TEST

Beta-carotene blood test

A beta-carotene blood test measures beta-carotene in blood to help assess dietary intake, absorption, and nutritional status.

WHAT IT MEASURES
Beta-carotene, a plant pigment and vitamin A precursor

SAMPLE
Blood from a vein

FASTING NEEDED?
Sometimes-laboratories may require 8 to 12 hours

HOW LONG IT TAKES
About 5 to 10 minutes

RESULTS IN
Usually several days, varying by laboratory

USED FOR
Supporting diagnosis of deficiency or malabsorption

MAIN LIMITATION
Recent food and supplements can substantially change the result

Overview

A beta-carotene blood test measures the amount of beta-carotene in your blood. Beta-carotene is an orange-red pigment found in foods such as carrots, sweet potatoes, squash, spinach, and other dark green or orange vegetables.

Your body can convert beta-carotene into vitamin A, which supports vision, immune function, skin, and normal growth. However, beta-carotene and vitamin A are not the same measurement.

This specialised test may help assess whether you are eating and absorbing carotenoids normally. Results must be considered alongside your diet, symptoms, medical history, and other tests.

Why the test is ordered

The test may be ordered when a clinician is investigating possible malabsorption. This can

occur when the digestive system has difficulty absorbing fat, because beta-carotene is absorbed with dietary fat.

It may also help investigate a possible nutritional deficiency or unexpectedly high carotene level. High levels can follow heavy supplement use or eating large amounts of carotene-rich food.

The test may be repeated to monitor an absorption problem or change in nutrition. It is not enough by itself to diagnose vitamin A deficiency, digestive disease, or another condition.

Who should have the test

You may be offered this test if your symptoms, diet, or other laboratory results suggest that you are not absorbing nutrients normally. It can be part of an assessment for conditions affecting the small intestine, pancreas, bile system, or liver.

It may also be considered if your skin has developed a yellow-orange colour. Carotene-related colouring usually does not turn the whites of the eyes yellow, but appearance alone cannot identify the cause.

Most people do not need routine beta-carotene testing. If vitamin A deficiency is the main concern, a serum retinol test may be more informative.

How to prepare

Instructions differ between laboratories. Some require fasting for 8 to 12 hours, while others say fasting is preferred rather than essential.

Your instructions may include:

Some laboratories ask you to stop vitamin supplements for about 24 hours. Follow the instructions provided with your appointment. Do not stop prescribed medicines unless the clinician managing them tells you to.

Being well hydrated can make the blood draw easier.

- Drink only plain water while fasting
- Avoid beta-carotene, vitamin A, or multivitamin supplements beforehand
- Tell the testing team about prescribed medicines and supplements
- Avoid an unusually large carotene-rich meal before the test

What happens during the test

A healthcare professional cleans an area of skin, usually inside your elbow, and inserts a small needle into a vein. Blood is collected into a tube before the needle is removed and a dressing is applied.

The appointment generally takes 5 to 10 minutes. The needle is usually in place for less than a minute.

Because beta-carotene can break down when exposed to light, heat, or air, the laboratory may protect the sample from light before processing it.

Understanding your results

Your report will show your beta-carotene concentration and the laboratory's reference range. Units and methods differ, so use the range printed on your report.

A low result can occur with low dietary intake or reduced absorption of fat and carotenoids. It may also reflect problems with digestion, nutrient transport, or metabolism. A low value does not identify the cause or confirm vitamin A deficiency.

A high result is often related to carotene-rich foods or supplements. It may be associated with yellow-orange skin colouring called carotenemia. The result does not show whether a supplement is beneficial or safe.

Interpretation can vary with age, pregnancy, medicines, blood fat levels, and clinical context. Your result may be compared with tests for vitamin A, liver function, blood fats, or other nutrients.

What affects the results

Beta-carotene levels are sensitive to recent diet and supplement use. Important influences include:

Poor sample handling can produce a falsely low result. Light, heat, delayed processing, and repeated freezing and thawing can damage beta-carotene.

- Recent food: Carrots, sweet potatoes, pumpkin, squash, and leafy greens can raise the result
- Supplements: Beta-carotene, vitamin A, and multivitamins can have a substantial effect

- Fasting: A recent meal can change blood fats and carotene concentration
- Blood fat levels: Beta-carotene travels in lipoproteins, which carry cholesterol and other fats
- Digestive absorption: Conditions affecting the intestine, pancreas, or bile flow can lower absorption
- Medicines: Orlistat and some cholesterol-lowering medicines can reduce absorption of fat-soluble substances
- Smoking and alcohol use: These can affect carotenoid concentrations and metabolism
- Liver, thyroid, or kidney conditions: These may change carotene processing or transport
- Pregnancy: Changes in blood volume and fats can affect interpretation
- Hard exercise or dehydration: Fluid shifts may temporarily alter the concentration

Accuracy and limitations

Laboratories commonly use high-performance liquid chromatography or mass spectrometry to separate and measure beta-carotene.

There is no single figure for how often the test misses a problem or gives an abnormal result without disease. It is used for several clinical questions, and there is no universal disease cut-off.

Recent food or supplements may temporarily produce a normal result despite a nutritional or absorption problem. Low dietary intake, fasting differences, or altered blood fat levels may cause an abnormal result without malabsorption.

The test measures circulating beta-carotene, not tissue stores or how efficiently your body converts it into vitamin A.

If vitamin A status is the main concern, serum retinol may be a better starting test. If malabsorption is suspected, tests for possible causes-such as coeliac disease blood tests, stool tests, pancreatic tests, or imaging-may be more useful.

Risks and complications

A blood draw may cause brief discomfort, a small bruise, or light-headedness. Significant bleeding, infection, or nerve injury is uncommon.

What happens next

A result within the laboratory's range may need no further action, particularly if other results are reassuring.

A low or high result is usually handled through routine follow-up. Your clinician may review your diet, supplements, medicines, and fasting preparation or repeat the test under standard conditions.

Further tests may be considered if there is concern about vitamin A status or nutrient absorption. Do not start high-dose beta-carotene or vitamin A supplements based only on this test.

Contact the testing service promptly if the blood-draw site develops increasing redness, swelling, pain, or bleeding that does not settle with firm pressure. Seek emergency care for severe breathing difficulty, collapse, or another serious symptom rather than waiting for the result.

Common questions

Can I drink coffee before the test?

If told to fast, drink only plain water. Black coffee may not be allowed. Follow the laboratory's instructions.

Does the time of day matter?

There is no required time for every laboratory. Morning testing is often convenient when fasting is needed. For repeat tests, similar timing and preparation can make comparison easier.

Can I exercise beforehand?

Ordinary activity is unlikely to cause a problem. Avoid an unusually hard workout if possible because strenuous exercise and dehydration may temporarily change blood concentrations.

Can I take my medicines?

Prescribed medicines are usually continued. Report everything you take because some medicines affect fat or carotenoid absorption. Do not stop treatment without specific instructions.

Should I stop my vitamins?

Some laboratories ask you to avoid vitamin A, beta-carotene, or multivitamin supplements for about 24 hours. Follow the instructions supplied for your test.

How quickly will I get the result?

Testing may be performed in a specialised laboratory. Results commonly take several days, but timing varies and may be longer if the sample is sent elsewhere.

Sources

- Mayo Clinic Laboratories. Beta-Carotene, Serum: Test Catalog Overview and Specimen Instructions .
- ARUP Laboratories. Beta Carotene, Serum or Plasma: Test Directory .
- National Institutes of Health, Office of Dietary Supplements. Vitamin A and Carotenoids: Fact Sheet for Health Professionals .
- Grune T, Lietz G, Palou A, et al. "Beta-Carotene Is an Important Vitamin A Source for Humans." The Journal of Nutrition . 2010;140(12):2268S-2285S.
- Tanumihardjo SA. "Vitamin A: Biomarkers of Nutrition for Development." The American Journal of Clinical Nutrition . 2011;94(2):658S-665S.