Biotin Interference in Laboratory Tests

Introduction

The manufacturers of laboratory tests often utilise a method using biotin-streptavidin interaction to generate accurate quantification of small molecules. Biotin in blood or other samples taken from patients on high dose biotin supplements may cause inaccurate test results that can be falsely high or falsely low.

Biotin supplementation has recently increased due to its purported effects on hair, nails, and skin. It’s nowadays found in prenatal multivitamins and supplements at levels that may interfere with lab tests. Biotin at higher doses can be used by physicians in the treatment of certain disorders.

Over-the-counter products can contain biotin doses from 50μg in multivitamin supplements up to 10mg in biotin-only products. For microgram doses, the half-life is 1.8 hours whereas a dose of 100-300mg is 7.8-18.8 hours.

A high dose of biotin (>5mg per day) can interfere with a number of common immunoassay-based tests including: TSH, free T4, free T3 and TPO antibody and can cause spurious results. While most analytes show a negative bias some can cause positive bias.

Avoiding Spurious Results:

Ask if your patient is taking biotin before sending them for a blood test. (Figure below adapted from Roche information)

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Fig 1: Biotin, a B vitamin taken for hair and nail growth can interfere with blood tests
Interference in Immunoassays in the Laboratory & Dosage of Biotin Supplements

30-60mcg PER DAY

This dose of biotin unlikely to interfere

This is the concentration you are expected to see in multivitamin preparations sold over the counter. Interference due to biotin at this dose is unlikely to affect test results.

5-10mg PER DAY

This dose of biotin can interfere with laboratory tests and is usually found in hair and nail growth supplements

Many immunoassays using the biotin-streptavidin assays are likely to be affected. Please note that with serial measurements of high sensitivity troponin as well as other critical assays such as NT ProBNP and procalcitonin may still be used to manage patients. If in doubt contact your local laboratory for advice. It is important to document that the patient is taking biotin on the request form if the test cannot be done after withdrawing biotin for 8 hours in those patients taking more than 5mg daily. In patients with renal impairment blood may have to be taken 3 days after stopping biotin.

GREATER THAN 10mg PER DAY

High dose treatment is more likely to interfere

The dose of biotin is likely to interfere with most immunoassay based measurements. All immunoassay tests should only be done at least 8 hours after stopping biotin use but preferably 3 days, especially if patients have renal impairment.

- Include ‘on biotin therapy’ within the clinical notes section of the lab request form and the dosage if known.

- If the lab test result does not match the clinical presentation of your patient, and if the patient is known to take biotin supplements, consider interference and communicate this to your laboratory for advice on interpretation and further testing.