 deficient had a normal serum B12 level.¹⁴

Using the UMMA test to screen a vegetarian population (N=54), 83% (19/23) identified as B12 deficient had falsely normal serum B12.⁵

SPECIFIC (If the test is positive, you have a B12 deficiency):

Vitamin B12 deficiency is the only known cause for high UMMA except for rare, life threatening enzyme defects which are identified early in life.

High UMMA from B12 deficiency normalizes with B12 treatment.^{5,10,11,14,17,18,20}

EARLY DETECTION: the Key to Prevention

Individuals may have neurological manifestations without anemia (normal hematocrit and/or MCV) and/or below normal serum B12 level.^{9-14,22,23}

High prevalence of undetected B12 deficiency in senior¹⁴ and vegetarian⁵ populations.

UMMA SCREENING CAN REDUCE RISK OF SUFFERING ALZHEIMER'S DISEASE (AD), HEART ATTACK, OR STROKE.

A UMMA screening of non-anemic seniors identified mild B12 deficiency in subjects (N=16) with UMMA = 7.8 +/- 5.1 µg per mg creatinine and Serum Hcys = 18.6 +/- 8.6 µmole per L.¹⁴ Subsequent research has shown that these individuals had a 2.7 fold increased risk for suffering AD, heart attack, and/or stroke.⁶⁴ Damage is insidious and may occur before symptoms.^{14,63,64}

The UMMA assay has been validated as a screening tool.¹⁴

THE CHOICE OVER OTHER TESTS

SERUM B12: often gives falsely positive^{17,18,26} and falsely negative^{5,14,28} values. Less sensitive^{5,14} and specific^{17,18,26} than UMMA.

SERUM MMA: falsely high in renal insufficiency and intravascular volume depletion.^{2,12,34} Less sensitive²⁰ and specific^{2,12,34} than UMMA.

SCHILLING TEST: Falsely normal in individuals who are unable to absorb food-bound B12 but can absorb crystalline B12.³⁸

SERUM HOMOCYSTEINE: Less sensitive^{14,20} or specific⁶ than UMMA.

SERUM HOLOTRANSCOBALAMIN II: not shown to be an accurate indicator of tissue B12 deficiency⁶ and not a functional test.

RATINGS OF TESTS FOR THE DETECTION OF VITAMIN B12 DEFICIENCY

TEST	Sensitivity	Specificity	Low Cost	Convenience	Non-Invasiveness	Avg. Score
UMMA	9	9	10	10	10	9.6
Serum B12	6	4	10	6	5	6.2
Serum MMA	8	6	4	6	5	5.8
Schilling	7	9	3	2	7	5.6
S-HomoCyst.	5	5	5	6	5	5.2

Scoring: 1= least, 10= best (Rating from a 2002 literature review)

WHO TO TEST?

Mental status changes
Neurologic or motor symptoms
Gastrointestinal surgery
Anemia or elevated MCV
Age 60 or over annually
Strict vegetarian diet after one year
Exclusively breast fed infant of vegan mother

NEUROLOGIC SYMPTOMS:

Paresthesia
Weakness or fatigue
Muscle aches
Impaired vibration or position sense
Ataxia
Abnormal gait
Decreased reflexes
Multiple sclerosis symptoms

PSYCHOLOGICAL SYMPTOMS:

Memory loss
Disorientation
Apathy
Irritability
Paranoia
Depression
Hallucinations
Violent behavior
Psychosis
Personality changes
Dementia

ADDITIONAL SYMPTOMS and REFERENCES
LISTED ON www.b12.com

COST:

\$70. Discounts are available for screening or research studies.
Less expensive than other labs. Mayo Medical Labs 2003 test catalog lists the UMMA test for \$184.80.

WHAT THE EXPERTS SAY:

Roach, et al. "80 to 90 percent of untreated patients will develop disorders of the nervous system."²⁴

Pruthi and Tefferi. "Because of the difficulties in diagnosing cobalamin (Cbl) deficiency, alternatives to measuring Cbl have been sought. Determining the UMMA level is a less invasive, more practical, and possibly, more sensitive method."⁴¹

Panke "Serum MMA suffers from falsely high values in patients with renal insufficiency and/or patients with intravascular volume depletion. ... routine reliance on serum vitamin B12 levels to confirm early deficiencies is not sufficient to detect all cases. Especially where there are neuropsychiatric symptoms, one should order UMMA levels."⁷²

Murray. "Of these three tests (serum B12, UMMA, and Hcys), the UMMA assay is perhaps the best test because it is sensitive, noninvasive, and relatively convenient for the patient."⁷³

Hvas et.al. "Our results suggest that plasma [i.e. serum or S] creatinine must be taken into consideration when interpreting S-MMA..... In the light of our study, we agree with others who state that we do not know how confidently we can exclude Cbl deficiency disease when S-Cbl is low and S-MMA is normal."³⁴

Carmel et. al. "Because low cobalamin concentrations can occur in the absence of deficiency, the term 'cobalamin deficiency' should probably be reserved for those cases with accompanying clinical or metabolic evidence supporting the diagnosis."²

Martin et. al..."Cobalamin therapy may lead to cognitive recovery in some patients... The window of opportunity for effective intervention may be as short as one year from the onset of medical symptoms...Clinicians should remain vigilant in screening for B12 deficiency, especially in patients with the recent onset of mental changes."²⁵

Halliday et. al..."Neuropsychiatric disturbances due to cobalamin deficiency in the absence of anemia should not be overlooked. The failure to make an early diagnosis will delay an effective therapy and result in possible irreversible neurologic deficits."⁶⁷

Donaldson. "The UMMA assay is effective for identifying early metabolic cobalamin deficiency."⁵

FOR MORE INFORMATION:

NORMAN CLINICAL LABORATORY, INC.

1044 Sunwood Court

Cincinnati, OH 45231-2546

Phone/FAX: 1-800-397-7408 and 1-513-521-8378 (TEST).

www.b12.com E-mail: B12tester@aol.com E-Mail for test kits and info.

Purpose:

Norman Clinical Laboratory, Inc. (NCL) was established in 1985 to provide a highly accurate, noninvasive, relatively inexpensive test for the detection of vitamin B12 deficiency.

Licenses and Accreditations:

U.S. Dept. of Health & Human Services (CLIA): 36D0347081

Medicare Provider: 36L000113

College of American Pathologists (CAP) Proficiency Testing Program: 37453-01-01

Specimen Handling Requirements:

No special handling is required. Use 1 ml of a random, spot urine specimen.

Mail NCL test kit with 49 cents postage or use your vial and send by overnight mail.

Turn-around time is 1-3 days.

Client Billing:

Cost is \$70, net 30 days. Discounts available for screening or research.

Hospitals, clinics, labs, and physician offices will be billed monthly.

Medicare assignment is accepted. NCL is not a Medicaid provider and does not bill insurance companies directly.

NCL accepts payment from patients and requests a check be enclosed with the specimen or credit card # and expiration date be listed on the lab request form.

NORMAN CLINICAL LABORATORY, INC.

Since 1985 -- the first commercial laboratory to provide the UMMA test.

Consider NCL a part of your team.