

NIH News in Health

National Institutes of Health • Department of Health and Human Services • newsinhealth.nih.gov

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Beyond Basic Blood Tests A Window Into Your Health

Blood courses through your body with every heartbeat. It carries life-giving oxygen to every organ. Blood also helps remove the waste products your body makes. Because it flows to and from every part of the body, blood can provide an important window into what's happening under the skin.

“So many biochemical compounds get absorbed from the tissues of the body into the blood. This makes the blood a really good place to look for hints of disease,” says Dr. Lori Minasian, who helps oversee cancer prevention research at NIH.

Blood tests can help your health care provider diagnose diseases. They can also help them choose the best treatments for many health conditions. Commonly used blood tests look for compounds that signal an increased risk of heart disease. Other tests help diagnose diabetes, vitamin deficiencies, and many types of infections.

Blood tests have been helpful for preventing some common, danger-



ous health events, like heart attack and stroke. NIH-funded researchers are working to expand the number of health conditions that can be detected with a simple blood test. These include cancer, **dementia**, and other deadly diseases.

Tracking Cancer • Like normal cells in the body, cancer cells also come into regular contact with blood. This means that substances from tumors, like pieces of **genes** or even whole cancer cells, can get into the bloodstream.

Researchers have developed tests to look for such substances in the blood. These are called liquid biopsies. These tests are already used for some types of cancer to monitor whether a tumor comes back after treatment, Minasian says. Scientists are also looking at whether these tests can identify which tumors may need more aggressive treatment to prevent them from returning.

Blood tests might one day be used for cancer screening, too. Screening tests aim to catch cancer early—before symptoms develop. Cancers found early are often easier to treat. This can save lives.

Some cancer screening tests are already available through your doctor. These include mammograms for breast cancer and colonoscopy for colorectal cancer. But neither are as simple to do as a blood test.

Many types of cancer still don't have screening tests available. More than half of cancer deaths are from cancers that don't have screening tests yet. These include deadly cancers like ovarian cancer and pancreatic cancer.

“The idea that, with a single blood test, you could screen for many deadly cancer types, has huge potential,” says Minasian.

The usefulness of blood tests for cancer screening is still in the early research stages. Right now, there's limited evidence for any benefits. Despite this, blood tests for cancer screening are marketed directly to consumers. People should be very careful about using these tests right now, Minasian cautions.

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Definitions

Dementia

Loss of thinking, memory and reasoning skills that seriously affects your ability to carry out daily activities.

Genes

Stretches of DNA you inherit from your parents that define features, like your risk for certain diseases.

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“There is not enough data to understand the full risks and benefits of using these blood tests for cancer screening,” she says. “The results could lead to anxiety or may provide a sense of false reassurance.”

If you’re concerned about your cancer risk, talk with a health care provider. They can help you stay up to date with proven screening tests.

Detecting Alzheimer’s Disease •

Like your body, your brain is full of blood vessels. So substances from injured brain cells can also enter your blood.

For decades, researchers have been trying to develop blood tests to help diagnose and better treat mental health conditions, explains Dr. John Hsiao, a psychiatrist at NIH. But, this has proven difficult.

Blood tests to determine whether someone is at risk for dementias are showing promise, Hsiao says. The proteins that damage brain cells in these conditions are now well understood. This means they can be measured.

The most common cause of dementia in older adults is Alzheimer’s disease. Measuring Alzheimer’s

disease proteins currently requires a brain scan or collecting spinal fluid. These tests can be costly and aren’t available in every community.

“But these abnormal proteins that build up in the brain also show up in the blood,” says Dr. Reisa Sperling, a neurologist at Harvard Medical School. Blood tests for Alzheimer’s have the potential to be “cheap and easy,” Hsiao adds.

Recent studies have shown that blood tests can detect early signs of Alzheimer’s disease in the brain. So researchers are looking at whether they can use them to find and treat people with the disease early. They hope this could help prevent or slow the loss of brain cells.

“Studies so far suggest that our best chance at being able to delay the memory loss and other symptoms of Alzheimer’s disease would be to treat very early,” Sperling says. But she does not recommend people without symptoms get blood tests done outside of studies just yet.

Some blood tests that claim to detect Alzheimer’s disease are being advertised to the public. But they are not yet FDA approved. Sperling warns that some of these tests may not be as accurate as those being used by researchers.

If you’re concerned about your risk for dementia, Sperling recommends joining a clinical study. “There are great research trials for people to go into, and they will use the best blood tests available,” she says. To learn more, visit go.nih.gov/NIHNiHJun2024Alzheimers or www.actcinfo.org.

Researchers are also trying to develop blood tests to detect other causes of dementia and brain conditions like Parkinson’s disease.

“These tests have the potential to really change how we diagnose and understand these conditions,” Hsiao says.

Stay Up To Date • It may be a while before a blood draw at your local clinic can find diseases like cancer or dementia. But keeping up with current blood tests can help you get early treatment for other potentially life-threatening problems. See the Ask Your Doctor box for more. ■



Ask Your Doctor

What Blood Tests Do I Need?

Depending on your age and other factors, your health care provider may order tests that measure:

- **Blood glucose (sugar):** To help diagnose diabetes or see whether you’re at risk for diabetes.
- **Blood lipids (fats):** To assess your risk for heart disease and related conditions. These tests measure levels of lipids called cholesterol and triglycerides.
- **Blood cell counts:** To help diagnose many diseases, including infections, cancer, and bleeding disorders. These tests measure the types of cells that carry oxygen and fight diseases.
- **Organ function:** To make sure organs like your liver, kidneys, and heart are working properly.
- **Specific blood-borne diseases:** To look for diseases like HIV and hepatitis C, which may not cause symptoms until after they’ve started to damage the body.
- **Vitamin deficiencies:** To measure levels of vitamins in the body. These aren’t usually recommended for healthy people. But if you have symptoms of some health conditions, your doctor may order tests to look for low levels of some vitamins.

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Web Links

For more about blood tests and health, see “Links” in the online article: newsinhealth.nih.gov/2024/06/beyond-basic-blood-tests

The Mighty Fruit Fly

Pesky Insects Give Clues to Our Health

Fruit flies can be a major nuisance. How can you help but be annoyed when they hover in swarms over fruits, around picnics, and in garbage? But before you give them a swat, take a moment to be thankful for the common fruit fly. These pests have given scientists surprising insights into how the human body works.

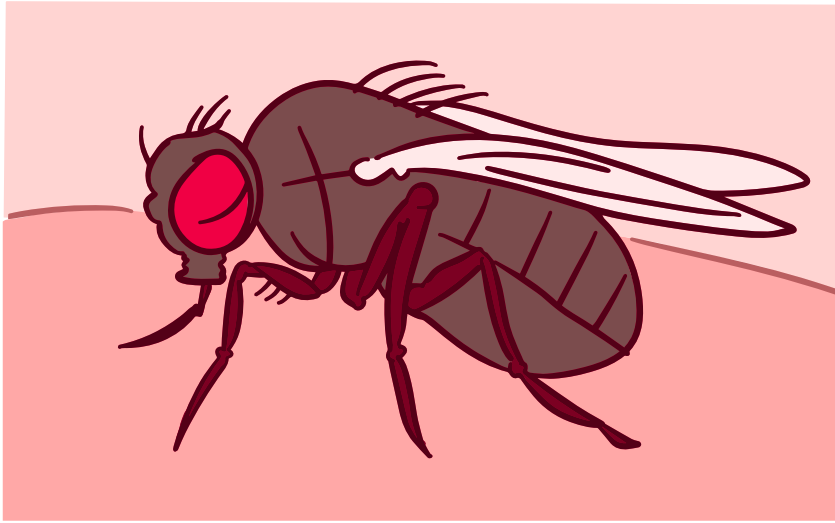
Studying flies might seem unrelated to human health. After all, we don't have wings, six legs, or antennae. And flies lack a backbone. But the underlying biological processes—like the activities of cells, molecules, and genes—are often similar.

“About 75% of human disease genes have counterparts in flies. So things we learn in flies will very often be relevant to humans,” says Dr. Kim McCall, who studies fruit flies at Boston University.

Over the years, experiments with flies have shed light on several types of cancer, diabetes, addiction, and many other aspects of human health. At least six Nobel Prizes have gone to scientists for their studies of flies.

One advantage of studying fruit flies is that they grow from egg to adult in only two weeks, so it's easy to study several generations. Dozens of fruit flies can live comfortably in small vials, eating only corn meal, sugar, and a little yeast. So they're inexpensive to care for. Research labs can readily house many thousands of flies.

Another advantage of flies is that their genes are easy to examine and modify. Scientists can add or remove specific genes in flies to learn more about how the genes work and what they do. By studying flies,



Some fruit fly researchers seem to have a sense of humor when it comes to naming genes. Many seem to enjoy puns. “Fly gene names can be very strange,” McCall says. See the Wise Choices box for some examples.

We humans owe a debt of gratitude to fruit flies and the discoveries they've enabled.

But apparently our appreciation can only go so far.

“The number one question I get asked by the public is: How do you get rid of them?” McCall says. “The answer is apple cider vinegar and a few drops of dish soap.” But scientists appreciate having these pesky insects around. ■

for example, one NIH-supported research team discovered more than 40 genes that cause rare genetic diseases in humans.

McCall and her colleagues analyze genes that affect cell death and the tiny trash-collecting machinery that clears away dead cells. “We have billions of cells in our body that die every day as part of normal turnover,” she says. “When they die, these cells also need to be removed. And if they're not removed properly, that can trigger problems.”

McCall's research found that when dead cells build up, nerve cells can break down and holes can develop in the fly brain. Her team is working to better understand this process. Their findings could give new insights into Alzheimer's and related diseases in people.

“Human and fly brains both have different kinds of nerve cells. They also have similar types of support cells that carry out similar functions, including cell death,” McCall says. “There are a lot of similarities in how nerve cells communicate with each other.”



Wise Choices

Punny Fly Genes

Some fly genes have fanciful names. But silly names don't diminish the importance of genes for understanding biology.

Abnormal glitches in the:

- *Dachshund* gene can produce flies with extra-short legs.
- *Ken and Barbie* gene can lead to flies that lack external genitals.
- *Tinman* gene can produce flies that have no heart.
- *Van Gogh* gene can lead to swirly hairs on the fly's back.



Web Links

For more about fruit fly research, see “Links” in the online article: newsinhealth.nih.gov/2024/06/mighty-fruit-fly



Health Capsules

For links to more information, please visit our website and see these stories online.

Green Spaces May Improve Kids' Mental Health

Mental health problems affect millions of children in the U.S. Some studies have found that people with access to parks and other green spaces tend to have better moods and a lower risk of mental disorders. But few studies have looked at whether this is true in children.

Researchers studied more than 2,000 kids born between 2007 and 2013. The children came from nearly 200 counties across 41 states. Parents used checklists to report on their children's mental health symptoms. The researchers used satellite

imagery to estimate how much green space was near each child's home.

The scientists found that kids ages 2 to 5 who lived near green areas had fewer mental health symptoms. For some symptoms, like anxiety or depression, the links were strong after accounting for other factors, like parent education or neighborhood socioeconomic status. For other behaviors, like aggression and rule breaking, the links weren't strong after considering these factors.

In older children, ages 6 to 11, no relationships were found between

green spaces and mental health.

This may be because kids in this age range spend more time at school and less at home.

"Our research supports existing evidence that being in nature is good for kids," says Dr. Nissa Towe-Goodman of the University of North Carolina at Chapel Hill, who led the team of researchers from NIH's Environmental Influences on Child Health Outcomes (ECHO) Program. "It also suggests that the early childhood years are a crucial time for exposure to green spaces." ■

Spirituality in Cancer Care and Serious Illness

Spirituality and religion can help many patients and families cope with difficult diseases like cancer. Spirituality is related to the way you look at the world and how you make sense of your place in it. It can include faith, religion, beliefs, values, and reasons for being.

The links between spirituality, religion, and health are not well understood. Yet, it often influences important decisions, including end-of-life care. Some research suggests

that spiritual and religious practices can support a positive attitude. That can help patients and caregivers feel better. Spiritual or religious well-being may also reduce anger and discomfort. It can decrease alcohol and drug abuse. And it may reduce blood pressure and heart disease risk. Spiritual well-being may also boost inner peace and freedom from regret.

It helps the medical team if patients or family bring up any spiritual

issues that are on their mind. Many hospitals have someone who can give support to people of different faiths, as well as those who aren't religious at all. You could also ask your health care team about local experts or organizations that help patients with serious illness and survivors.

To learn more about spirituality in cancer care and serious illness, visit www.cancer.gov/about-cancer/coping/day-to-day/faith-and-spirituality. ■



Featured Website

How Medications and Supplements Interact

go.nih.gov/NIHNIHJun24SupplementInteractions

Did you know that taking medications and dietary supplements at the same time can be harmful? It's important to tell your health care providers about all the drugs and

supplements you take. Learn how to avoid problems at this website. You can also test your knowledge about how medications and supplements may interact.

Know the Science: How Medications and Supplements Can Interact

Introduction

Talk With Your Health Care Providers

Some Supplements May Increase the Effects—and Side Effects—of Medications

Some Supplements May Decrease the Effects of Medications

Interactions With Over-the-Counter Medications

Some Medication-Supplement Interactions Can Be Serious

Tips on Reading Supplement Labels

Introduction

Many Americans take dietary supplements along with prescription or over-the-counter medications.

Sometimes, taking medications and supplements together may have unintended effects, including:

- Increasing the medication's effects
- Decreasing the medication's effects

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