

Routine Blood Tests: A Guide

Guiding the conversation with your physician regarding comprehensive, routine blood tests.

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HEY THERE!

Yay for grabbing my "Routine Blood Tests" guide! One of the most common questions I get from my students and clients is - "What lab tests should I have done?" Great question!

I'm sort of a data freak. I want to know my numbers so I can adjust my diet accordingly, consider supplementation (if necessary) and adjust any supplementation. As a "food first" dietitian, I'll always advocate for optimizing our nutrition with foods as best as possible. However, there are times when supplementation is necessary.

Now it's time to know your numbers too!

Consider this guide as a tool to help guide you in conversation with your physician(s) to ensure nutrition adequacy in your plant-based approach against cancer and chronic disease. Additionally, this guide pairs well with my "Supplement Guide" you can find within "[The Wholesome Journey](#)".

Alright, ready? Let's dive in!

Alison

WHAT YOU'LL FIND INSIDE:



VITAMIN B12



VITAMIN D



IODINE



IRON PANEL



LIPID PANEL



OMEGA-3 INDEX



ZINC



SUMMARY OF TESTS



REFERENCES

Note:

The reference ranges within this guide are common measurements for results of these tests. Normal value ranges may vary slightly from lab to lab. And, some labs use different measurements or test different samples. Talk to your provider about the meaning of your specific test results.

Pssst - Click each one to jump right to it!

DISCLAIMER:

This guide is not intended to provide therapy, counseling, or clinical advice or treatment, or to take the place of clinical advice and treatment from your personal physician. Participants are advised to consult their own qualified health-care physicians and professionals regarding medical issues. The author takes no responsibility for any possible consequence from any treatment, action, or application of information from this guide to the participant.

AFFILIATE DISCLOSURE:

Just a heads up - this guide contains product affiliate links. If you click and purchase using my link, I may receive a small commission at no extra cost to you. I only recommend products/tools/resources that I have personally vetted.

VITAMIN B12

SERUM VITAMIN B12 OR uMMA

If plant-eaters are not regularly consuming adequate sources of vitamin B12 through fortified foods, a supplement is necessary. Vitamin B12 is one supplement that is a must for vegetarians, vegans, and plant-predominate eaters since plants are no longer a reliable source of vitamin B12 (as they once were). The vitamin itself is not created by humans, animals, or plants - but rather by certain bacteria.

Vitamin B12 is necessary for the conversion of the inactive form of folate to the active form (1).

DEFICIENCY:

A deficiency of vitamin B12 can result in a form of anemia, similar to deficiencies in folate and iron.

Vegans, vegetarians, and plant-predominate eaters are at higher risk for vitamin B12 deficiency and therefore require a supplemental form of vitamin B12 to meet needs (if not meeting needs through fortified food sources and/or animal foods).

CONSIDERATIONS:

Serum vitamin B12 is a measurement of recent B12 ingestion. Whereas a better measurement of vitamin B12 status is a urinary methylmalonic acid (uMMA) measurement as it is more reliable and the most sensitive test for B12 deficiency. When uMMA is elevated, a vitamin B12 deficiency is likely.

NORMAL RANGE:

Serum Vitamin B12: 160-950 pg/mL

uMMA: 0.3 to 2 mmol/mol cr

FOOD SOURCES:

The best food sources of vitamin B12 are animal sources such as beef liver, clams, milk and yogurt. Additionally, fortified sources such as nutritional yeast, non-dairy milk and fortified cereals can be a reliable source if regularly and adequately consumed.

GET TESTED:

A serum vitamin B12, which is what is typically drawn with most physicians, is not the most reliable test for vitamin B12. Consider requesting a uMMA level. If your physician is unable to do this test, consider testing at home with OmegaQuant. If wanting to test at home, [OmegaQuant](#) provides a reliable, easy at-home test. (Use coupon code WHOLESOMELLC for a small discount at checkout.)

VITAMIN D

25-hydroxyvitamin D

Vitamin D, or often referred to as the "sunshine vitamin", is produced when the skin is exposed to sunlight, specifically when exposed to ultraviolet B (UVB) radiation (when not protected by sunscreen). Vitamin D regulates calcium and phosphorus levels. Many are familiar with vitamin D's role in osteoporosis and bone health, while research continues to investigate the role vitamin D may play in cancer risk. (1)

DEFICIENCY:

Vitamin D deficiency can result from inadequate intake, inadequate sunlight exposure, malabsorption or other disorders.

FOOD SOURCES:

Very few foods are naturally rich in vitamin D3. Food sources of vitamin D are primarily found in fortified food products such as milk and yogurt (both dairy and non-dairy options).

NORMAL RANGE:

30 - 100 ng/mL

Some experts recommend higher levels than a minimum of 30 ng/mL for overall health. Although, research has not concluded a more optimal level at this time. However, research suggests a vitamin D level between 40-60 ng/dL for both children and adults for sufficiency and as it may support metabolic, heart, brain and immune health. If below this range, consider discussing supplementation with your physician or other qualified healthcare professional.

CONSIDERATIONS:

It is important to remember that vitamin D levels tend to rise during summer months related to increased sun exposure. If testing during the summer months, consider testing during the winter months as well to ensure a healthy level of vitamin D all throughout the year.

The lab value reflects your vitamin status over the past 1-2 months.

GET TESTED:

Vitamin D is very commonly ordered by physicians. Be sure to check with your insurance to determine coverage. If wanting to test at home, [OmegaQuant](#) provides a reliable, easy at-home test. (Use coupon code WHOLESOMELLC for a small discount at checkout.)

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IODINE

Urinary Iodine and Thyroid Hormones

Iodine is a nutrient of consideration, especially among vegans and vegetarians who have a higher risk of developing a deficiency (2). Just like any dietary approach, appropriate planning is necessary. In fact, iodine deficiencies are on the rise, likely related to decreased use of iodized salt (replaced with sea salts) and a decrease in iodine within our soils. (8)

Iodine plays an especially important role when it comes to creating thyroid hormones. These hormones play an important role in our metabolism. A deficiency may lead to hypothyroidism and other symptoms such as hair loss, fatigue, dry skin, weight gain, and more. (9, 10)

Often, iodine levels are first assessed with thyroid hormone levels (such as TSH) since if we don't have enough iodine, we will produce insufficient amounts of thyroid hormones.

Thereafter, iodine levels are typically assessed using urinary iodine as it reflects dietary intake since humans excrete more than 90% of dietary iodine through urine (11). However, urinary iodine concentrations have not been the standard test for individuals (12).

So, what then? If you are concerned you may be deficient or at risk for an iodine deficiency, speak with your physician about having your thyroid hormones tested. If out of normal ranges, it is possible your physician may then request a urinary iodine concentration test. With these results, consider working with a dietitian to help determine your average dietary intake of iodine through dietary recalls.

RECOMMENDED DIETARY INTAKE: (11)

Adult Males & Females: 150 mcg

Pregnancy: 220 mcg

Lactation: 290 mcg

FOOD SOURCES: (11)

Seaweed (nori, dulse, or wakame) is one of the best sources of iodine!

Dulse flakes: 2 tsp = 150 mcg

Nori: 3 tsp or 2 sheets = 150 mcg

Wakame: 2 tsp = 150 mcg

Iodized Salt: 1/2 tsp = 150 mcg

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IRON PANEL

Serum Iron, Serum Ferritin, TIBC, Transferrin

Identifying an iron deficiency is not as simple as noting low hemoglobin (Hgb) on a Complete Blood Count (CBC) as there are several types of anemia. Including:

- Iron deficiency anemia - too little iron
- Vitamin B12 deficiency - too little B12
- Folate deficiency - too little folate (vitamin B9)
- Anemias related to chronic disease(s) - sickle cell, aplastic, autoimmune, etc.

If you have low hemoglobin (Hgb) and hematocrit (Hct), it doesn't necessarily mean iron deficiency. Another clue to iron deficiency would be the mean corpuscular volume (MCV). If these 3 labs are low, it would likely warrant an iron panel lab draw (and vitamin B12 and folate) to identify the type of anemia. At this point, speak with your physician regarding a iron panel lab draw to investigate further.

An iron panel would include:

- **Serum iron:** a measure of the total iron circulating your blood
- **Serum ferritin:** a protein that helps store iron in the body
- **Transferrin:** a protein that carries iron in your blood
- **TIBC (Total Iron Binding Capacity):** how much of the transferrin in your blood isn't carrying iron

When assessing if iron deficiency is present, typical results include:



IRON PANEL (1) *(continued)*

| Lab Test | Notes | Normal Range | What would indicate a possible iron deficiency? |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hemoglobin | This is not part of the iron panel, however, it is the first indicator an iron panel may be necessary. | Male: 14-18 g/dL Female: 12-16 g/dL | Male: < 14 g/dL Female: < 12 g/dL |
| Serum Iron | A measurement of the level of iron in your blood. | 50 - 170 mcg/dL | < 50 mcg/dL *A low serum iron, yet normal serum ferritin does not equate to iron deficiency anemia |
| Serum Ferritin | The measurement of a protein that helps store iron in the body. Considered the storage form of iron. | Male: 12-300 ng/mL Female 10 - 150 ng/mL | Decreases in ferritin levels indicate a decrease in iron storage associated with iron deficiency anemia. A ferritin level <10 ng/mL is considered iron deficiency anemia. |
| Transferrin | The protein that carries iron in your blood. Considered the transport form of iron. When iron stores are low, transferrin levels increase. When transferrin is low, there is too much iron. | Male: 215-365 mg/dL Female: 250-380 mg/dL | Levels above normal range. |
| Total Iron Binding Capacity (TIBC) | TIBC essentially measures the same as transferrin - it is the body's ability to transport the iron. | 250-460 mcg/dL | Levels above normal range. |
| Transferrin Saturation | Essentially, how many places on your transferrin that can hold iron are actually doing so. | 20-50% | <20% |

IRON PANEL *(continued)*

FOOD SOURCES:

Research indicates vegetarians consume as much, if not more, iron than omnivorous eaters (2). However, non-heme sources of iron (found in plants) should be paired with a source of vitamin C to increase bioavailability (or, the body's ability to absorb/use the iron).

The Wholesome Journey, Module 4, Unit 10, Lesson 32 reviews iron more in depth. Within that lesson, you can find the handout "Sources of Iron" PDF.

GET TESTED:

Although an iron panel is not typically a routine lab test drawn, it is very common practice and should easily be added to a lab order with your physician.

If you suspect or are concerned with iron deficiency, be sure to have a conversation with your physician regarding drawing an iron panel.

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LIPID PANEL

LDL-C

Lipoproteins are considered to be an accurate predictor of heart disease - which are particles found in the blood made out of proteins and fats. Lipoproteins carry cholesterol throughout the bloodstream and LDL-Cs specifically carry cholesterol to the arteries.

High levels of these particles can lead to a buildup of cholesterol in the arteries forming plaques, which can lead to atherosclerosis, or the hardening of the arteries. Atherosclerosis can lead to heart attack, stroke, and other blood vessel diseases.

Although a lipid panel test typically includes total cholesterol, HDL-C (high-density lipoprotein cholesterol), LDL-C, and triglycerides (along with ratios of these) - as it relates to risk for cardiac events, LDL-C should be the primary number to focus on when aiming to reducing risk of a cardiac event.

A typical lipid panel outlining a normal range for LDL-C recommends levels of <129 mg/dL. However, research indicates that those with an LDL-C of <100 mg/dL were 30-40% less likely to die from heart disease than those with an LDL-C between 100-129 mg/dL. (13)

Furthermore, other studies suggest achieving an LDL-C below 75 mg/dL is the most optimal level to drastically reduce the risk of heart disease and a cardiac event. (14)

NORMAL LEVEL OF LDL-C:

<129 mg/dL

Cooper Center Longitudinal Study: <100 mg/dL

CONSIDERATIONS:

A newer test measuring Apolipoprotein B-100 (ApoB) can be measured and is an even better predictor of cardiac risk compared to LDL-C (15). LDL-C tests are more common, however, consider requesting a ApoB lab draw, especially if you have high levels of LDL-C for a more accurate assessment of cardiac risk.

LIPID PANEL (continued)

DIETARY CONSIDERATIONS:

A recent meta-analysis (an analysis of available studies on the topic) demonstrated that vegetarian and vegan diets significantly reduce LDL-C, total cholesterol, and ApoB. (16)

Aim to focus on reducing saturated fats as much as possible to reduce LDL-C and ultimately to reduce heart disease risk.

Plants (with the exception of coconut and palm) are naturally low in saturated fat.

GET TESTED:

If your physician isn't currently drawing a lipid panel yearly, discuss with your physician and request a lipid panel.

If possible and if your LDL-C is elevated, consider requesting an ApoB lab draw as well.

OMEGA-3 INDEX

ANOTHER RISK FACTOR ASSESSMENT FOR HEART DISEASE

If you're not familiar with the omega-3 index test, you are certainly not alone. This relatively new test (since the early 2000s) is considered another risk factor for heart disease, similar to that of a lipid panel or cholesterol test. According to an article published in the [American Journal of Clinical Nutrition](#): "the omega-3 index compares very favorably with other risk factors for sudden cardiac death" (3). Research continues to mount on the benefits of an optimal omega-3 index as it relates to Alzheimer's, eye diseases, and even gene expression (4) - which may relate to cancer.

The omega-3 index test results are given in a percentage with a ideal percentage of 8%+ and considered the lowest risk for heart disease and a sudden cardiac event. Intermediate risk is considered between 4-8%, whereas deficiency and undesirable levels are <4%. Research demonstrates those finding themselves within the undesirable level are at a 90% higher risk of sudden cardiac death (3).

This test measures the amount of EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) found in the red blood cells membranes (the blood). EPA and DHA are two forms of omega-3 fatty acids.

Another type of omega-3 is ALA (alpha linoleic acid). ALA is converted into DHA, EPA, and DPA (docosapentaenoic acid). However, our body's ability to convert ALA to DHA, EPA, and DPA is rather inefficient and may not equate to adequate amounts of EPA and DHA. (5)

Some experts argue whether plant-based food sources of ALA are sufficient enough to convert to adequate amounts of EPA and DHA.

In that case, it may be of particular interest for a plant-predominate eater to have their omega-3 index tested to ensure adequate levels of EPA and DHA. If results identify an index below the desirable 8%, an individual may consider increasing their daily intake of ALA foods or a direct DHA and EPA supplement, such as algae or fish oil. (6)

Of note, omega-3s (and the consumption/supplementation of) does not reduce cholesterol levels. However, they have been found to have an impact on heart disease, triglycerides, blood pressure (7), and the Omega-3 index.

OMEGA-3 INDEX (continued)

FOOD SOURCES:

| Food | Grams of ALA (per serving) | Grams of DHA (per serving) | Grams of EPA per serving) |
|----------------------------------------------|----------------------------|----------------------------|---------------------------|
| Flaxseed oil, 1 tbsp | 7.26 g | -- | -- |
| Chia seeds, 1 ounce | 5.06 g | -- | -- |
| Walnuts, 1 ounce | 2.57 g | -- | -- |
| Flaxseed, whole, 1 tbsp* | 2.35 g | | |
| Salmon, Atlantic, wild, cooked, 3 oz | -- | 1.24 g | 0.59 g |
| Herring, Atlantic, cooked, 3 ounces** | -- | 0.94 g | 0.77 g |

*Recommended to grind whole flaxseeds into a meal/powder since humans cannot absorb the nutrients from whole flaxseeds.

**Farmed vs. wild not indicated by USDA database

Be sure to check out *The Wholesome Journey, Module 4, Lesson 31* for the handout "Sources of Omega-3s" for more information.

GET TESTED:

Unfortunately, omega-3 index testing is not of regular practice and it can be difficult to have this test done through your physician or health care provider.

If wanting to test at home, [OmegaQuant](#) provides a reliable, easy at-home test. (Use coupon code WHOLESOMELLC for a small discount at checkout.)

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Serum Zinc, Zinc Taste Test

Zinc is commonly a nutrient of concern for those pursuing a plant-predominate dietary pattern. However, compared to non-vegetarian control groups, adult vegetarians have similar or somewhat lower intakes and lower - but within normal range - serum zinc concentrations. (2)

Zinc is an essential mineral necessary for many functions within the body, including enhancing immune function, wound healing, and cell signaling and division (17).

DEFICIENCY:

Symptoms of deficiency include loss of appetite, loss of taste, stunted growth, impaired immune systems, diarrhea, hair loss and mood disorders. (17)

CONSIDERATIONS:

Unfortunately, serum zinc is not the most accurate measurement of zinc. Research shows serum zinc may detect moderate to significant deficiency, however, mild deficiency may not be detected.

A zinc taste test may be just as accurate and is also easy and inexpensive to perform (18). The level at which you taste the zinc can help identify your zinc status.

Zinc is not as bioavailable within many plant foods (such as legumes and whole grains) since they contain phytates that can reduce the absorption of zinc. Therefore, it would be recommended to increase the daily recommendation of zinc to account for this or to use methods such as soaking, heating, sprouting, fermenting, and leavening which have been shown to unlock zinc from phytates and lead to increased bioavailability. (17,20)

NORMAL RANGE:

Serum Zinc: 0.55 - 1.50 mcg/mL

GET TESTED:

Discuss with your physician regarding the best test for you to assess zinc status. If wanting to perform the zinc taste test at home, you can find it [here](#).

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ZINC (continued)

RECOMMENDED DIETARY ALLOWANCES: (17, 19)

| | Male | Female | Pregnancy | Lactation |
|----------------------------------------------------------|---------|--------|-----------|-----------|
| Average Adult | 11 mg | 8 mg | 11 mg | 12 mg |
| Vegetarian or Vegan Adult (1.5 times the RDA) | 16.5 mg | 12 mg | 16.5 | 18 mg |








PLANT FOOD SOURCES: (21)

| Food | Zinc |
|-----------------------------------|--------|
| Hemp seeds, 2 tbsp | 2 mg |
| Tofu, extra firm, 1/2 cup | 1.8 mg |
| Cashews, 15 nuts | 1.7 mg |
| Tahini, unhulled, 2 tbsp | 1.4 mg |
| Chickpeas, cooked, 1/2 cup | 1.3 mg |
| Pumpkin seeds, 2 tbsp | 1.1 mg |
| Pecans, 15 halves | 1 mg |
| Quinoa, 1/2 cooked | 1 mg |
| Flaxseeds, 2 tbsp | 0.6 mg |

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SUMMARY OF BLOOD TESTS



| Nutrient | Recommended Test |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Vitamin B12  | <u>uMMA</u> |
| Vitamin D  | <u>25-hydroxyvitamin D</u> |
| Iodine  | Thyroid Levels, followed by urinary iodine concentration (if necessary) |
| Iron  | <i>Iron Panel:</i> serum iron, serum ferritin, transferrin, and TIBC or transferrin saturation |
| Lipid Panel  | LDL-C (low density lipoprotein cholesterol) and ApoB (if possible) |
| Omega-3  | <u>Omega-3 index test</u> |
| Zinc  | Serum zinc or <u>zinc taste test</u> |

WHERE TO GO FROM HERE:

Use this guide as a conversation tool with your physician. If your results indicate a deficiency, be sure to work with your physician and/or dietitian to create a plan to increase these levels to adequate levels either via diet and/or supplementation.

Be sure to grab the Wholesome Supplement Guide found within *The Wholesome Journey, Module 4, Unit 10, Lesson 33.*

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