TEST

Alpha fetoprotein

An alpha-fetoprotein test measures a protein used in pregnancy screening and cancer care

WHAT IT MEASURES
Alpha-fetoprotein, a protein produced mainly by a developing baby's liver

SAMPLE
Blood

FASTING NEEDED?
No

HOW LONG IT TAKES
About five minutes for the blood draw

RESULTS IN
Usually a few days; laboratory turnaround differs

USED FOR
Screening, supporting diagnosis, and monitoring

MAIN LIMITATION
Cancer and noncancerous conditions can both raise AFP

Overview

Alpha-fetoprotein, usually shortened to AFP, is a protein produced in large amounts by a developing baby's liver and yolk sac. Only small amounts are normally present in the blood of most healthy adults.

An AFP blood test has two main roles. During pregnancy, it can help estimate the chance of certain fetal conditions. Outside pregnancy, it is used as a tumour marker-a substance that can rise with some cancers or other medical conditions.

AFP cannot diagnose cancer or a fetal condition by itself. Its meaning depends on why it was measured, your age, whether you are pregnant, your health history, and how the result changes over time.

Why the test is ordered

During pregnancy, AFP may be included in second-trimester screening. It can help assess the

chance of open neural tube defects, such as spina bifida, and abdominal wall defects. It may also form part of a screening calculation for chromosome conditions.

Outside pregnancy, AFP may be ordered to:

Germ cell tumours begin in cells that normally form eggs or sperm. They most often develop in the testicles or ovaries, although they can occur elsewhere.

Some liver surveillance programmes use AFP with an ultrasound scan. AFP should not replace imaging because many liver cancers do not produce a high AFP level.

- Help assess a possible liver or germ cell tumour
- Monitor treatment for a cancer known to produce AFP
- Check for cancer returning after treatment
- Support liver cancer surveillance in selected people at higher risk

Who should have the test

You may be offered AFP screening during pregnancy, usually as part of a wider prenatal screening programme. The timing and tests offered differ between healthcare systems.

You may also need the test if scans, symptoms, or another examination suggest a possible liver or germ cell tumour. It is commonly measured before treatment when one of these cancers has been diagnosed, then repeated to follow the response.

People with cirrhosis or certain long-term hepatitis B infections may be offered regular liver cancer surveillance. Whether AFP is included depends on the surveillance programme and your individual risk.

AFP is not a useful general cancer screening test for people without a specific risk or clinical reason. A raised result is not specific enough to show where a problem is or what caused it.

How to prepare

You can usually eat and drink normally. Fasting is not required, and prescribed medicines can generally be taken as usual.

Tell the healthcare professional arranging the test if you:

Do not stop medicines or supplements unless your healthcare professional gives you specific instructions. Biotin can interfere with some laboratory testing methods, but the effect depends on the particular assay used.

- Are pregnant or could be pregnant
- Take biotin supplements, especially high-dose products
- Have liver disease or recently had liver treatment
- Are receiving treatment for cancer
- Recently had another AFP test at a different laboratory

What happens during the test

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

The blood draw itself usually takes less than five minutes. You can normally leave immediately and return to your usual activities.

For pregnancy screening, the laboratory combines the AFP result with information such as the stage of pregnancy. Other screening results and personal details may also be included in the calculation.

Understanding your results

AFP may be reported as a concentration, often in nanograms per millilitre. Pregnancy screening commonly reports it as a multiple of the median, or MoM. This compares your result with the expected middle value at the same stage of pregnancy.

Reference ranges and interpretation vary by laboratory, age, sex, pregnancy status, medicines, and clinical context. Use the range printed on your report rather than comparing your number with an online range.

A raised AFP level outside pregnancy can occur with liver cancer or some germ cell tumours. It can also rise with noncancerous liver inflammation, liver injury, or cirrhosis. One raised result does not establish a diagnosis.

A normal result does not completely exclude cancer. Some cancers produce little or no AFP.

During pregnancy, a higher-than-expected AFP result can be linked to incorrect pregnancy dating, more than one baby, or certain fetal conditions. A lower result may contribute to a screening estimate for some chromosome conditions. Either result requires interpretation with the rest of your screening information.

Trends often matter more than one measurement. Falling AFP during cancer treatment may

suggest that treatment is working. AFP that stays elevated or rises may lead to further assessment, but scans and other tests are needed to understand why.

What affects the results

Several factors can change AFP without a laboratory mistake.

In pregnancy, the exact gestational age is especially important because AFP changes as pregnancy progresses. A pregnancy dated even slightly differently may produce a different screening interpretation. Twins or other multiple pregnancies also produce more AFP than a single pregnancy.

Maternal weight, diabetes, and some pregnancy complications can affect the screening calculation. Laboratories may adjust for relevant factors, but methods are not identical everywhere.

Age matters. Newborn babies naturally have much higher AFP levels than adults, and the level falls after birth. Children therefore need age-specific interpretation.

Active liver inflammation or regeneration can raise AFP without cancer. This may occur with hepatitis, cirrhosis, or recovery from liver injury.

The timing of cancer treatment matters as well. AFP takes time to fall after a tumour is removed or successfully treated. Testing too soon may not show the full change.

Different laboratory methods can give slightly different numbers. Rarely, antibodies in the blood can interfere with an assay and produce a misleading result. High-dose biotin may affect certain test systems.

Ordinary meals, coffee, time of day, and routine exercise do not usually have an important effect on AFP. Few medicines directly change AFP, although your full medicine and supplement list still helps with interpretation.

Accuracy and limitations

AFP is not accurate enough to diagnose a condition on its own.

In liver cancer, some tumours produce AFP while others do not. This means the test can miss cancer when AFP remains normal. It can also suggest cancer when the true cause is hepatitis, cirrhosis, or another noncancerous liver condition. Ultrasound and, when needed, contrast-enhanced CT or MRI provide more direct information.

For germ cell tumours, AFP is useful for certain nonseminomatous tumours but not all tumour

types. A pure seminoma should not produce AFP. Imaging, other markers such as beta-human chorionic gonadotropin, and examination of tissue may be needed for diagnosis.

Pregnancy AFP screening finds increased chances rather than confirming a fetal condition. It can miss some affected pregnancies, and many abnormal screening results are not caused by a fetal disorder. A detailed ultrasound is usually the more direct next test. Amniocentesis may sometimes provide further information.

Results from different laboratories may not be directly interchangeable. When AFP is being followed over time, using the same laboratory and method can make the trend easier to interpret.

Risks and complications

The main risks are a small bruise or soreness where the needle entered. Some people feel briefly light-headed or faint during a blood draw.

What happens next

A result within the laboratory's expected range may need no further action, although planned surveillance or monitoring usually continues on schedule.

An unexpected result is often repeated before conclusions are made. Your healthcare professional may compare it with earlier values and arrange liver blood tests, other tumour markers, an ultrasound, or another scan.

After an abnormal pregnancy screening result, the next steps may include confirming the pregnancy dates and performing a detailed ultrasound. You may also be offered a discussion with a fetal medicine or genetics specialist. Screening results are not a diagnosis.

A high AFP result by itself is not usually an emergency. Arrange routine follow-up so the result can be interpreted in context.

Seek urgent maternity advice for heavy bleeding, severe abdominal pain, leaking fluid, or a marked reduction in fetal movements after you normally feel them. Seek emergency help for collapse, sudden confusion, vomiting blood, or black, tar-like stools, particularly if you have significant liver disease.

Common questions

Can I drink coffee before an AFP test?

Yes. Coffee does not usually affect AFP, and fasting is not required unless you are having another test that needs it.

Does the time of day matter?

No. AFP does not usually need to be collected at a particular time.

Can I exercise beforehand?

Normal exercise is unlikely to change the result. You can usually continue your normal activities before and after the blood draw.

Does a high AFP result mean I have cancer?

No. Liver inflammation, cirrhosis, pregnancy, and other noncancerous conditions can raise AFP. Cancer can only be assessed using the result alongside scans, examination, and sometimes a biopsy.

Why might my AFP test be repeated?

Repeating the test can confirm an unexpected result and show whether the level is rising, stable, or falling. A trend is often more useful than one measurement.

When is AFP tested during pregnancy?

It is generally measured during the second trimester, often between 15 and 20 weeks. The exact timing and type of screening offered differ between healthcare systems.

Sources

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- National Cancer Institute: Tumor Markers
- Mayo Clinic Laboratories: Alpha-Fetoprotein Tumor Marker, Serum