

# Beware – Biotin Supplements May Alter Your Thyroid Test

Analysis by [Dr. Joseph Mercola](#)

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## STORY AT-A-GLANCE

- › Biotin plays a role in energy production, and is commonly used to remediate neurological problems, hair loss (alopecia) and skin conditions (such as acne and eczema) associated with a lack of certain enzymes
- › Research suggests biotin is a helpful adjunct in the treatment of multiple sclerosis (MS), by improving myelin repair and facilitating cellular energy production
- › Taking a biotin supplement can throw off your thyroid test results, producing false highs or lows, so avoid taking any biotin supplements at least a day or two before your thyroid test to ensure accurate results

***Editor's Note: This article is a reprint. It was originally published November 21, 2016.***

Biotin (vitamin B7) – an essential water-soluble micronutrient – is a member of the B complex group of vitamins.<sup>1</sup> Other names sometimes used for biotin include vitamin H, coenzyme R and d-biotin.<sup>2</sup>

Biotin plays a role in energy production, and since your body does not synthesize biotin, you must obtain it from your food. It's commonly used to remediate neurological problems, hair loss (alopecia) and skin conditions (such as acne and eczema) associated with a lack of certain enzymes.

Adequate intake levels are set at 5 micrograms (mcg) per day for infants and 30 mcg for adults,<sup>3</sup> and since this amount is fairly easy to obtain from food, deficiencies are thought to be rare.

For example, 50 grams (gm) of butter (about 3.5 tablespoons) or 50 grams of sunflower seeds contain 47 mcg and 33 mcg of biotin respectively. Still, some take high-dose biotin supplements to improve their hair, skin or nails, and it's important to realize that this can skew test results for thyroid hormones.

## Common Signs and Symptoms of Biotin Insufficiency

While more rare than other [nutrient deficiencies](#), biotin insufficiency or deficiency can certainly occur. Since biotin is water-soluble, your body will not store it. Hence, your intake must remain consistent. Pregnant women are also at heightened risk for insufficiency or deficiency, which could have adverse effects on the developing fetus.

Hair loss and red, scaly rashes (especially on your face) are common signs you may need more biotin. Other signs and symptoms of biotin deficiency include:

- [Depression](#)
- Loss of appetite
- Nausea
- Muscle pain
- Paresthesia

In your body, biotin plays an important role in:<sup>4,5</sup>

Metabolizing fats, carbohydrates and amino acids

Proper function of your nervous system

Maintaining healthy LDL cholesterol

Regulating blood sugar

Strengthening hair and reversing hair loss by reacting with enzymes to make amino acids, building blocks for proteins such as keratin, which your hair is made of

Strengthening your nails. In one study, 2.5 mcg of biotin per day for at least six months improved nail thickness by 25%<sup>6</sup>

## **Biotin May Benefit Multiple Sclerosis Patients**

Interestingly, research suggests biotin may be a helpful adjunct in the treatment of multiple sclerosis (MS).<sup>7</sup> As explained by Multiple Sclerosis News Today:<sup>8</sup>

*"[Biotin] acts in MS by increasing a route of cellular energy production, protecting against the breakdown of nerve cell axons. It also activates enzymes that are setting the pace on myelin repair by being involved in the production of myelin constituents."*

In one randomized controlled trial, nearly 13% of the patients diagnosed with progressive MS reported improvement after taking a pharmaceutical grade, high-dose biotin (referred to as MD1003) for nine months. None of the patients taking a placebo reported improvements. After two years, 15.4% of the treatment group demonstrated less disability. According to professor Ayman Tourbah:<sup>9</sup>

*"Full results of the MS-SPI study are especially remarkable. This is the first time that a drug has reversed the progression of the disease in a statistically significant proportion of patients."*

*In addition, if we look at the mean Expanded Disability Scale (EDSS) change, the data compare very favorably with all previous trials that looked at the same endpoint. Almost no progression was observed in patients treated with MD1003 for 24 months, and this has never been observed before ...*

*Results ... point to the fact that targeting neuron and oligodendrocyte metabolism represents a promising and novel disease modifying therapy approach in progressive MS, particularly in patients with a not-active progressive disease."*

## **Beware – Biotin Supplements May Alter Thyroid Tests**

For all its benefits, there are drawbacks to biotin supplements that you really need to be aware of. As it turns out, taking a biotin supplement could throw off your thyroid test results, producing false highs or lows. As reported in Endocrine News:<sup>10</sup>

*"The physician had been treating the patient's hypothyroidism successfully with levothyroxine for some time, when suddenly her free T4 levels spiked despite a normal thyroid stimulating hormone (TSH) level.*

*The physician referred the patient to [Dr.] Cary N. Mariash, professor of clinical medicine at Indiana University in Indianapolis, where additional laboratory tests had inconsistent results: her free T4 and total T3 were elevated, but her total T4, T4 index and TSH were normal.*

*Fortunately, Mariash could clear up the confusion by asking the patient a simple question: 'Are you taking biotin?' Yes, she replied, she had recently started taking 10 mg a day in hopes of improving her hair and nails.*

*Her tests returned to normal when she stopped taking biotin. The problem had nothing to do with the patient's thyroid – the biotin was interfering with the tests.*

*Mariash presented this case at the recent International Thyroid Congress because he has recently encountered several patients whose abnormal thyroid test results were caused by taking biotin and 'most endocrinologists don't know about this problem.'"*

## **If Thyroid Test Results Are Mismatched to Clinical Observations, Consider Biotin Interference**

The ramifications of this kind of test result interference could be severe. As noted by Dr. Carol Greenlee, an endocrinologist in Colorado, people may be treated for hyperthyroidism, Grave's disease or even cancer, even though they do not actually have a

thyroid problem – they're simply taking large doses of biotin, which is throwing off the test results.

The reason for this discrepancy in the test results is related to the fact that most immunoassays rely on biotin-streptavidin attraction, and when your blood sample contains mega-doses of biotin, it interferes in this process, rendering the results either artificially high or low. According to Endocrine News:

*"In the case of competitive immunoassays – usually used for low molecular weight targets (such as T4, T3 and cortisol) – biotin interference causes a falsely high result. In immunometric (sandwich) assays, it gives a falsely low result.*

*Other characteristics of the assay can also make a difference. For instance, a longer incubation time increases the opportunity for interference. Different assays for various analytes, even from the same manufacturer, can therefore vary in their susceptibility to biotin interference ...*

*[Co-director of the endocrine laboratory at the Mayo Clinic, Dr. Stefan] Grebe says it may fall to the physician ordering the test to be vigilant:*

*'When your lab results don't make sense in terms of the clinical picture, or in terms of the constellation of lab results you have received, you should always think first of an assay interference – one of which is biotin – before you think of really exotic reasons for this to have happened, such as TSH-secreting pituitary tumors.'*

The remedy is simple. Since biotin is water-soluble, it flushes out of your body fairly quickly. Simply avoid taking any biotin supplements at least a day or two before your thyroid test to ensure accurate results. Biotin does not actually alter your thyroid hormones, it only affects the test results, so it's not contraindicated for thyroid health in general.

## **Dietary Sources of Biotin**

Also, the concern with biotin altering test results refers to high-dose biotin supplements only, not food, and since biotin is readily found in many foods, this is your best bet if you believe you need more of it. That said, biotin supplements are, in and of themselves, quite safe, even at the mega-doses used in MS studies, which used upwards of 300 mg per day.

There are two forms of biotin found in food – free biotin (found in plants) and protein-bound biotin (found in protein-based animal foods). Your body can use either of these forms, but the free version is more readily absorbed as it does not need to be converted into a bioavailable form. Foods high in free biotin include:<sup>11,12</sup>

- Green peas
- Lentils
- Carrots
- Cauliflower
- Mushrooms

Protein-bound biotin is found in:

- Organic, free-range/pastured eggs yolks
- Organ meats such as liver and kidneys
- Dairy products such as milk, butter and cheese (ideally organic raw milk from grass fed cows)
- Seafood (just make sure it's low in mercury and other contaminants, and wild caught, not farmed)

Pastured egg yolk is one of the best sources of biotin, yet many warn against eggs, for the fact that the egg white contains avidin, a glycoprotein that binds to biotin. The idea is that eating egg whites could potentially lead to a biotin deficiency. However, cooking the egg white will deactivate the avidin, making this a non-issue. (Biotin, on the other hand, is unaffected by cooking.)

Moreover, if you consume the whole egg (both yolk and egg white) there is more than enough biotin in the yolk to compensate for the avidin binding, making biotin deficiency a highly unlikely outcome of eating eggs. On the other hand, if you regularly consume egg whites only (perhaps tossing the yolk for fear of cholesterol and fats), you really are putting yourself at risk for a biotin deficiency unless you eat a lot of other biotin-rich foods or take a biotin supplement.

So to be clear, I recommend eating the whole egg. Not only will this give you plenty of biotin, but **egg yolks** also contain valuable fats, cholesterol and protein needed for optimal health.

## Sources and References

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- <sup>1</sup> [The Daily Star February 21, 2016](#)
- <sup>2, 3</sup> [URMC.rochester.edu, Biotin](#)
- <sup>4, 12</sup> [Authority Nutrition, 7 Health Benefits of Biotin \(Archived\)](#)
- <sup>5</sup> [Medical Daily February 20, 2016](#)
- <sup>6</sup> [Journal of the Academy of Dermatology 1990 Dec;23\(6 Pt 1\):1127-32](#)
- <sup>7, 9</sup> [Business Wire April 21, 2016](#)
- <sup>8</sup> [Multiple Sclerosis News Today April 27, 2016](#)
- <sup>10</sup> [Endocrine News January 2016](#)
- <sup>11</sup> [Global Healing Center November 9, 2016](#)