TEST

Schilling test

The Schilling test is an older urine test used to investigate why vitamin B12 is not absorbed normally.

WHAT IT MEASURES
Urinary excretion of swallowed radiolabelled vitamin B12

SAMPLE
Urine

FASTING NEEDED?
Sometimes, according to the laboratory protocol

HOW LONG IT TAKES
Dosing visit plus a 24-hour urine collection

RESULTS IN
Several days; timing varies by laboratory

USED FOR
Diagnosing the cause of vitamin B12 malabsorption

MAIN LIMITATION
Kidney function and incomplete urine collection can falsely lower results

Overview

The Schilling test is a historical test of vitamin B12 absorption. It measures how much swallowed vitamin B12 appears in your urine after you receive a small dose labelled with radioactive cobalt.

Vitamin B12 needs several steps to move from food into the bloodstream. In the stomach, it attaches to intrinsic factor, a protein made by stomach cells. The pair is then absorbed in the last part of the small intestine, called the terminal ileum.

During the test, an injection of unlabelled vitamin B12 is also given. This fills the body's immediate storage capacity, allowing more of the swallowed, labelled vitamin to pass into the urine. Your urine is collected, usually for 24 hours, and tested for radioactivity.

The Schilling test is now rarely available. Many countries have stopped using it because it involves radioactive material, requires an accurate urine collection, and does not always identify the cause reliably. Blood tests and investigations aimed at particular causes have largely replaced it.

Why the test is ordered

Historically, the test was ordered after vitamin B12 deficiency had been found. Its purpose was not to confirm the deficiency itself, but to investigate why absorption was reduced.

The test could help separate:

Pernicious anaemia is an autoimmune condition in which the immune system damages stomach cells or interferes with intrinsic factor. Without enough working intrinsic factor, vitamin B12 cannot be absorbed normally.

Modern assessment may instead include blood tests for intrinsic factor antibodies, review of medicines and surgery, testing for coeliac disease, and sometimes endoscopy or bowel imaging. The most suitable approach depends on your results and medical history.

- Lack of intrinsic factor, as occurs in pernicious anaemia
- Disease or removal of the terminal ileum
- Other forms of intestinal malabsorption
- Less common causes, such as bacterial overgrowth or pancreatic disease

Who should have the test

The Schilling test is not used for routine vitamin B12 screening. It is also not usually needed simply because a blood test shows a low or borderline vitamin B12 level.

Today, very few people are offered the test because the labelled vitamin is not widely available. If it is proposed, it is generally because a specialist centre is investigating suspected vitamin B12 malabsorption and believes the result could change management.

The test is generally avoided during pregnancy because it uses radioactive material. Breastfeeding also requires specific advice about radiation precautions. Kidney disease or difficulty completing a timed urine collection may make the result hard to interpret.

How to prepare

Follow the instructions from the facility performing the test. Historical protocols differ, particularly over how long you should avoid food before and after swallowing the labelled vitamin. Some require fasting overnight.

Tell the testing team if you:

Do not stop medicines or supplements unless the testing service specifically tells you to. Some affect vitamin B12 absorption, but stopping them may be unnecessary or unsafe.

You will usually receive a collection container and written instructions. Ask what to do if any urine is missed, spilled, or passed during a bowel movement.

- Are pregnant, might be pregnant, or are breastfeeding
- Have kidney disease or problems passing urine
- Have diarrhoea, vomiting, or difficulty collecting all your urine
- Have had stomach or bowel surgery
- Take vitamin B12 tablets or receive vitamin B12 injections
- Take metformin, acid-suppressing medicines, antibiotics like amoxicillin or doxycycline , or other regular medicines

What happens during the test

First, you swallow a small dose of vitamin B12 labelled with a radioactive form of cobalt. You then receive a larger injection of ordinary, unlabelled vitamin B12 into a muscle.

You collect your urine for a set period, commonly 24 hours. A typical collection begins by emptying your bladder and recording the time without saving that first urine. After that, you collect every urination, including the final one at the stated finishing time. Use the exact instructions supplied by the laboratory.

The container may need to be kept cool. The testing service will explain storage and handling because the urine contains a small amount of radioactive material.

If too little labelled vitamin B12 appears in the urine, the test may be repeated with intrinsic factor. Improved absorption during this repeat stage historically supported a diagnosis of pernicious anaemia.

Some older versions included further stages using antibiotics or pancreatic enzymes. These were intended to investigate bacterial overgrowth or reduced pancreatic function, but protocols were not consistent.

Understanding your results

The report usually states the proportion of the swallowed labelled vitamin B12 recovered in the timed urine collection.

A result within the laboratory's expected range suggests that the labelled vitamin was absorbed and then excreted through the kidneys. A low result may suggest poor absorption, but it can also occur when the urine collection is incomplete or kidney function is reduced.

If an initially low result becomes normal when the test is repeated with intrinsic factor, this suggests that lack of working intrinsic factor contributed to the poor absorption. If the result remains low, another intestinal or digestive cause may be considered.

Ranges and interpretation vary by laboratory, test protocol, age, sex, pregnancy status, medicines, kidney function, and clinical context. The result should be considered alongside blood counts, vitamin B12 measurements, symptoms, medical history, and other tests.

What affects the results

The Schilling test depends on several steps working correctly. A problem at any step can produce a low number without proving intestinal malabsorption.

The most important influences include:

A recent blood transfusion does not usually change urinary recovery of the labelled dose directly. However, it can affect related blood results, including the blood count, and may complicate the overall assessment.

- Incomplete urine collection: Missing even one sample can make excretion appear lower than it was.
- Kidney function: Labelled vitamin B12 must pass through the kidneys into urine. Reduced kidney function can cause a falsely low result.
- Urine output and hydration: Very low urine output may interfere with collection and interpretation.
- Vomiting or diarrhoea: Vomiting may remove the oral dose, while rapid intestinal transit may change absorption.
- Stomach or bowel surgery: This can genuinely alter vitamin B12 absorption and affects how the result is interpreted.
- Medicines: Metformin, long-term acid suppression, colchicine, neomycin, and some other medicines may reduce vitamin B12 absorption through different mechanisms.
- Vitamin B12 treatment: Recent tablets or injections may affect the wider assessment of deficiency, although the test uses a specially labelled dose.

- Timing errors: Starting late, finishing early, or using the wrong container can make the result unreliable.

Accuracy and limitations

The Schilling test can show that little labelled vitamin B12 reached the urine, but it cannot always identify why. A low result may reflect poor absorption, reduced kidney excretion, or an incomplete urine collection.

The test can therefore say absorption is abnormal when it is actually normal. It may also miss partial or intermittent malabsorption, particularly when the swallowed dose or protocol does not reflect everyday vitamin B12 absorption.

Repeating the test with intrinsic factor can help identify intrinsic factor deficiency, but correction is not absolute proof of pernicious anaemia. Failure to correct does not identify one specific alternative cause. Repeat stages also introduce more opportunities for collection and timing errors.

Reliable figures for how often the Schilling test misses a cause or gives a false result are not available across all versions of the test. Different radioactive labels, doses, collection times, and interpretation thresholds were used.

A targeted test is often better. Intrinsic factor antibody testing may support pernicious anaemia, while coeliac blood tests, endoscopy, imaging, or tests for intestinal inflammation may be more useful when another digestive disorder is suspected. No single replacement test answers every question.

Risks and complications

The radioactive exposure is small, but it is one reason the test has been discontinued in many places. Special precautions may be needed during pregnancy or breastfeeding.

The vitamin B12 injection can cause brief discomfort, a small bruise, or light-headedness. Serious reactions are uncommon. Collecting urine itself is not painful.

What happens next

A normal result may lead to a review of whether the original vitamin B12 result was accurate and whether diet, medicines, or another condition explains it.

A low result usually needs confirmation and interpretation rather than immediate conclusions. Routine follow-up may include repeat blood tests, intrinsic factor antibody testing, assessment of kidney function, or tests for stomach and bowel conditions.

Vitamin B12 treatment should not normally be delayed when deficiency is clinically important, especially if there are neurological problems such as numbness, weakness, balance changes, or memory difficulties. Treatment can begin while the cause is being investigated.

Seek urgent medical assessment for new or rapidly worsening weakness, trouble walking, confusion, fainting, chest pain, or severe shortness of breath. These symptoms are not caused by the Schilling test itself, but they may need prompt evaluation.

Common questions

Can I drink coffee before a Schilling test?

Not if your protocol requires fasting. Coffee, including black coffee, may count as breaking the fast. Follow the laboratory's instructions; water is often allowed, but this should be confirmed.

Does the time of day matter?

The exact start time matters because the urine collection must cover the full stated period. Starting in the morning often makes a 24-hour collection easier, but the laboratory may use a different schedule.

Can I exercise beforehand?

Ordinary activity is unlikely to alter vitamin B12 absorption directly. Avoid exercise that could leave you dehydrated or make it difficult to complete the urine collection.

Can I take my vitamin B12 supplement?

Ask the testing service. Do not stop prescribed vitamin B12 on your own, particularly if it was started for neurological symptoms or significant deficiency.

What if I miss some urine?

Tell the laboratory. Even one missed sample can falsely lower the result. You may need to restart the collection rather than submit an incomplete sample.

Is the Schilling test still available?

Usually not. Access differs between countries and specialist centres, but the radioactive form of vitamin B12 is no longer routinely supplied in many places.

Sources

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