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Understanding Autoimmune Diseases

When Your Body Turns Against You

Your body's disease defense system, called the immune system, goes to battle every day. It helps keep you healthy by fighting off viruses and bacteria that sneak into your body. But sometimes, your immune system makes mistakes. If it sees your body's healthy cells as a threat, it may attack them. This can cause an autoimmune disorder.

There are many different autoimmune diseases. Some involve only one type of tissue. For example, in a disease called vasculitis, your immune system attacks your blood vessels. Other autoimmune diseases involve many different parts of the body. Lupus, for example, can damage the skin, heart, lungs, and more.

Most autoimmune diseases cause **inflammation**. But the symptoms they cause depend on the body parts affected. You can have pain in your joints or muscles. Or you may experience skin rashes, fevers, or fatigue.

Researchers still don't know what causes most autoimmune diseases.

But they've made progress in understanding what puts you at risk and figuring out ways to diagnose and treat them.

What Are the Triggers? • Some autoimmune diseases are rare, but others are fairly common. About 1% of people in the U.S. have rheumatoid arthritis, explains Dr. Mariana Kaplan, an NIH specialist in autoimmune diseases. Rheumatoid arthritis damages the joints.

Certain **genes** put you at higher risk for developing an autoimmune disorder. But genes alone aren't usually enough, says Dr. Peter Grayson, an NIH expert on vasculitis. His team recently found a single gene change that can cause vasculitis in older men.

Most people who carry genes linked with autoimmune diseases still won't develop one. Usually, one or more triggers are needed to set off the immune system.

Different things in your environment can serve as triggers, explains Dr. Andrew Mammen, an NIH expert on muscle diseases. His team studies myositis, a disease in which immune cells attack the muscles.

Too much sun exposure can trigger a type of myositis in people who have certain genetic risk factors, Mammen explains. But, he says, most people need other triggers as well to develop the condition. What they are aren't always clear.

Certain viruses can also jump-start an autoimmune attack. A recent NIH-funded study found that a virus called Epstein-Barr may trigger some cases of multiple sclerosis, or MS. MS is an autoimmune disease that damages the nerves.

Other risk factors can be your age, sex, smoking history, and weight. Many autoimmune diseases are also more common in women than men.

Getting a Diagnosis • A diagnosis of an autoimmune disease can take

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Definitions

Inflammation
Heat, swelling, and redness caused by the body's protective response to injury or infection.

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

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time, says Grayson. Especially if it's one that affects many parts of the body.

People often turn to different doctors for different symptoms. "If you're seeing, for example, an eye doctor, a skin doctor, and a lung doctor separately, they may not see that your symptoms are connected," says Grayson.

Symptoms of autoimmune diseases can also mimic those of many other conditions. "For example, we call lupus 'the great imitator,' because it can look like many other diseases," Kaplan says.

Talk with your health care provider if you're having muscle, bone, or joint pain that's not related to an injury. Or if you've had pain in multiple areas or for long periods of time. They may refer you to a rheumatologist. This is a doctor who specializes in diseases that cause inflammation.

Your doctor may use blood tests to look for **antibodies** that are attacking your own tissues. These are called autoantibodies. But having them in your blood isn't enough to be diagnosed with an autoimmune disease. Many people have them in their blood but don't get sick, Kaplan explains.

Imaging technologies can be used to look for signs of an autoimmune disorder, too. X-rays can show joint issues. MRIs can reveal damage deep in the body.

Researchers are trying to find new ways to use imaging to help diagnose or monitor autoimmune disease. Grayson's lab is testing whether PET scans can find hidden inflammation in the blood vessels of people with vasculitis.

Tamping Down the Attack • There are no cures for autoimmune disorders yet. But researchers have made progress in managing symptoms.

Drugs called corticosteroids are often the first treatment for an autoimmune disease. "They work quickly, and they're effective," Mammen says.

But steroids suppress your entire immune system. So they can have serious side effects. These include high blood pressure, bone loss, and weight gain.

Other drugs suppress only parts of the immune system. These tend to have fewer side effects and can be used for longer. Some of these drugs get rid of cells that make certain antibodies. Others target specific immune-system proteins. One such drug was recently the first new drug approved for lupus in a decade.

You may need to try several different drugs to find the one that works best to control your symptoms, Grayson says. It's important to work with your doctor to balance quality of life with treating the disease, he adds.

Lifestyle changes can also help control symptoms. Movement is especially important for autoimmune diseases that affect the muscles, like myositis and MS, Mammen says.

"We actually prescribe exercise," he says. "It's not optional; it's part of the treatment."

Talk with your health care provider about different activities you can try. Low-impact workouts like yoga, water aerobics, or walking can be helpful for some people.

Quitting smoking can help those whose disease affects their blood vessels, Grayson says.

Researchers are working to develop better treatments. NIH projects are bringing together scientists, nonprofit groups, and drug companies to find new treatments and research tools for autoimmune diseases.

Researchers also want to find ways to detect autoimmune diseases before they cause symptoms, Mammen explains. "Maybe there's a time period where early treatment could put the brakes on one developing," he says. ■

Definitions

Antibodies
Germ-fighting molecules made by the body's immune system.

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Wise Choices

Autoimmune Disease Symptoms

Symptoms of autoimmune diseases can mimic those of other problems. Common ones include:

- Redness, heat, pain, and swelling in one or more parts of the body
- Feeling tired all the time (fatigue)
- Joint pain and stiffness
- Muscle aches or weakness
- Skin problems such as rashes, sores, and dry or scaly skin
- Shortness of breath or trouble breathing
- Fever that comes and goes
- Loss of appetite

Web Links

For more about autoimmune diseases, see "Links" in the online article: newsinhealth.nih.gov/2022/06/understanding-autoimmune-diseases

Staying Safe in the Water

Guard Against Germs While Swimming

When the weather gets warm, you may want to get outside for some fun in the sun. Going to a pool, lake, or beach often tops that list. Spending time in the water can bring health hazards. But some simple habits can help keep your summer fun—and healthy.

Many different germs and organisms can live in water. These include bacteria, viruses, parasites, and plant matter that can make you sick. A lot of germs that live in water cause stomach and intestinal upset. These can bring diarrhea or vomiting. You can also get skin rashes, ear or eye pain, and a cough or congestion after swimming in contaminated waters.

Common culprits for gut symptoms after swimming are parasites. These include *Cryptosporidium* (Crypto) and *Giardia intestinalis*. But bacteria, like *E. coli*, and viruses can also be the cause.

Many water-borne germs come from the poop of people and animals. So it's important to never go to the bathroom or to change dirty diapers near the water. If you bring a pet, be sure to pick up after them.

Pools are often treated with a chemical called chlorine to kill germs. But it doesn't work on all of them immediately. Some, like Crypto, can linger for days despite the chlorine. And natural bodies of waters, like oceans and lakes, can't be treated with chemicals.

"You can't just look at the water and say, 'I think that there's an elevated level of bacteria," says Dr. Dwayne Porter at the University of South Carolina. But scientists can test recreational waters for certain bacteria.

Porter's group studies ways to monitor water conditions around the local beaches. They collect data about a bacteria called *enterococcus*. *Enterococcus* lives in the guts of people and animals. High levels of the bacteria can mean the water is contaminated with poop. That often means that other germs are present, too.

His group works with local partners to create daily water forecasts. The forecasts predict which areas may have high levels of bacteria. They alert local residents using the websites howsthebeach.org and howsmyscriver.org.

Porter and his colleagues plan to expand the alert system to include *Vibrio vulnificus* (Vibrio). Vibrio can make you very ill if you eat contaminated seafood. They are also flesh-eating bacteria. If they infect a wound on your skin and aren't treated, it can lead to amputation or death.

The team is trying to figure out what factors can predict an increased risk of Vibrio infections. Changes to the water's temperature and salt levels may increase the bacteria's growth. Another possibility is toxic algae blooms. These release nutrients that help the bacteria thrive.

Certain types of algae also release toxins that contaminate the water and the air. So, in general, it's important to avoid areas with toxic algae and not eat the seafood found there.

Being aware of local water conditions before you go to the beach can help you stay safe. "If there are concerns with either the bacteria or other hazards, focus on other activities to do," Porter advises.

For more tips on staying safe in the water, see the Wise Choices box. ■

Wise Choices

Stay Healthy in the Water

- Shower before and after swimming.
- Try not to swallow the water.
- Never go to the bathroom in the water. Take kids for bathroom breaks and check diapers every hour. Change diapers away from the water.
- Stay out of the water if you've had diarrhea recently to help protect others from infectious germs.
- Always wash your hands before you eat or drink after playing in recreational waters or in the sand.
- Cover open wounds with waterproof bandages.
- Don't swim in water that looks murky or has an odor.
- Stay out of the ocean for at least 24 hours after a storm. Avoid places where storm water is released on the beach.
- Check for warning signs posted around the area. Ask lifeguards about the water conditions.
- Check local alert systems. Visit go.usa.gov/xubNw for information on specific U.S. beaches.

Web Links

For more about water safety, see "Links" in the online article: newsinhealth.nih.gov/2022/06/staying-safe-water

Health Capsules

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

Treating Eye Vein Blockages

Fluid buildup at the back of the eye can cause swelling and leaky blood vessels. This is called macular edema. If left untreated, it can lead to blurred vision and eventually blindness. Retinal vein occlusions are one cause of it. These are blockages in veins in the retina (the light-sensing tissue in the back of your eye). A new study showed that treating blockages brings long-lasting benefits.

The study compared two drugs: aflibercept (Eylea) and bevacizumab (Avastin). Both block a family of molecules called VEGFs. VEGFs are released when blood flow is disrupted, leading to macular edema.

Researchers treated 330 people with macular edema caused by severe retinal vein blockages. Participants received an injection with an anti-VEGF drug once a month for at least six months. After one year, participants continued treatments at their doctor's discretion.

The research team assessed participants five years after their initial treatment. They found that most doctors reduced the frequency of injections after 12 months. Some switched their patients to the other anti-VEGF drug. After five years, many showed improvement in the sharpness of their vision compared with the start of the study. Both drugs had similar results.

"This five-year study tells us a lot about what's happening with retinal vein occlusion patients in the real world," says Dr. Ingrid U. Scott of Penn State University. "It also underscores the importance of disease monitoring and individualized treatment to achieve the best possible vision." ■

Whole Person Health

Many things affect your health. These include your biological makeup as well as your behavior. Eating a healthy diet, getting enough physical activity and sleep, and managing your stress can all help you stay healthy. But your environment matters, too. Where you're born and grow up, and where you live and work influence your risk for many diseases.

Whole person health looks at all the factors that affect your well-being. Health and disease are not separate things. Instead, you can think of them as a path that's connected, with health in one direction and disease in the other. Some things move you toward health, and some things lead you away from it. Whole person health emphasizes restoring health, promoting resilience, and preventing diseases.

Understanding how the places you've lived impact your health can help you prevent some diseases. Addressing issues as early as possible can help restore your health.

Self-care, a healthy lifestyle, and learning new ways of managing stress can help you stay healthier. Chronic stress can make many diseases worse. These include diabetes, heart disease, obesity, chronic pain, and depression.

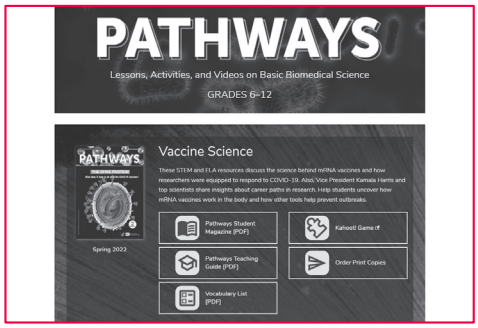
NIH researchers continue to study the connections between lifestyle, diet, biology, health, and disease. Learn more about NIH research on whole person health at go.usa.gov/xudvq. ■

Featured Website

Vaccine Science for Kids

www.nigms.nih.gov/education/pathways

Pathways is a magazine designed for students in grades 6–12. It aims to build awareness about basic science and how it's important to health. The recent Vaccine Science issue highlights how mRNA vaccines work. It also explains how other tools help prevent outbreaks.



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