TEST

Serum iron test

A serum iron test measures the amount of iron circulating in the liquid part of your blood.

WHAT IT MEASURES
Iron circulating in the liquid part of your blood

SAMPLE
Blood

FASTING NEEDED?
Sometimes, often for a morning sample

HOW LONG IT TAKES
About five minutes for the blood draw

RESULTS IN
Same day to two days, varying by laboratory

USED FOR
Investigating iron deficiency or overload within an iron panel

MAIN LIMITATION
Large changes with meals, timing, supplements, and illness

Overview

A serum iron test measures iron in the liquid part of your blood at the time the sample is taken. Most of this iron is attached to transferrin, a protein that carries iron around the body.

Your body needs iron to make haemoglobin. Haemoglobin is the part of red blood cells that carries oxygen. Iron is also used by muscles and enzymes.

Serum iron is not the same as your total amount of stored iron. The level can change during the day and after eating or taking an iron supplement. For this reason, the test is usually interpreted with other results rather than on its own.

Related tests may include ferritin, which reflects stored iron; transferrin or total iron-binding capacity, which measures the blood's ability to carry iron; and transferrin saturation, which estimates how much transferrin is carrying iron. A full blood count can show whether you have anaemia and what your red blood cells look like.

Why the test is ordered

A serum iron test may be ordered when symptoms, medical history, or another blood test suggests an iron problem. Possible reasons include investigating tiredness, weakness, pale skin, reduced exercise tolerance, or abnormal red blood cell results.

It may also form part of an assessment for:

Serum iron alone cannot confirm why a result is high or low. Its value comes from the pattern formed with ferritin, transferrin, transferrin saturation, and other findings.

- Suspected iron deficiency or iron-deficiency anaemia
- Possible iron overload
- Liver disease, inflammation, or long-term illness affecting iron results
- Monitoring after treatment for an established iron problem
- Possible iron tablet poisoning, as part of an urgent assessment

Who should have the test

You may have this test if a healthcare professional is investigating possible iron deficiency, anaemia, or excess iron. It may also be useful if you have a condition or treatment that affects how iron is absorbed, stored, lost, or carried in the blood.

Not everyone needs serum iron as a routine screening test. In many situations, ferritin and a full blood count provide more useful first information. The most suitable group of tests depends on your symptoms, health history, medicines, and earlier results.

Children or adults who may have swallowed too many iron tablets need urgent medical advice. Do not wait for a routine serum iron appointment or try to interpret the risk from symptoms alone.

How to prepare

Follow the instructions from the laboratory or healthcare service arranging the test. Preparation differs between laboratories.

You may be asked to have the sample collected in the morning and to avoid food for a set period beforehand. If fasting is required, you can usually drink plain water. A very long fast is not necessarily better because prolonged fasting can also affect serum iron.

Tell the person arranging the test about iron tablets, multivitamins containing iron, and recent intravenous iron treatment. These can raise the result. Do not stop prescribed iron or another

medicine unless you have been specifically told to do so.

Also mention a recent blood transfusion, pregnancy, current illness, and any difficulty following the fasting instructions. This information can help with interpretation or determine whether the test should be rescheduled.

What happens during the test

A healthcare worker places a small needle into a vein, usually on the inside of your elbow or the back of your hand. A small amount of blood is collected into a tube.

The blood draw usually takes about five minutes, although registration and waiting may take longer. You can normally leave and continue your day immediately afterward unless you feel faint.

If the test is being used after a possible iron overdose, the timing of the sample is important. This testing takes place as part of an urgent medical assessment rather than routine blood collection.

Understanding your results

Results may be reported in micrograms per decilitre or micromoles per litre. Use the reference range printed by the laboratory that processed your sample.

Ranges and interpretation vary by laboratory, age, sex, pregnancy status, medicines, and clinical context. A number slightly outside the range does not by itself establish a medical condition.

A low serum iron result can occur with iron deficiency. It can also occur during infection, inflammation, long-term illness, or changes in the proteins that carry iron. A single low result therefore does not prove that your iron stores are low.

A high result may occur after an iron-containing meal or supplement. It can also be seen with excess body iron, some liver conditions, increased breakdown of red blood cells, or recent iron treatment or transfusion.

Other results help explain the pattern. For example, a low ferritin often supports depleted iron stores. Ferritin can rise during inflammation, however, so a result within range may not always exclude iron deficiency. Transferrin saturation is often more useful than serum iron alone when investigating excess iron.

What affects the results

Serum iron has substantial natural variation. A result may change without a laboratory error or a meaningful change in your overall iron stores.

Important influences include:

Age, sex, menstrual blood loss, and medicines also affect how the result should be interpreted. Heavy menstrual bleeding generally changes iron stores over time rather than causing a predictable immediate change in serum iron.

A damaged blood sample in which red blood cells have broken open is called a haemolysed sample. This can interfere with some laboratory methods. The laboratory may report the limitation or request another sample.

- Time of day: Levels may be different in morning and later samples
- Food and fasting: Recent meals and prolonged fasting can alter the result
- Iron supplements: Tablets, multivitamins, injections, or infusions can raise it
- Recent transfusion: Donor red cells can change iron-related measurements
- Inflammation or infection: These can lower circulating iron while ferritin rises
- Pregnancy and oestrogen medicines: These change transferrin and blood volume
- Liver or kidney disease: These may alter iron handling and carrying proteins
- Red blood cell turnover: Bleeding, haemolysis, or recovery after anaemia can change the pattern

Accuracy and limitations

Laboratories can measure the iron present in a particular sample accurately. The larger problem is that the amount in the sample may not represent your stored iron or usual level.

The test can miss iron deficiency when serum iron is temporarily normal, such as after eating or taking a supplement. It can also suggest iron deficiency when circulating iron is low because of inflammation even though iron stores are not depleted. There is no single reliable "miss" or "false alarm" rate because accuracy changes with the reason for testing, the cut-off used, and the other tests included.

Ferritin is generally a better measure of iron stores. A full blood count helps identify anaemia, while transferrin saturation can be more informative when excess iron is suspected. If inflammation may be affecting ferritin, additional blood tests and the overall clinical picture are

needed.

Serum iron is also not the best test for confirming inherited haemochromatosis. Persistently abnormal transferrin saturation and ferritin may lead to repeat testing or, in selected situations, genetic testing.

Risks and complications

A blood draw may cause brief discomfort, a small bruise, or minor bleeding where the needle entered. Some people feel light-headed or faint, but serious complications are uncommon.

What happens next

Your result is usually reviewed alongside your full blood count, ferritin, transferrin or total iron-binding capacity, and transferrin saturation. A repeat morning or fasting sample may be suggested if preparation, supplements, illness, or timing could have affected the first result.

Routine follow-up may include discussing diet, blood loss, medicines, digestive symptoms, menstrual bleeding, pregnancy, or previous transfusions. Further testing should be guided by the whole pattern rather than serum iron alone.

Seek urgent medical help if someone may have swallowed too many iron tablets. Emergency assessment is also appropriate for severe breathlessness, chest pain, fainting, vomiting blood, or black tar-like stools, especially when these symptoms are new or worsening. These symptoms should not wait for a routine test result.

Common questions

Can I drink coffee before a serum iron test?

If you have been told to fast, drink only plain water unless the laboratory says otherwise. Coffee, including black coffee, may break the laboratory's fasting instructions.

Does the time of day matter?

Yes. Serum iron can change during the day, although the pattern is not identical for everyone. Morning collection is often used to make repeat results easier to compare.

Can I exercise beforehand?

Ordinary activity is unlikely to prevent testing. Strenuous exercise can affect hydration, inflammation, and red blood cell turnover, so avoid an unusually hard workout if the laboratory

has asked for a standardised morning sample.

Should I take my iron tablet before the test?

Iron tablets can temporarily increase serum iron. Ask the service arranging the test when to take your dose, and do not stop prescribed treatment without specific instructions.

Can I have the test during my period?

Yes. However, regular or heavy menstrual bleeding can reduce iron stores over time and is important information when your results are interpreted.

Why was my serum iron normal when my ferritin was low?

Serum iron changes quickly with meals, supplements, and time of day. Ferritin reflects stored iron more closely, so depleted stores can be present even when one serum iron result is within range.

Sources

- MedlinePlus Medical Test: Iron Tests - US National Library of Medicine
- Mayo Clinic Laboratories: Iron, Serum - test collection and interpretation information
- ARUP Consult: Iron Deficiency Anemia - laboratory testing guidance
- World Health Organization: Guideline on Use of Ferritin Concentrations to Assess Iron Status - 2020
- British Society of Gastroenterology Guidelines for the Management of Iron Deficiency Anaemia in Adults - Gut , 2021
- European Association for the Study of the Liver Clinical Practice Guidelines on Haemochromatosis 00211-21/fulltext) - Journal of Hepatology , 2022