MAYO CLINIC
Mayo Medical Laboratories

Laboratory Service Report 1-800-533-1710

Patient Name	Patient ID	Age	Gender	Order #
SAMPLEREPORT,FB12V	SA00062884	47	F	SA00062884
Ordering Phys CLIENT,CLIENT				**DOB** 06/10/1966
Client Order # SA00062884	**Account Information**			**Report Notes**
Collected 10/02/2013 12:04	C7028846-DLMP Rochester SDSC 2 - Client Support Rochester, MN 55901			
Printed 10/02/2013 13:12				

Test	Flag	Results	Unit	Reference Value	Perform Site*
Vitamin B12 Deficiency Panel					
RECEIVED: 10/02/2013 12:17 **REPORTED:** 10/02/2013 12:18					
Methylmalonic Acid		177	nmol/L	73-271	Y115
2-Methylcitric Acid		157	nmol/L	60-228	Y115
Homocysteine		10.6	umol/L	5.1 - 13.9	Y115
Cystathionine		204	nmol/L	44-342	Y115

INTERPRETATION:

	NORMAL	B12 DEFICIENCY		FOLATE DEFICIENCY	
Metabolite	%HIGH		%HIGH		%HIGH
	RANGE VALUES	RANGE	VALUES	RANGE	VALUES
Methylmalonic Acid:					
	73-271 <3	271-200,000	>95	73-271	<3
2-Methylcitric Acid:					
	60-228 <3	228-15,000	>80	60-228	<3
Homocysteine:					
	5.1-13.9 <3	14-500	>95	14-250	>95
Cystathionine:					
	44-342 <3	342-4000	>80	342-18,000	>80

NOTE 1)Serum Methylmalonic Acid and Homocysteine are the primary metabolic tests for diagnosing and distingushing between B12 and folate deficiency. They can be used in conjunction with the serum B12 which is usually low or low normal (<350 pg/mL) in B12 deficiency and the serum folate which is usually low or low normal (<5 ng/mL) in folate deficiency. 2-Methylcitric Acid and Cystathionine provide confirmatory evidence for such deficiencies. Homocysteine and especially Cystathionine may also be high in B6 deficiency.

NOTE 2) Elevated levels of serum metabolites will correct to normal after treatment with the appropriate vitamin but will not correct after treatment with the wrong vitamin, even in pharmacologic amounts.

NOTE 3) Any of the four metabolites can be elevated due to renal insufficiency or intravascular volume depletion. This occurs most commonly in the case of 2-Methylcitric

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Acid and Cystathionine. Elevated metabolite levels do not correct with B12, folate or B6 treatment unless vitamin deficiency coexists.

NOTE 4) Serum metabolite levels can be rechecked 5 to 15 days after vitamin therapy.

NOTE 5) Normal ranges 6 hours post oral Methionine load (10 mg L-Methionine/kg body wt.) are as follows: Homocysteine 16.5-45.7 umoles/Liter and Cystathionine 424-2500 nmoles/Liter. Methylmalonic Acid and 2-Methylcitric Acid do not change after a Methionine load.

* Performing Site:

Y115	Metabolite Laboratories, Inc.Department of Hematology Univ of CO Denver 12700 E. 19th Ave., Room 9122/9125 Building P-15, Research Complex 2 Aurora, CO 80045	Lab Director: