The methyl-B-12 is used to transfer the methyl group onto homocysteine to form methionine. Methionine is important in methyl transfers and is necessary for the synthesis of myelin sheaths. In the absence of B-12, DNA is not produced and the cells grow without dividing, becoming megaloblasts.

B-12 is also involved in carbohydrate metabolism. It has been noted that lactic acid and pyruvate increased from 50% to 100% during B-12 deficiency. Neurological problems often occur when there is a B-12 deficiency because the nervous system relies on carbohydrates as its main source of fuel.

IV. Requirements

RDA–3mcg

Optimal daily intake– 100–500mcg

LAB–serum B-12 (microbial assay) normal >100pg/ml, appears to be the most widely used and considered the most accurate. (Dr. Herman Baker of New York, one of the world experts in vitamin measurements, claims most all assays tend to analyze inactive metabolites.) Pregnancy, large doses of vitamin C, and folate deficiency may result in a falsely reduced B-12 assay.

Serum B-12 (RIA) is not as accurate, since it picks up all forms of cobalamin including those that are inactive.

24 hour urine MMA–Methylmalonic acid requires B-12 for conversion to succinic acid and, without B-12, it increases in the urine. This test is very sensitive and also very expensive.

SCHILLING TEST–This test can be used to assess the etiology of deficiency.

1) Ingest 1µg radioactive B-12 without intrinsic factor (IF). Next give a large "flushing" dose of non-labeled B-12 via IM and collect 24-48 hour urine.
   If > 7% *B-12 in urine = OKAY.
   If < 7% *B-12 in urine = Deficient B-12 due to **malabsorption** or **lack of IF**.
2) Ingest radioactive B-12 with IF and find *B-12 in urine = **pernicious anemia**.
3) Ingest radioactive B-12 with IF and find no *B-12 in urine= **malabsorption**.

NOTE–50-75% of patients with pernicious anemia have antibodies to IF–Heidelberg.
Hypersegmented neutrophils–**takes 1-2yrs for MCV to become elevated.**

* Indicates radioactive label.

V. Sources

Best Sources of Vitamin B-12 (animal sources)

Food	Amount	µg	Food	Amount	µg
Liver, beef	3 oz	93.5	Tuna, canned, drained	3 oz	1.8
Clams	3 oz	~60.0	Cheese	3 oz	1-2
Salmon steak	3 oz	3.0	Milk (whole or skim)	8 oz	0.9
Lamb	3 oz	2.6	Halibut	3 oz	0.8
Lobster	3 oz	2.6	Egg	1 large	0.6
Beef	3 oz	2.0	Chicken	3 oz	0.3

Sources of Vitamin B-12 (non-animal sources)

	Food	Amount	µg
	Brewer's yeast	2 T	2.0
Sea Vegatables	Nori	2 sheets	2.0
	Wakame	3 wet oz	1.9-5.3
	Kombu	3 wet oz	1.5-4.1
	Arame	3 wet oz	0.09-0.15
Micro-algaes	"Super Blue Green"	3g	23.1
	Chlorella	3g	4.0
	Spirulina	3g	1.2

"Super Blue Green" algae source of B-12 confirmed by Dr. Herman Baker, Brooklyn, New York.

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