

SUMMER 2018

# NIH MedlinePlus

MAGAZINE

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Access for All

Uncovering the Mysteries of  
Multiple Sclerosis

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'American Ninja Warrior' Host and  
Comedian Matt Iseman Stands Up to

# RHEUMATOID ARTHRITIS





Student speaks at a Science Day Q&A session; Below, NIH staff and students engage in sessions.

## Inspiring the Next Generation at NIH's Science Day

**N**EARLY 500 STUDENTS from 11 Washington, D.C.-area schools recently attended “Science Day at NIH” on the National Institutes of Health (NIH) campus in Bethesda, Maryland.

Co-sponsored by the National Institute on Minority Health and Health Disparities (NIMHD), the National Library of Medicine (NLM), the Friends of the NLM, and Mentoring in Medicine, Science Day at NIH promotes diversity in the biomedical workforce.

The overarching goal of the event is to inspire students to explore careers in health care and science. The students—many of them African-American or Latino—participated in hands-on activities and presentations about biomedical research.

“You have to have passion for what you do. If you dislike what you’re doing, you will not do a good job,” said NIMHD Director Eliseo J. Pérez-Stable, M.D., as he delighted the audience with a journey through his medical and scientific career.

“This is a great opportunity for all of us here at NIH to welcome you and showcase what we do to contribute to the health of society, through biomedical discoveries, through creating new drugs and therapeutics, and to finding new pathways to help people better understand their health and health care,” NLM Director Patricia Flatley Brennan, R.N., Ph.D., told the students.

Panelists Kelvin Choi, M.D., of NIMHD; Nakela Cook, M.D., M.P.H., of the National Heart, Lung and Blood Institute; Jeff Day, M.D., of NLM; and Carla Easter, Ph.D., of the National Human Genome Research Institute shared how passion helped them chart their career paths.

Overall, it was a great day of learning at NIH.



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**NIH MedlinePlus** magazine is published by  
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24 Superior Drive, Suite 103  
Natick, MA 01760 | (508) 907-7000

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Volume 14  
Number 2



Host Matt Iseman on the set of NBC's "American Ninja Warrior."

## WHO WE ARE

The National Institutes of Health (NIH) is the **nation's premier medical research agency**, with 27 different institutes and centers. The National Library of Medicine (NLM) at NIH is the world's largest medical library.

NLM provides **free, trusted health information** to you at [medlineplus.gov](http://medlineplus.gov) and in this magazine. Be sure to visit us online at [medlineplus.gov/magazine](http://medlineplus.gov/magazine).

Thanks for reading!

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Tips for staying healthy this summer

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# health

NEWS,  
NOTES,  
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FROM NIH

## Fighting Cancer: Ins and Outs of Immunotherapy

**RESEARCH** Cancer can play a cat and mouse game with our immune systems, hiding cells and making it harder to fight off the disease.

One treatment to help combat this is immunotherapy, a type of cancer treatment that helps strengthen patients' immune systems and fight off cancer.

NIH and the National Cancer Institute are working to research and improve immunotherapy to help save lives.

### What is cancer?

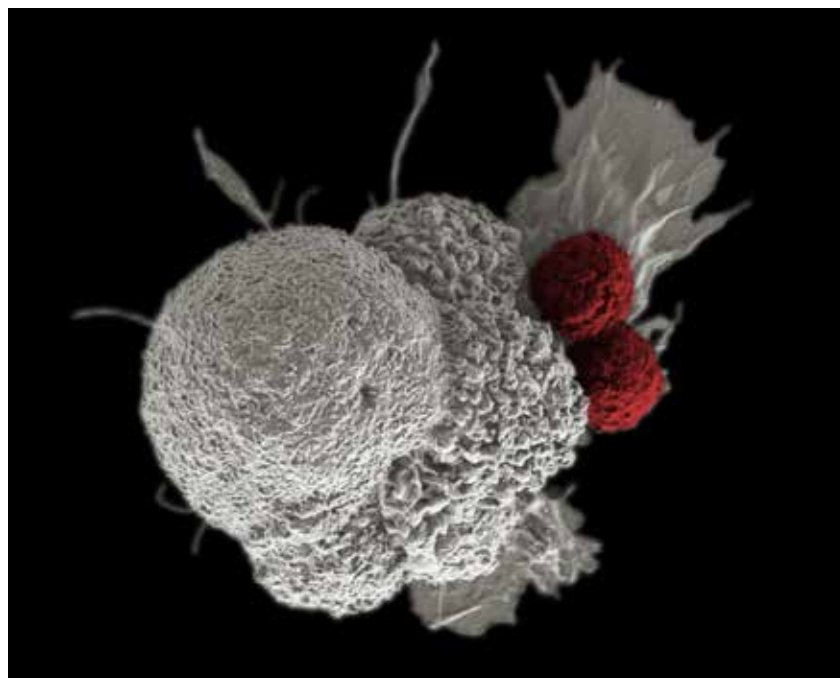
Our body usually forms new cells when our old cells die. Sometimes this process goes wrong. With cancer, new cells grow when you don't need them, and old cells don't die when they should. These extra cells can form a mass called a tumor.

### How does immunotherapy combat cancer?

Some types of immunotherapy help find extra cancer cells so that they can be destroyed. Others boost your immune system to work better against cancer.

### Who could benefit from immunotherapy?

Immunotherapy is not as widely used as surgery, chemotherapy,



Shown here is a pseudo-colored scanning electron micrograph of an oral squamous cancer cell (white) being attacked by two cytotoxic T cells (red), part of a natural immune response.

and radiation therapy. But immunotherapies have treated people with many types of cancer and are being tested in clinical trials.

Ask your health care provider if immunotherapy may be a good option for you or a loved one.

### How is immunotherapy given?

Treatment can be given intravenously (in your vein), by taking a pill, or through your bladder. For patients with early skin cancer, there is an immunotherapy cream you can rub on your skin.

# Are you Getting Enough Sleep?

**BY THE NUMBERS** Just one more minute.

Sleep is something that's vital to keep our bodies working properly. Getting enough sleep at the right times and on a regular schedule helps you function better.

People who don't get enough sleep are less productive at work and school. They take longer to finish tasks, have slower reaction times, and make more mistakes.

Not getting enough sleep is also linked to chronic health problems later in life. Those include heart disease, kidney disease, high blood pressure, diabetes, stroke, obesity, and depression.

More than **35 percent of adults** in the U.S. reported not getting enough rest or sleep every day.



**Driver sleepiness** is a factor in about 100,000 car accidents each year.

**50-70 million** Americans have ongoing sleep disorders.



## How much sleep do we need?



**Adults** over the age of 18: **7-8 hours a day**



**Teens** ages 12-18: **8-10 hours a day**



**Children** ages 6-12: **9-12 hours a day**

**SOURCES:** National Heart, Lung, and Blood Institute: Sleep Deprivation and Deficiency; Centers for Disease Control and Prevention: Short Sleep Duration Among U.S. Adults; American Academy of Sleep Medicine: Sleep Recommendations

### Where do you get immunotherapy?

You may get immunotherapy treatment at a doctor's office, a clinic, or an outpatient unit at a hospital.

### What are possible side effects of immunotherapy?

Side effects are unique to each patient and each cancer.

Some common side effects include fever, chills, weakness, dizziness, nausea or vomiting, fatigue, and other flu-like symptoms.

If you had immunotherapy through your vein, you may have pain, swelling, soreness, itchiness, or a rash at the needle site.

### What is NIH's role in immunotherapy research?

NIH and the National Cancer Institute are leading the way in immunotherapy research and development.

NCI's Center for Cancer Research is dedicated to finding new and better treatments for cancer, including immunotherapy.

Steven Rosenberg, M.D., Ph.D., and his team at the center have pioneered immunotherapy treatment. They also work with patients at the NIH Clinical Center to test new immunotherapies and improve cancer patients' lives.

### What new immunotherapy research is NCI studying?

Just recently, Dr. Rosenberg and his team saw a complete cancer regression in a late-stage breast cancer patient thanks to an experimental immunotherapy treatment they are working on.

The patient, who is part of an ongoing clinical trial at NCI's Center for Cancer Research, was not responsive to other treatments.

15 percent of patients in the same trial have seen similar results with both liver and colon cancers. ■

**SOURCES:** MedlinePlus: Cancer; National Cancer Institute: Immunotherapy; National Cancer Institute: Press Releases



# Tips for Staying Healthy and Safe this Summer

**HEALTH TIPS** MedlinePlus and NIH offer lots of information online to help. We've summarized some helpful highlights to get you started.



## Sun Exposure and Your Skin

Too much time in the sun is linked to everything from sunburns to heat illness, long-term skin damage, and skin cancer.

You can't see the sun's UV (or ultraviolet) rays but they contain a form of radiation that passes through your skin and can damage your skin cells.

If possible, stay out of the sun from 10 a.m. to 2 p.m. when the sun's rays are strongest. If you do need to go out in the sun, take steps to be safe. Use and reapply a sunscreen with an SPF of 15 or higher and wear UV-protective sunglasses and clothing.

Also, keep an eye out for skin moles or spots that change color, which could be a sign of cancer. Contact your health care provider immediately if you think you may have a cancerous mole.

**SOURCE:** MedlinePlus: Sun Exposure



## Poison Ivy, Oak, & Sumac

Ouch! Poison ivy, oak, and sumac are types of plants with sap or oil that many of us are sensitive to. When our skin touches the sap, it can create itchy rashes and blisters. The rash often doesn't often start until 12 to 72 hours after contact.

To avoid rashes, try to recognize and stay away from poison ivy, oak, and sumac. Be cautious when you hike or spend time in heavily wooded areas.

If you come in contact with one of these plants, wash your skin with soap right away. If you do get a rash, your pharmacist may recommend over-the-counter medicines to help with itching. Luckily, rashes are not contagious. If your rash is severe or you notice swelling, contact a health care provider immediately, as that can be a sign of a serious reaction.

**SOURCE:** MedlinePlus: Poison Ivy, Oak, and Sumac; American Academy of Dermatology: Poison Ivy, Oak, and Sumac



## Dehydration

Our bodies are 90 percent water, so it's no surprise we need a lot of it to keep going each day. In fact, the average person needs three quarts of water daily to function well.

But when we're exercising, sweating, or spending time in the sun, we may need more liquid.

Without enough hydration and electrolytes, we can become dehydrated. Signs of dehydration are feeling thirsty, having dark-colored urine, feeling faint or dizzy, and having to urinate less.

If you think you may be dehydrated, try to drink small amounts water over a period of time to prevent throwing up.

Electrolytes—minerals in our bodies that help balance the amount of water—are key to avoiding dehydration. Sports drinks (without caffeine) with electrolytes may help if you have an imbalance.

**SOURCES:** MedlinePlus: Dehydration; MedlinePlus: Electrolytes



## Insect Bites and Stings

At one point or another, you've probably experienced a not-so-fun bug bite or sting. Mosquito and flea bites usually itch. Bee, wasp, and hornet stings and fire ant bites usually hurt.

In general, bug bites and stings are uncomfortable but not life-threatening. However, if you know you are allergic to any insects, like bees or wasps, keep an emergency epinephrine kit handy.

Ticks are usually harmless, but a bite from an infected blacklegged deer tick can lead to Lyme disease. Lyme disease is a bacterial infection that can cause serious health problems if left untreated. Some early symptoms include fever and chills, headache, joint and muscle pain, and a bull's eye rash where the tick bit you. After spending time outdoors where there may be ticks, make sure to check yourself, family members, and your pets. If you think you may have Lyme disease, seek medical help immediately.

For mild itching or discomfort from other bug bites or stings, over-the-counter antihistamines, anti-itch creams, and ibuprofen and acetaminophen may help.

To avoid bug bites and stings, use insect repellent according to label instructions, be careful when performing activities outside, wear protective clothing (like long pants or sleeves), and avoid heavily scented soaps and perfumes.

**SOURCES:** MedlinePlus: Insect Bites and Stings; Food and Drug Administration: Beware of Bug Bites and Stings; National Institute of Allergy and Infectious Diseases: Lyme Disease

IMAGES: ADOBE STOCK

# Help the Future of Research with **All of Us**



**RESEARCH** The All of Us Research Program is now recruiting people like you.

By gathering health information from people all over the country, All of Us will serve as a national resource to inform thousands of future research studies. The program is led by NIH.

Researchers will use data from the program to learn more about how individual differences in lifestyle, environment, and biological makeup can influence health and disease. All of Us participants may be able to learn more about their own health too.

To join, you must be over the age of 18 and live in the U.S. After signing up and filling out enrollment and consent forms, you'll be asked to fill out health surveys. You might also be invited to visit an All of Us partner center to give samples—like blood and urine.

All of Us is committed to protecting your privacy. Your name, address, and other identifying information will be removed from all the research data. We look forward to helping the future of research—and you!

**SOURCES:** All of Us: How to Join; All of Us: How Your Data Will be Used; All of Us: Participation; Joinallofus.org

# A Patient's KIDNEY TRANSPLANT Journey

*Lupus patient shares organ donation experience with mother*

**A**lison Lee is a fighter. She has fought lupus, kidney failure, and cancer—all in just 35 short years.

Alison was diagnosed with lupus at 16 years old. Lupus is a disease in which your immune system attacks your healthy cells and tissue by mistake.

**PERSONAL STORY** Lupus may affect the kidneys and can lead to kidney failure.

However, Alison didn't experience serious lupus symptoms until she was in her mid-20s, when she started to have anemia (or lack of red blood cells), shortness of breath, and heart issues.

At that point, she was living in New York City and doing things many other 20-somethings do: working, hanging out with friends, and enjoying life.

## Kidney failure

But things got worse in 2014 when her lupus started to damage her kidneys. She remembers feeling fatigued and very weak.

"When going to dinner with my friends a few blocks away, I would need to stop and take a break and sit on a bench because I couldn't walk three blocks," Alison said.

She also noticed decreased urine output. Her kidneys started to fail. She remembers feeling fatigued and going in and out of the hospital.

"I would go through an entire day at work without having to pee at all. I knew something was going on," Alison said.

Finally, in 2014, she decided to leave her job because she felt so sick. In 2015, she started kidney dialysis because her kidneys were unable to work well enough to keep her healthy.

"Because my heart had been struggling for so many years, my doctors said it wouldn't be able to handle a kidney transplant," Alison said.

"Dialysis was really difficult for me. At the beginning it was like a full-time job because you need to drain and

refill the fluid every four to six hours. It was difficult to have a normal life," she added.

However, the dialysis improved Alison's health dramatically.

## Preparing for a transplant

After six months on dialysis, she was healthy enough for a transplant. She had a transplant evaluation and asked family members to be tested to see if any of them would be good potential donors.

Alison was one of the lucky ones when it came to finding a donor. Her mom, sister, and brother all offered to donate.

"Of course, my mom being my mom said she would donate," Alison said.

Her mom wouldn't have it any other way. "My mom is so selfless, and she has helped me throughout all of my health issues in the past," Alison added.

Despite her fears, Alison said the excitement about the future outweighed her concerns about the surgery.

"The whole transplant experience was straightforward and easy. The hospital wanted to make sure I understood everything that was happening with the transplant and also post-transplant," Alison said. "I was more excited about the prospect of the future than scared about the procedure."

After surgery, Alison woke up and had to pee a lot, which was a good sign. It meant her kidney was working well. Her blood work was also positive.

Alison's mom, who was in her sixties at the time, also did well. She was back up and helping take care of Alison during her recovery just three days after surgery.

## A difficult recovery

While the transplant surgery was straightforward, Alison's recovery wasn't easy.

About a month after surgery, she discovered a lump growing behind her ear. She ended up contracting





Alison Lee at the podium, and pictured at far right with her parents and sister at a Lupus Research Alliance gala.

“My mom is so selfless, and she has helped me throughout all of my health issues in the past.”

— Alison Lee

lymphoma, a cancer of the lymph nodes. While very rare, a drug Alison needed to prevent rejection of her transplant allowed a slow-growing lymphoma she had before the transplant to transform into a more aggressive lymphoma.

“It’s not common, but I had some history of a slow growing lymphoma in my past, so they knew this was a risk. Coupled with my recovery from transplant, I also had to go through the biopsy and the chemo treatment that I did for about four months,” Alison said.

Despite the difficult battle of recovery coupled with chemotherapy, Alison’s positive attitude and family helped her each step of the way. An unexpected benefit from her chemo was decreased rejection of

her transplanted kidney. “The chemo was surprisingly beneficial for my transplant. I was given lots of fluid which helped to keep the new kidney hydrated. Also, the chemo itself essentially killed my immune system, preventing it from attacking the new kidney,” Alison said.

### The next chapter

Alison is in remission but still deals with related health issues. She works closely with the Lupus Research Alliance, focusing on patient advocacy and sharing her story and message of hope with others. She recommends other people struggling with health issues find a support group or organization.

“It’s good for me to interact with other lupus patients. It helps me to feel more comfortable with my disease,” Alison said.

Alison also works part time and carves out time to travel and enjoy the little things. She recently traveled to Mexico for a yoga retreat.

“I think a positive attitude is really important,” said Alison. “Even through all of this, I’ve never felt like I was dying or wasn’t going to survive. Each issue just becomes another bump that I have to get through until things will get better.” ■

# Getting a Kidney Transplant:

## What You Need to Know

**I**n the U.S., an estimated 14 percent of the population has chronic kidney disease, and roughly 661,000 Americans have kidney failure. Of these, 468,000 people are on kidney dialysis, and almost 200,000 live with a functioning kidney transplant.

MedlinePlus and the National Institute of Diabetes and Digestive and Kidney Diseases have helpful information about how kidney transplants and other options can help.

### What are kidneys?

Your kidneys are two bean-shaped organs that filter out waste and extra water, make hormones, and do other important things to keep you healthy. They are located on either side of your spine and are each about the size of your fist.

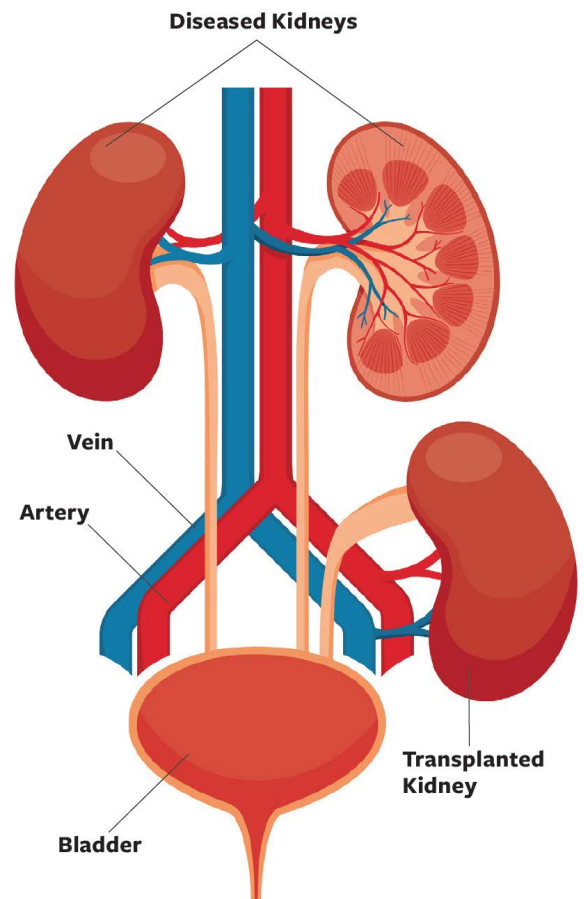
### What causes kidney failure?

Diabetes and high blood pressure are the main causes of chronic kidney disease, which is the gradual loss of kidney function. Other conditions that affect the kidneys include autoimmune diseases like lupus and inherited diseases like polycystic kidney disease.

Some people live with kidney disease for years, others quickly progress to kidney failure. Kidney failure means that your kidneys have lost most of their ability to function—less than 15 percent of normal kidney function.

Medication and other methods of managing kidney disease help some people maintain kidney function for years. Others progress quickly to kidney failure.

Dialysis and kidney transplants are two treatments used to replace failing kidneys. Dialysis takes the place of your kidneys by helping remove waste and water from your blood, but doesn't fully replace everything your kidneys normally do.



## Kidney failure means that your kidneys have lost most of their ability to function—less than 15 percent of normal kidney function.

### Can a transplant help?

When your kidneys have failed, a transplant may also be a good option. Compared to dialysis, a working transplanted kidney does a better job of filtering waste, replacing your failed kidneys, and keeping you healthy.

However, a kidney transplant isn't for everyone. Anyone interested in a kidney transplant should be evaluated by a transplant center, as some people may not be healthy enough for transplant surgery.

While a transplant is a good treatment for kidney failure, it's not a cure. You need to take medicines daily so your body doesn't reject the new kidney. You also need to see your health care professional regularly.

### Getting a transplant

Your health care professional will refer you to a transplant center for tests to see if you're healthy enough to receive a transplant. Living donors, such as family or friends, need to be tested to make sure they're healthy enough to donate a kidney.

If you have a living donor, don't worry about being a perfect "match." Today, innovations such as kidney exchanges allow transplant surgeons to get around incompatibilities and make many living donor transplants possible.

If you don't have a living donor, you'll be placed on a waiting list to receive a kidney. You'll have regular blood tests while you wait for a kidney. The center must have a recent sample of your blood to match with any kidney that becomes available. As soon as a kidney is available, you must go to the hospital to have your transplant. Donated organs need to be used in a specific amount of time or they may not be usable.

### During surgery

Surgery usually takes three to four hours. The damaged kidneys are not usually removed.

If a family member or friend is donating the kidney, you'll schedule the surgery when it's best for you, your donor, and your surgeon. One surgeon will remove the kidney from the donor, while another prepares you to receive the donated kidney.

### After surgery

Many people report feeling better right after having transplant surgery. For others, it takes a few days for the new kidney to start working.

You will probably need to stay in the hospital for several days to recover from surgery—longer if you have any problems. You'll have regular follow-up visits after leaving the hospital.

If you have a living donor, the donor will probably also stay in the hospital for a couple of days, although probably less time than you will.

### Transplant rejection

Transplant rejection often begins before you feel any symptoms. Rejection occurs when the immune system attacks the "foreign" transplanted kidney.

The routine blood tests that you have at the transplant center will reveal early signs of rejection. You may develop high blood pressure or notice swelling because your kidney isn't getting rid of extra salt and fluid in your body.

If you think you may have transplant rejection, contact your health care professional immediately. Rejection can often be treated, but only if it is detected early. Your health care professional will treat early signs of rejection by adjusting your medicines to help keep your body from rejecting your new kidney. Rejection does not necessarily mean you will lose your transplant.

Additionally, when you're taking anti-rejection medicines, you're at a greater risk for infection.

Anti-rejection medicines can dull symptoms of problems such as infection. Call your transplant center right away if you aren't feeling well or have:

- a fever of more than 100 degrees
- drainage from your surgical scar
- burning when you pass urine
- a cold or cough that won't go away ■

**SOURCES:** MedlinePlus; National Institute of Diabetes and Digestive and Kidney Diseases: Kidney Transplantation; National Kidney Foundation

# Improving Organ Donation for All

*Dr. Dorry Segev works with NIH to improve kidney transplant access across U.S.*



**Dorry Segev, M.D., Ph.D., is working on multiple NIH-funded studies on organ transplantation.**

**D**orry Segev, M.D., Ph.D., is a leader in the field of organ transplantation. The Johns Hopkins University surgeon and research chair is working to improve transplant access and success for patients across the U.S.

Dr. Segev is currently working to address geographic disparities with kidney transplantation—making sure where you live doesn't impact your ability to get an organ. The research is supported by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK).

Dr. Segev's team is also working with the National Institute on Aging and the National Institute of Allergy and Infectious Diseases to expand organ donation to different populations, such as older patients and those with HIV.

He spoke to NIH MedlinePlus magazine about some of his recent research.

## Who is a good candidate for a kidney transplant?

Anyone with kidney failure is a potential candidate for a kidney transplant. If you have kidney failure and can tolerate

an operation and medicines to suppress your immune system—to keep your body from rejecting the new kidney—you can have a kidney transplant.

Many people with kidney failure on dialysis don't know about transplantation and don't realize they could be a good candidate.

On average, if you have a kidney transplant, you will double your remaining life expectancy compared to staying on dialysis. We've even shown substantial survival benefit and improvement in quality of life in older transplant recipients. Today, we're doing 10 times as many transplants in people over 65 than we did a decade ago. The outcomes are getting better every year.

## When should a patient think about kidney transplantation?

When someone is heading towards kidney failure, even at stage 4 or stage 5 kidney disease, the default pathway is dialysis. But this is actually not the best pathway. In fact, we know that if you get transplanted before you even start dialysis, you'll have much better outcomes.

It's important for people who are heading towards kidney failure to prepare for transplantation. Find out as much as you can. Try to find a living donor. Take all the steps leading up to the transplant so that when you need the transplant, you're ready.

## Can you tell us about the kidney transplant waiting list?

If you can't find a living donor, you are put on a list of more than 100,000 people across the country. Organs are distributed to patients based on a number of factors, like how long you've been on the list, your age, blood type, and where you live.

Here's the problem. There are some areas that have a high supply of organs and a low demand, and some areas with a low supply and a very high demand. For example, a dense urban area like New York City has a high demand, but low supply. A more rural area might have a low demand for organ donation (because there are fewer people) but have a high supply since high-speed motor vehicle crashes are often a major source of organ donation.

That means that where you live may determine if you get an organ on the waiting list, unless you're able to travel to other parts of the country. That can be both expensive and physically challenging for patients.



“We hope to better equalize access for people and, as a result, reduce organ discard and save lives overall.”

— Dorry Segev, M.D., Ph.D.

### Can you tell us about your NIH research on improving transplant access?

The research we’re doing, funded by NIDDK, is trying to address these geographic disparity issues by changing how the organ distribution system works in the U.S.

You might look at it in simple terms as “redrawing the map.” It uses the same science that people use to organize school and voting districts. It helps equalize the distribution of supply and demand for organs so that where someone lives doesn’t prevent them from receiving an organ.

We hope to better equalize access and, as a result, reduce organ discard and save lives overall.

This goes hand in hand with the effort to improve donor rates in the U.S.

### What advice do you have for people interested in donating a kidney?

The advice I would give people is to learn as much as they possibly can about the actual risks of donation.

The risk of dying from donating a kidney is 3 in 10,000. That’s incredibly safe. And the worries about kidney failure down the road after donating a kidney are much lower than you would think.

In 15 years after you have donated a kidney, on average in the U.S., the risk of getting kidney failure is about 30 in 10,000.

We’re also using NIDDK funding to research health and wellness outcomes for donors. We’re looking for ways to better counsel people on donation and monitor their health post-surgery.

### What are some common misconceptions?

One is “I’m too old to donate a kidney.” We’re seeing more people donate in their 60s and 70s; personally, I operated on an 81-year-old who donated a kidney. In fact, it’s almost safer to donate in your 60s and 70s than in your 20s. In your 20s, we don’t know what’s going to happen to you medically for the rest of your life.

Another misconception is that you have to be a match to be a living donor.

We used to say if you have a compatible living donor you can have a transplant. Today we say if you have a living donor you can have a transplant. Our ability to get around those blood incompatibilities has changed dramatically in the last 15 years.

Through kidney exchange and what’s called kidney desensitization, we are often able to work around the

incompatibilities or address them head on.

Something else that’s important to know is HIV shouldn’t stop you from receiving or donating an organ. These days we give transplants to hundreds of people who have the disease and there is a huge survival benefit from transplantation in HIV.

It’s also a misconception, even in the HIV community, that you can’t be a donor if you have HIV. We wrote a bill back in 2013, signed by President Obama, that now allows us to use those organs for people who have HIV and are on the waiting list, which is really important. ■

### Find Out More

► **Medline Plus**

<https://medlineplus.gov/kidneytransplantation.html>

► **National Institute of Diabetes and Digestive and Kidney Diseases**

<https://www.niddk.nih.gov/health-information/kidney-disease>

# Matt Iseman: Rheumatoid Arthritis Warrior

*Emmy-winning ‘American Ninja Warrior’ host opens up about health, career, and NIH research*

**M**att Iseman was trained as a doctor, but he is known to many as a comic, first winner of the “New Celebrity Apprentice,” and host of the hit TV show “American Ninja Warrior.” He is also one of millions of Americans living with arthritis and has been an advocate for more research into the condition. He spoke with NIH MedlinePlus magazine to talk about his experience and what drives him to success.

## **Tell us about your experience with rheumatoid arthritis.**

I was diagnosed Christmas of 2002.

When I was told I had rheumatoid arthritis (RA), the first thought I had was relief. People are always shocked when they hear that. But it had been 18 months that I had been having symptoms—18 months when my body and my life were falling apart.

## **What was it like at first?**

I had just turned 30 and my symptoms started with pain in my right index finger and then spread to my feet, back, and neck. I was always exhausted and often sleeping up to 14 hours a day. I had been an athlete all my life, but couldn’t work out at all and eventually gained 55 pounds. I saw a range of doctors, but no one could tell me what was wrong.

When I was finally told I had RA, I was relieved because I knew there was something I could do about it.



“I’m walking proof of the importance of research like that done by NIH.” — Matt Iseman



### **What’s the good news?**

The good news is when I started treatment (with a biologic medicine that helps reduce inflammation), it gave me my life back.

That is why I have been a passionate advocate, working with groups like the Arthritis Foundation to let others know that there is hope. Despite the fact that I am a doctor and understood the disease, I didn’t know anyone who had it. Many who are newly diagnosed go online and see the worst-case scenario.

I want them to see me, someone who won “Celebrity Apprentice,” who hosts “American Ninja Warrior,” and travels the country doing stand-up comedy. I love sharing my story. There is hope. This is a disease you can lead a full life with.

### **What do you do to keep up your health and energy?**

I used to play basketball, but I haven’t played basketball or run since I was diagnosed. I like to tell people that whatever you are dealing with, don’t focus on what you can’t do, focus on what you can do. You will be amazed at what you can accomplish.

I have discovered yoga and pilates. They are terrific for building strength and flexibility. If you are dealing with RA, the saying goes “motion is lotion.” The more you move the better you feel and the better your vitality.

Laughter has always been key for me, particularly when I was down before I was diagnosed. Stand-up comedy really saved my life at that point. No matter how bad I felt, I did stand-up comedy, laughing and making others laugh. Taking care of yourself physically and emotionally is key. And laughter is such a great tool.

### **What about the importance of having a strong support community?**

No one does it alone. We talk about that on “American Ninja Warrior” and I talk about arthritis.

When you are newly diagnosed, your doctor, your nurse, and your family are going to talk to you. But it is also important to talk to someone who is going through or has been through what you are. Join a group to share stories and tips about living with RA.

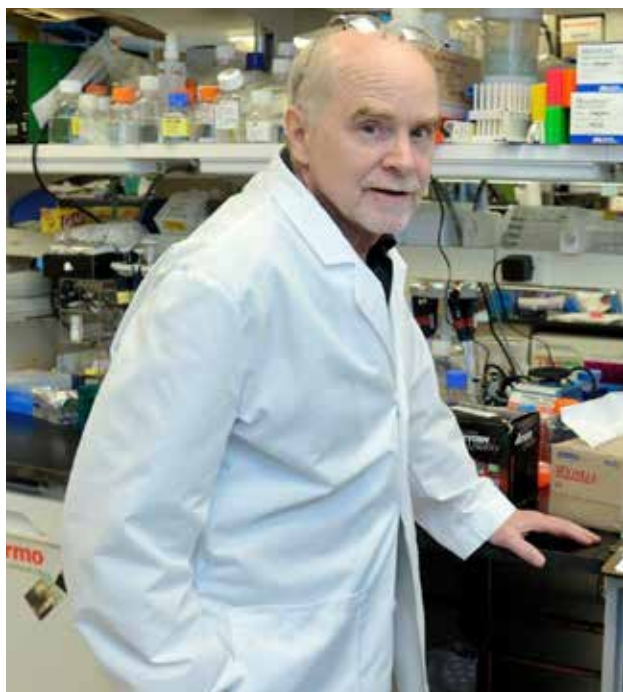
### **NIH supports a great deal of research aimed at improving treatments for arthritis. Would you speak to the importance of this research?**

I’m it. I’m walking proof of the importance of research like that done by NIH. The medication I’m on was discovered just four years before I was diagnosed.

We would not have advancements like this without the research supported by NIH. We need to make sure that researchers have the funding to develop even better treatments and one day find a cure. ■

# Treating Rheumatoid Arthritis: Search for a Cure

*NIH studies look for new medications and improved outcomes*



**John O'Shea, M.D., is the scientific director at the National Institute of Arthritis and Musculoskeletal and Skin Diseases.**

**R**heumatoid Arthritis (RA) is a tricky disease. No one knows what causes it, but while there isn't yet a cure for the autoimmune disease, it can be treated. Arthritis is an extremely common problem but not all forms of arthritis are alike.

Just as symptoms of RA can vary, medical treatments can vary, but the important thing to know is that over the last 20 years the treatment of RA has changed dramatically with the approval of many new, highly effective drugs.

These can help slow or stop joint damage, minimize disability, and reduce inflammation, pain and swelling. Lowering stress, eating a healthy diet, quitting smoking, and getting enough rest are all suggested lifestyle changes.

Some medicines are taken by mouth, while others require regular injections; these drugs are highly effective, but do have

side effects. Thus, it's essential to get a proper diagnosis from a doctor who specializes in rheumatic diseases, understands all the different causes of arthritis—in adults and children—and has experience with the new drugs, advises John O'Shea, M.D., scientific director at the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS).

"RA and other autoimmune diseases don't just affect the joints, they cause inflammation throughout your body," Dr. O'Shea says.

The main goal in treating RA is to reduce inflammation and pain, stop more joint damage, and to be able to function normally.

"We now have better treatment therapies to keep you safe, as well as clinical studies that specifically look at inflammation," Dr. O'Shea adds. The RA drug tofacitinib, approved for the treatment of RA in 2012, targets a protein that was discovered in the early 1990s by O'Shea and his colleagues.

Dr. O'Shea and his team at NIAMS are studying the molecular and genetic basis of rheumatoid arthritis and other inflammatory diseases in an effort to identify potential strategies for future therapies.

Researchers are also studying the natural history of the disease in children and adults to understand more fully how RA progresses and impacts people's lives.

In addition, NIAMS researchers are collaborating with investigators outside of NIH to explore whether people with RA who are in remission (no symptoms of the disease) while taking TNF inhibitors are at risk of having symptoms come back if they stop taking the medicine.

Another study funded by NIAMS focuses on RA patients with inflammation in the blood vessels and heart tissue, which can eventually lead to heart disease.

"People who have rheumatoid arthritis have a 50 percent increase in chance of experiencing a stroke or heart failure," says Joan Bathon, M.D., chief of the division of rheumatology at Columbia University Medical Center in New York.

Known as the TARGET study, the clinical trial aims to see if treatment of arthritis in individuals with RA will also reduce inflammation in blood vessels. Inflammation in blood vessels is believed to be an early predictor of atherosclerosis (hardening of the arteries) which leads to heart attacks and



“We now have better treatment therapies to keep you safe, as well as clinical studies that specifically look at inflammation.”

— John O’Shea, M.D.

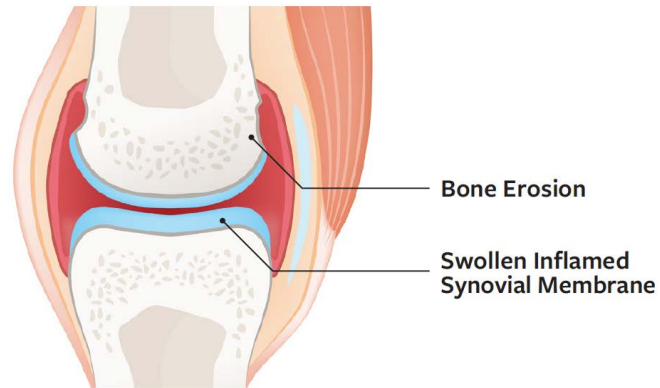
strokes. If RA medications reduce inflammation in blood vessels, this may reduce future chances of heart attacks and strokes. “We want to aggressively treat rheumatoid arthritis, to see if it will help the heart,” Dr. Bathon says.

Joining a clinical study such as the TARGET study will help researchers find a cure more quickly. There are 30 sites in the U.S. focusing on the TARGET study, with more to come soon.

“We have a lot of treatments, but none of our treatments cure the disease,” Dr. Bathon says. “In lieu of a cure is prevention of related complications from the disease. RA is treatable. We’re focusing on outcomes right now and getting people with RA back on track.”

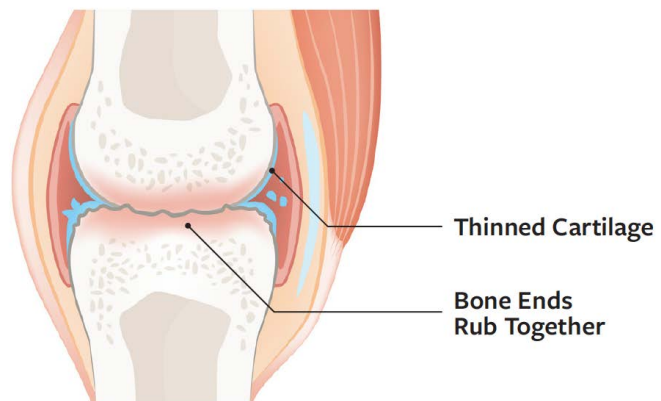
The bottom line: If you have symptoms of rheumatoid arthritis, early diagnosis is essential. It is critical to get aggressive treatment as early as possible to help slow RA and help prevent permanent joint damage. ■

## Know the Difference: Rheumatoid Arthritis or Osteoarthritis?



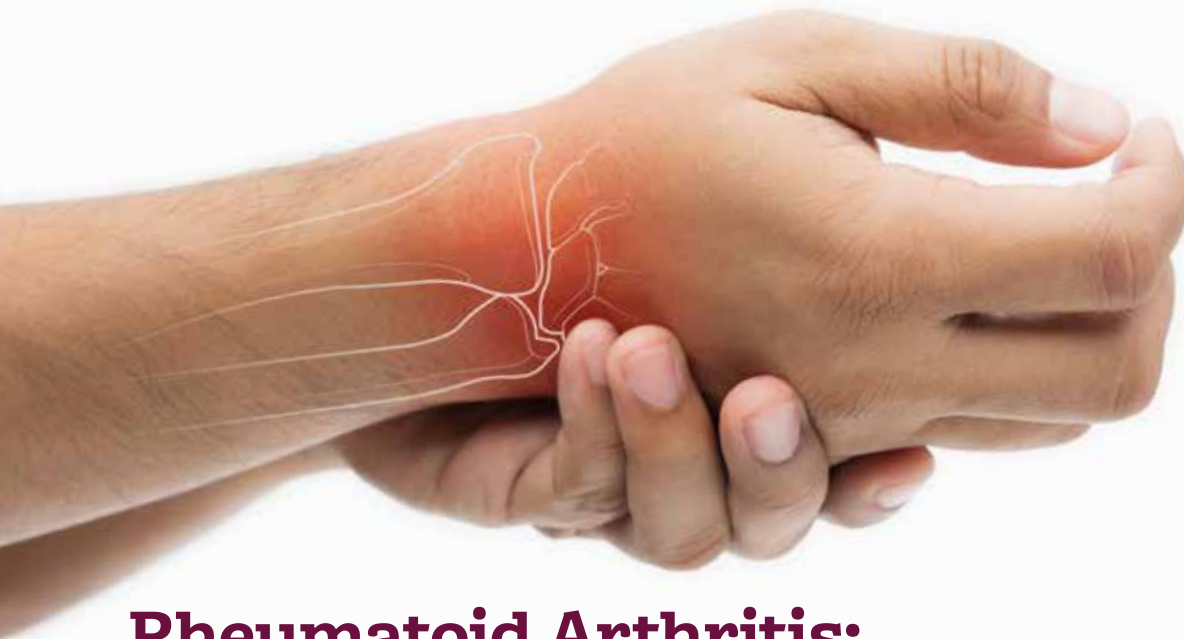
### Rheumatoid Arthritis

Rheumatoid Arthritis is an autoimmune disease, a result of the immune system attacking the tissues that line the body’s joints. This causes pain, swelling, and stiffness in the joints and the pain is often symmetrical. It is more common in women and in those who are middle aged, but it can happen to anyone.



### Osteoarthritis

Osteoarthritis happens over time. It is the most common form of arthritis, and it usually occurs in older people. The protective cartilage on the ends of your bones wear down as you age, making it difficult to move. It usually affects one side of the body. Osteoarthritis can damage any joint in your body, though it most commonly affects joints in your hands, knees, hips, and spine.



## Rheumatoid Arthritis: Understanding a Difficult Joint Disease

**W**hen you hear about someone who has arthritis, you might think of an older person with pain or stiffness in his or her joints. But that's not always the case.

There are many types of arthritis and millions of people in the U.S. have some form of it. One type of arthritis that affects more than 1.5 million people in the U.S. is rheumatoid arthritis.

Rheumatoid arthritis (RA) is an inflammatory autoimmune disease, which means the body's immune system mistakenly attacks the tissues that line your joints instead of fighting infections.

RA causes pain, swelling, and stiffness in your joints. It usually affects your wrists, hands, and knees, preventing them from working properly. While RA is more common in women age 30 or older, RA can affect all people.

RA is different from the more common osteoarthritis, which is the arthritis that many older people develop over time. No one knows what causes RA. While there is no cure, it can be treated.

### What to look for

Symptoms of RA range from mild to severe. Sometimes RA affects one joint at a time, but more typically it presents as pain, warmth, and swelling in the joints on both sides of the body at the same time or on alternating sides.

It can also affect body parts that are not joints, including your eyes, mouth, heart, and lungs. Symptoms can last for only a short time or they can come and go.

It's important to recognize the signs of RA and see your health care provider as soon as possible to get a proper diagnosis. Your provider will use tests to help diagnose you and then refer you to a rheumatologist, who focuses on autoimmune illnesses—many of which target the musculoskeletal tissues. You and your rheumatologist can determine the treatment that is best for you.

### Symptoms of RA include some or all of the following:

- Swollen, tender, or warm joints
- Symmetric swollen joints (on both sides of the body), such as in both your right and left wrists
- Swollen joints in the wrist and finger joints closest to the hand
- Other swollen joints such as the neck, shoulders, elbows, hips, knees, ankles, and feet
- Feeling tired and having low energy
- Fevers
- Pain and stiffness that lasts for more than 30 minutes in the morning or after a long rest
- Symptoms that last for many years ■

**SOURCE:** National Institute of Arthritis and Musculoskeletal and Skin Diseases: Rheumatoid Arthritis

# Reaching New Heights with Joint Disease

*Patient doesn't let rheumatoid arthritis slow her down*



BJ Pessia has battled RA for 24 years.

## BJ Pessia is a jack of all trades and master of all.

A real estate agent, carpenter, painter, landscaper, ski instructor, soccer coach, and caregiver, she is always engaged in a hands-on project or busy caring for someone.

Physical work hasn't always been easy for BJ. She was diagnosed with rheumatoid arthritis (RA) 24 years ago, when she was 30 years old.

"One day I noticed I had wrist pain. The pain moved to my other wrist and would fluctuate from each wrist with no consistency," she says.

Health care providers told her it was carpal tunnel syndrome, but she didn't do any repetitive work and was not convinced that was the problem.

After several blood tests and a visit to a rheumatologist, BJ was diagnosed with RA. By then the inflammation

**PERSONAL STORY** symptoms were also in her shoulders and her hips—but

again, never consistent, and always moving from one side to the other with no pattern.

The original RA medications she was prescribed had serious side effects, including stomach issues and liver damage. Eventually she found a medication that worked for her.

Now, BJ rarely has big flare-ups.

"The new medication changed my life, and I can usually feel inflammation coming on when it does happen," she says. "I can paint and do light construction to get houses ready to go on the market to sell."

BJ says RA can be as much of a mind problem as it is a physical problem.

"I got tired of people telling me that my pain was caused by me doing too much—or people would try to figure out what I did wrong to make my wrists or shoulders hurt," she says. "It's nothing that I did. It's my body reacting to an autoimmune disease and attacking a joint."

In addition to finding the right medication to treat her RA, BJ also attributes her wellness to sticking to a healthy diet, keeping her weight down, and staying active.

She is currently training for the Pan Mass Challenge fundraiser, a 191-mile bicycle ride across Massachusetts that raises money for cancer research. She also plans to hike all the 4,000-foot mountain peaks in New Hampshire.

**"Go to a major rheumatology treatment center and talk to a rheumatologist who will really listen to you. Know your body and stay active."**

– BJ Pessia

Her advice to those who have or suspect they have RA: "Go to a major rheumatology treatment center and talk to a rheumatologist who will really listen to you. Know your body and stay active." ■

## Find Out **More**

### ► Medline Plus

<https://medlineplus.gov/rheumatoidarthritis.html>

### ► National Institute of Arthritis and Musculoskeletal and Skin Diseases

<https://www.niams.nih.gov/health-topics/rheumatoid-arthritis>

### ► Arthritis Foundation

<https://www.arthritis.org>

# Uncovering the Mysteries of Multiple Sclerosis

*Medical imaging helps NIH researchers understand the tricky disease*

**A**n estimated 2.3 million people worldwide live with Multiple Sclerosis (MS). MS is a hard-to-predict disease of the central nervous system. MS gets in the way of communication between our brains and our bodies. This creates symptoms like muscle weakness, numbness, coordination problems, and memory and thinking issues.

While there is no cure or known cause for MS, researchers have learned a lot about the disease thanks to magnetic resonance imaging (MRI).

MRI has changed how MS is diagnosed. It has reduced the time from early symptoms to diagnosis from years to months.

NIH MedlinePlus magazine spoke with Daniel Reich, M.D., Ph.D., a senior investigator, neurologist, and radiologist at the National Institute of Neurological Disorders and Stroke (NINDS). Dr. Reich leads clinical studies focusing on MS at NINDS.

## How are MRIs used in MS research?

With a kidney or liver, you can take a biopsy or get bone marrow for research. With MS, we need access to the fluid that the brain makes. MRIs are beginning to help us see images to get the biology we need—and gives us different information from what we get from a spinal tap needle.

With my collaborators—physicists, engineers, doctors, junior scientists, and medical school students—we're trying



Daniel Reich, M.D., Ph.D. (standing) listens to team members at NIH.

to understand how MS starts. We also want to know how the damage caused by MS occurs in the brain so we can develop improved therapies. Modern, advanced medical imaging like MRI is helping us learn more about MS.

There are 15 approved medications available to reduce the amount of MS inflammation and stop MS attacks. They all work differently and have different side effects. The problem is that we don't have good approaches to repair or control cell damage caused by MS. We need to understand the biology. MRI was key in finding the 15 medications that we now have—and also for improved therapies in the future.



“We want to shift our focus from stopping inflammation to stopping the disease. It’s an ongoing evolution. We can get there with outstanding imaging and more research.”

– **Daniel Reich, M.D., Ph.D.**

## What are you most excited about with this research?

I’m excited that we are rapidly discovering biological ways for how we might repair and protect the brain. Within the last four years, we have a whole set of different families of drugs that appear to accelerate repair to the myelin (coating of nerve fibers) in animals. These are the first positive clinical trials. We’re taking baby steps.

Twenty-five years ago, we began to break open the barriers to stop inflammation. Now we are prying open the door to repair therapy. I’m hopeful that in the next few years we’ll have improved treatment for people.

## What challenges do you face?

MS is a very complex disease that builds up over time. It’s different for each person: how the nervous system reacts, how resilient your nerve cells are, where the inflammation exists, and much more. It’s a lot of biological processes that play out over time. That makes it harder to analyze the cells over time.

The second challenge is that we don’t know when or how the disease begins. We think that it may often begin in the teenage years, but MS is often silent when it starts—and people may not have their clinical first attack until their 20s or 30s. We know that genetics play a role, too.

## What changes do you hope to see as a result of your research?

My number one goal is to stop the worsening of MS. I also hope that our research can help repair and prevent the cell damage and find out what causes the disease in some people. In other words, we want to shift our focus from stopping inflammation to stopping the disease. It’s an ongoing evolution, but we can get there with outstanding imaging and more research.

## What is your advice to those with MS?

Education is critical, because the landscape of MS is rapidly changing, and no one knows your disease better than you do.

Get involved with the MS community. The National Multiple Sclerosis society has excellent clinicians who can care for you and offer family support and education on MS.

Get involved with research, too. MS research starts with MS patients, and not every study involves experimental treatment. Ask your doctor about research studies you can participate in, and look into what’s going on at nearby medical schools and at the NIH Clinical Center—America’s research hospital. ■

# Multiple Sclerosis: An Overview

## What is MS?

Multiple sclerosis, or MS, is a chronic disease that affects the central nervous system (the brain and spinal cord). A patient's clinical course is difficult to predict.

It damages myelin, a substance that wraps around nerve fibers and helps protect them.

Damaged myelin exposes our nerve fiber and disrupts key communication between our nervous system and brain. This creates pain, coordination issues, vision problems, and more.

MS is considered to be an autoimmune disease, in which your immune system mistakenly attacks healthy cells in your body.

## Know the symptoms

Multiple sclerosis signs and symptoms appear in many ways. They can range from minimal to disabling, depending on how much nerve damage there is and which nerves are affected.

The majority of MS patients are mildly affected, but in the worst cases, MS can make a person unable to write, speak, or walk.

MS symptoms usually appear in people between ages 20 and 40 and can include the following:

- Blurred or double vision
- Red-green color distortion or blindness in one eye
- Severe tiredness
- Muscle weakness in hands or feet
- Problems with coordination or balance
- Difficulty walking or standing
- Partial or complete paralysis
- Numbness or prickling “pins and needles” sensations
- Speech problems
- Tremors or dizziness
- Hearing loss
- Depression
- Memory loss or difficulty concentrating

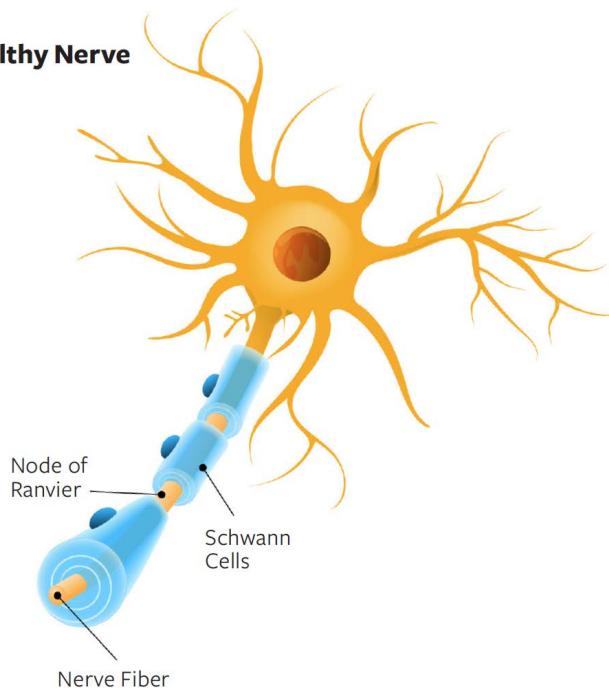
Check with a health care provider if you experience any or some of these symptoms and suspect it may be MS.

## Treatment

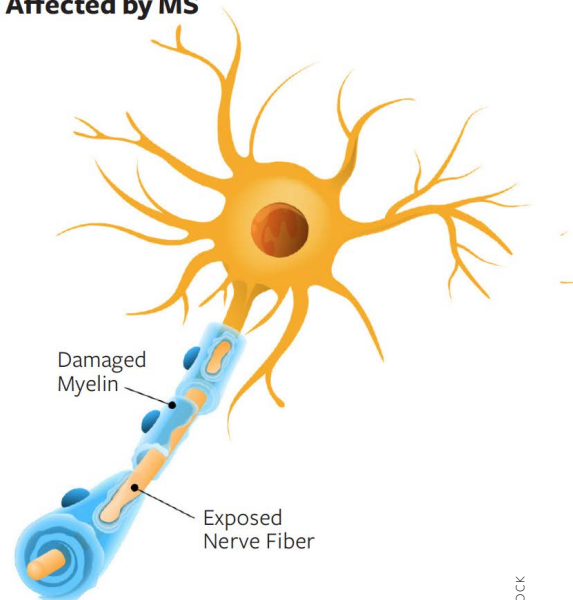
Some people with MS do well without therapy, and in some cases, medications can have serious side effects. Some have major risks, which requires close monitoring. Unfortunately, MS can worsen slowly enough that patients are not always aware of it, and this can happen in the absence of new lesions in the brain or spinal cord. ■

**SOURCES:** National Institute of Neurological Disorders and Stroke; National Multiple Sclerosis Society; Definition of MS

Healthy Nerve



Nerve Affected by MS



# One Day at a Time: Living with an Unpredictable Disease

*Multiple sclerosis patient finds strength in family, friends*



**K**im Bench likes routines. Every morning, she gets out of bed, does her stretches, and makes breakfast. That is, if she is feeling well enough.

Kim has multiple sclerosis (MS), an often debilitating disease that affects the central nervous system (the brain and spinal cord).

“MS is very unpredictable,” Kim says. “I can feel great one day and wake up another day and temporarily not be able to see.”

Kim is 48 years old and lives in Norfolk, Massachusetts.

Her MS symptoms began when she was about 21 years old. She felt a numb sensation in her legs at times and extreme exhaustion. She even passed out from the pain of a sprained ankle and had double vision when driving one day.

Kim didn’t know these were symptoms of MS.

“My doctors kept telling me it was stress-related,” she said.

But Kim wasn’t convinced. She switched primary-care providers four times until one doctor listened to her symptoms.

“He turned out the lights and looked into my eyes. Then he scheduled an MRI,” she said.

“I wouldn’t be where I am today if it were not for my friends and neighbors.”

– Kim Bench

The MRI showed lesions on her brain and in her spine, indicating that she had MS. She began seeing a neurologist for treatment and medications.

Once the neurologists told her it was MS, she felt relieved she had a diagnosis.

Over the past 20 years, Kim has had various symptoms. She says her most recent symptoms make her feel like an elastic band is being pulled around her ribcage. She also now needs a walker or scooter to help her get around.

Kim says she has been on different medications and treatments with varying success and side effects. Some medications had side effects similar to the flu.

Despite her MS symptoms and the side effects of treatment, Kim still considers herself lucky.

“I don’t feel bad for myself and I don’t complain,” she says. “There are much worse situations in the world. If I need help, I ask for help.”

That help comes from family and friends. They help keep her company now that she can no longer work due to her symptoms. Even strangers in a grocery store offer to help her.

“I wouldn’t be where I am today if it were not for my friends and neighbors,” she says. “If I’m having a down day, I call a friend.”

Kim’s advice to someone with MS: “Be open to anything. Go on medication right away. Explore your diet and surround yourself with positive people all the time.” ■

## Find Out **More**

- ▶ **MedlinePlus**  
<https://medlineplus.gov/multiplesclerosis.html>
- ▶ **National Institute of Neurological Disorders and Stroke**  
<https://www.ninds.nih.gov>
- ▶ **National Multiple Sclerosis Society**  
<https://www.nationalmssociety.org>



New

# Blood Pressure Guidelines: *What You Need to Know*

## Understanding your blood pressure reading

Making sense of your blood pressure reading can be tricky, but we've broken it down to help you better understand what the numbers mean.

A blood pressure reading involves two numbers, one over the other. For example, a reading might be presented as 120/80.

Systolic pressure, the top number, is the pressure on the arteries when the heart beats and pumps blood.

Diastolic pressure, the bottom number, is the pressure on the arteries in between heartbeats.

Although both systolic and diastolic measures are important, research has found that systolic pressure is a strong predictor of heart problems caused by high blood pressure, especially among older adults. Normal blood pressure is less than 120/80.

## New blood pressure guidelines

In late 2017, the American Heart Association and the American College of Cardiology announced updated high blood pressure guidelines. The new guidelines are based, in part, on research carried out and funded by the National Heart, Lung, and Blood Institute (NHLBI) at NIH.

- Under the updated AHA/ACC guidelines, if you have systolic blood pressure rates of 130 and higher you are considered to have high blood pressure. The old guidelines set high blood pressure rates at 140 or higher.

- These new guidelines were informed by a number of clinical studies that showed that lifestyle changes can help high-risk individuals reduce their blood pressure—and may ultimately save lives.
- Those changes include heart-healthy diets, weight loss, and exercise as key first steps in reaching a lower blood pressure target.
- One study that helped inform the guidelines was the SPRINT (Systolic Blood Pressure Intervention) trial, which was supported by NHLBI.
- SPRINT studied 9,300 adults, aged 50 and older, at risk for heart disease from around the U.S. It showed that achieving a lower blood pressure goal of 120 mm Hg (instead of 140) reduced the rate of heart events by about 25 percent and the overall risk of death by 27 percent.

## Talk to your health care provider

You can measure your blood pressure at home with a monitor and in your health care provider's office. Some people have higher blood pressure readings at the doctor's office due to the stress that appointments can create. It's known as "white coat hypertension."

Be sure to talk to your health care provider about your blood pressure reading and any follow-up steps you need to take. ■

**SOURCE:** National Heart, Lung, and Blood Institute: Blood Pressure Reading



Under the updated AHA/ACC guidelines, if you have systolic blood pressure rates of **130** and higher you are considered to have high blood pressure. The old guidelines set high blood pressure rates at **140** or higher.

These guidelines were informed by studies showing that lifestyle changes—such as heart-healthy diets, weight loss, and exercise—are the first key steps in reaching a lower blood pressure target.

## DASH: Eat Your Way to Lower Blood Pressure

### What is DASH?

DASH stands for Dietary Approaches to Stop Hypertension. This eating plan is based on research studies sponsored by the National Heart, Lung, and Blood Institute. It can help lower high blood pressure and improve cholesterol levels.

### How can I follow it?

- Fill up on healthy vegetables, fruits, and whole grains.
- Eat a mix of fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils.
- Limit foods that are high in saturated fat.
- Limit sugary beverages and sweets.

### What else can I do to help lower my blood pressure?

Along with DASH, staying active, maintaining a healthy weight, and not smoking can help lower your blood pressure. If you drink alcohol, cutting back to no more than one drink a day can also help. ■

**SOURCES:** MedlinePlus: DASH Eating Plan; National Heart, Lung, and Blood Institute: DASH Eating Plan



# Updated Blood Pressure Guidelines: Lifestyle Changes are Key

*NIH's David Goff unpacks new updates, shares advice*

**N**early 86 million people in the U.S. have high blood pressure. (Blood pressure over 140/90 is traditionally defined as high blood pressure.) The condition, also known as hypertension, puts additional pressure on our blood vessels.

The additional pressure can damage your heart and blood vessels, increasing our risk for strokes, heart disease, and kidney failure.

But knowing if you have high blood pressure isn't always simple. The condition is often called "the silent killer" because it has few—if any—symptoms. Other than you or a health provider checking your blood pressure, you may not realize you have it.

The American Heart Association (AHA) and the American College of Cardiology (ACC) published updated blood pressure guidelines in November 2017. The new guidelines place almost half of the U.S. in high blood pressure range.

To help you navigate the new guidelines, NIH MedlinePlus magazine spoke to David C. Goff Jr., M.D., Ph.D. He is director of the division of cardiovascular sciences at the National Heart, Lung, and Blood Institute (NHLBI). He shared tips for lowering your blood pressure to meet the guidelines safely and effectively.

## What do you want the public to know about the new guidelines?

There is increased risk once your blood pressure goes above 120/80. Research shows that for people with a systolic above 130—the risk for heart attack, stroke, kidney disease, and heart failure is higher than for people with normal blood pressure, which is no greater than 120 systolic.

## What else should the public understand?

The new guidelines say people who already have had a heart attack or a stroke should be especially attentive. This also goes for people who have not had a heart attack or stroke but are at high risk for a heart attack or stroke, based on risk factors such as smoking, age, cholesterol, diabetes, and related factors. The AHA/ACC guidelines strongly recommend these people start drug therapy at the 130-systolic level.

If you have not had a heart attack or stroke and are at lower risk, the AHA/ACC guidelines don't recommend



David C. Goff Jr., M.D., Ph.D. is director of the division of cardiovascular sciences at NHLBI.

starting drug therapy until a systolic level of 140. If you're between 130 and 139, lifestyle changes, such as improving diet and increasing activity, are recommended.

African-Americans, Cuban-Americans, and Puerto Ricans should pay special attention because they are especially vulnerable to high blood pressure. Almost 46 percent of African-American adults have high blood pressure.

## What lifestyle changes can help with high blood pressure?

Lifestyle changes are something we've been talking about for some time now.

Eat a healthier diet—like the DASH Diet—which means more fruits and vegetables, whole grains, lean meats and low-fat dairy, and nuts.

It also means if you're obese or overweight you should lose



**“Lifestyle changes are something we’ve been talking about for some time now. Eat a healthier diet—like the DASH Diet—which means more fruits and vegetables, whole grains, lean meats, low-fat dairy, and nuts.”**

— David C. Goff Jr., M.D., Ph.D.

weight and be more physically active. If you smoke, you should stop smoking. If you consume alcohol, cut back. And reduce the salt (sodium) in your diet by avoiding salty foods such as salted nuts, processed meats, processed cheeses, and other processed foods.

### **Some people might feel overwhelmed by making big changes in diet and exercise. What do you say to them?**

Small changes can be very effective.

Sometimes it can seem overwhelming to think about making major changes. But, we can build in

small changes over time.

For example, at lunch, perhaps you often have a sandwich. Well, bread is a big source of salt. Deli meats—especially turkey and ham—are major sources of salt. If you trade in that sandwich for a healthy salad with some nuts and fruit, you’ve got a much healthier meal with a lot less salt.

### **What questions should I ask my health care provider about my blood pressure?**

An important question to start with is, “What’s my risk for heart disease and stroke?”

If you had a heart attack or stroke, then you know. But if you haven’t had a heart attack or stroke, then ask your doctor about your risk.

And the second important question to ask is, “Now that I know my risk, what’s the most important thing for me to do to lower my risk?”

For example, if you smoke, you need to quit. Your health care provider can respond by saying, “Here are ways I can help you quit smoking.” The same goes for advice on eating and exercise.

Finally, ask, “Should I do anything to lower my blood pressure?” Your doctor can then advise on lifestyle changes or medical therapy as appropriate.

### **What else do the new guidelines tell us?**

The guideline writers paid a lot of attention to strategies for improving blood pressure control.

They covered things like the importance of team care—the involvement of nurses and pharmacists in the process.

The guideline writers also emphasized things like home-based blood pressure monitoring and other types of self-care. ■

### **Find Out More**

- ▶ **Medline Plus**  
<https://medlineplus.gov/highbloodpressure.html>
- ▶ **NHLBI - High Blood Pressure**  
<https://www.nhlbi.nih.gov/health-topics/high-blood-pressure>
- ▶ **NHLBI - Dash Diet**  
[www.nhlbi.nih.gov/health-topics/dash-eating-plan](http://www.nhlbi.nih.gov/health-topics/dash-eating-plan)

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LATEST  
RESEARCH  
UPDATES  
FROM NIH

## Bringing Prosthetic Hands to Life

**NIH IS IMPROVING PROSTHETIC, OR ARTIFICIAL, LIMBS** so that they can work better and feel more natural to patients.

Using vibrations and a complex, computerized interface between patients' brains and limbs, the team of researchers was able to trick the patients' brains into moving their prosthetic hands.

In the small group of patients with limb loss, a surgeon redirected the nerves for the missing part of the limb—in this case, nerves for the hand and fingers—to other remaining muscles. When the subject tries to move their amputated limb, the reconnected muscle contracts. Those signals can then be connected to a computer to drive the motion of bionic hands.

The motion-sensing bionic arm and hands coordinate more naturally and fully with the brain by vibrating near the muscles, which creates sensations that help control the prosthesis.

The research study was funded in part by NIH's National Institute of Neurological Disorders and Stroke and the NIH Director's Transformative Research Award. The award supports projects



Researchers at NIH and around the country are working to improve prosthetic limbs for patients.

that are often risky and untested but have the potential to lead to major research findings.

“Decades of research have shown that muscles need to sense movement to work properly. This system basically hacks the neural circuits behind that system,” says James W. Gnadt, Ph.D., of NINDS. “This approach takes the field of prosthetic medicine to a new level, which we hope will improve the lives of many.” ■

**SOURCES:** NIH Research Matters: Improving Control of Bionic Prosthetic Hands; National Institute of Neurological Disorders and Stroke: Bionic Limbs

The motion-sensing bionic arm and hands **coordinate more naturally and fully** with the brain.

IMAGE: ADOBESTOCK

# Study Offers Clues for Improving Seasonal Flu Vaccine

**THE 2017-2018 FLU SEASON** was rougher than most. During peak flu activity in February, more than 10 percent of deaths in the U.S. were attributed to the flu or pneumonia, according to the Centers for Disease Control and Prevention.

To help combat the flu, NIH-supported researchers are exploring how to improve vaccines. Current influenza vaccines mainly target the influenza surface protein hemagglutinin (HA) but can sometimes offer varying or limited protection.

Recent studies indicate that seasonal flu vaccines might provide better protection if they were

optimized to include an additional target, a different flu surface protein called neuraminidase (NA).

The study is supported by the National Institute of Allergy and Infectious Diseases. This study and related efforts are part of NIH's larger plan to develop a universal vaccine—one that can durably protect all age groups against multiple strains of the flu.

Remember to get your seasonal flu shot every year to help protect yourself and your loved ones. ■

**SOURCE:** National Institute of Allergy and Infectious Diseases: Improved Flu Vaccine

3D print of influenza virus. The virus surface (yellow) is covered with proteins called hemagglutinin (blue) and neuraminidase (red) that enable the virus to enter and infect human cells.



# Extending Cancer Survival in Young Patients



**EARLY RESULTS FROM A CLINICAL TRIAL** show that a new drug may extend survival for cancer patients with a specific type of cancer. The cancer occurs in 1,000 people each year in the U.S. and often affects younger patients.

Sarcomas are cancerous tumors of the connective tissue. They are divided into two main groups: bone sarcomas and soft tissue sarcomas.

Desmoid tumors, which the drug showed promise in, are unusual. They can appear almost anywhere in the body, and some can slowly squeeze vital organs or blood vessels, which can be life-threatening.

The drug, sorafenib tosylate, extended progression-free survival in the sarcoma patients compared with a placebo. Progression-free survival is the length of time patients live before their disease worsens.

The trial was sponsored in part by the National Cancer Institute. ■

**SOURCE:** National Cancer Institute: Sorafenib Improves Progression-Free Survival

NIH  
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## ➤➤ How Sound Travels Through Our Bodies

**Have you ever wondered** how sound waves turn into the noises we hear every day?

The National Institute on Deafness and Other Communication Disorders has answers.

In a two-and-a-half minute animated video, “Journey of Sound to the Brain,” researchers show how sound travels from the ear to the brain, where it is interpreted and understood.

The video teaches about the deepest parts of the inner ear and shows how this process helps us communicate with the world around us.



Find it all in one place!

[medlineplus.gov/magazine](http://medlineplus.gov/magazine)



## ➤➤ 7 Tech Breakthroughs that Could Change Your Health

**An alcohol-monitoring tattoo?** Glowing tumors? A flu vaccine patch?

Welcome to the future of medicine—funded by your National Institutes of Health (NIH).

A new video highlights seven groundbreaking technologies, which are funded by and for all Americans and NIH’s National Institute of Biomedical Imaging and Bioengineering.

## ➤➤ What’s New on MedlinePlus?

**MedlinePlus offers information** on symptoms, treatment, and prevention for more than 1,000 diseases and wellness issues. Now three more topics are available.

The newest topics on MedlinePlus are:

- eosinophilic esophagitis (EoE), a chronic disease of the esophagus
- body lice (also called clothes lice), tiny insects that live and lay nits (lice eggs) on clothing
- dislocated shoulder

Everyday health information is updated on MedlinePlus because we want to bring you the most factual, up-to-date information possible.



# NIH Is Here to Help

**The National Institutes of Health (NIH)**—the nation’s medical research agency—includes 27 Institutes and Centers and is a part of the U.S. Department of Health and Human Services. It is the primary federal agency for conducting and supporting basic, clinical, and translational medical research, and it investigates the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit [www.nih.gov](http://www.nih.gov).

## Institutes

**National Library of Medicine (NLM)**  
[www.nlm.nih.gov](http://www.nlm.nih.gov)  
888-FIND-NLM 888-346-3656

**National Cancer Institute (NCI)**  
[www.cancer.gov](http://www.cancer.gov)  
800-4-CANCER 800-422-6237

**National Eye Institute (NEI)**  
[www.nei.nih.gov](http://www.nei.nih.gov) | 301-496-5248

**National Heart, Lung, and Blood Institute (NHLBI)**  
[www.nhlbi.nih.gov](http://www.nhlbi.nih.gov)  
301-592-8573

**National Human Genome Research Institute (NHGRI)**  
[www.genome.gov](http://www.genome.gov)  
301-402-0911

**National Institute on Aging (NIA)**  
[www.nia.nih.gov](http://www.nia.nih.gov)  
Aging information 800-222-2225  
Alzheimer’s information  
800-438-4380

**National Institute on Alcohol Abuse and Alcoholism (NIAAA)**  
[www.niaaa.nih.gov](http://www.niaaa.nih.gov)  
301-443-3860

**National Institute of Allergy and Infectious Diseases (NIAID)**  
[www.niaid.nih.gov](http://www.niaid.nih.gov)  
301-496-5717

**National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)**  
[www.niams.nih.gov](http://www.niams.nih.gov)  
877-22NIAMS 877-226-4267

**National Institute of Biomedical Imaging and Bioengineering (NIBIB)**  
[www.nibib.nih.gov](http://www.nibib.nih.gov)  
301-451-6772

**Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)**  
[www.nichd.nih.gov](http://www.nichd.nih.gov)  
800-370-2943

**National Institute on Deafness and Other Communication Disorders (NIDCD)**  
[www.nidcd.nih.gov](http://www.nidcd.nih.gov)  
800-241-1044 (voice)  
800-241-1055 (TTY)

**National Institute of Dental and Craniofacial Research (NIDCR)**  
[www.nidcr.nih.gov](http://www.nidcr.nih.gov)  
301-480-4098

**National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)**  
[www.niddk.nih.gov](http://www.niddk.nih.gov)  
NIDDK Health Information  
Center 1-800-860-8747

**National Institute on Drug Abuse (NIDA)**  
[www.nida.nih.gov](http://www.nida.nih.gov) | 301-443-1124

**National Institute of Environmental Health Sciences (NIEHS)**  
[www.niehs.nih.gov](http://www.niehs.nih.gov)  
919-541-3345

**National Institute of General Medical Sciences (NIGMS)**  
[www.nigms.nih.gov](http://www.nigms.nih.gov)  
301-496-7301

**National Institute of Mental Health (NIMH)**  
[www.nimh.nih.gov](http://www.nimh.nih.gov)  
866-615-6464

**National Institute on Minority Health and Health Disparities (NIMHD)**  
[www.nimhd.nih.gov](http://www.nimhd.nih.gov)  
301-402-1366

**National Institute of Neurological Disorders and Stroke (NINDS)**  
[www.ninds.nih.gov](http://www.ninds.nih.gov)  
800-352-9424

**National Institute of Nursing Research (NINR)**  
[www.ninr.nih.gov](http://www.ninr.nih.gov)  
301-496-0207

## Centers & Offices

**Fogarty International Center (FIC)**  
[www.fic.nih.gov](http://www.fic.nih.gov)  
301-402-8614

**National Center for Complementary and Integrative Health (NCCIH)**  
[www.nccih.nih.gov](http://www.nccih.nih.gov)  
888-644-6226

**National Center for Advancing Translational Sciences (NCATS)**  
[www.ncats.nih.gov](http://www.ncats.nih.gov)  
301-435-0888

**NIH Clinical Center (CC)**  
<http://clinicalcenter.nih.gov>  
301-496-2563

**Office of AIDS Research (OAR)**  
[www.oar.nih.gov](http://www.oar.nih.gov) | 301-496-0357

**Office of Behavioral and Social Sciences Research (OBSSR)**  
[www.obssr.od.nih.gov](http://www.obssr.od.nih.gov)  
301-402-1146

**Office of Rare Diseases Research (ORDR)**  
[www.rarediseases.info.nih.gov](http://www.rarediseases.info.nih.gov)

**Genetic and Rare Disease Information Center**  
888-205-2311

**Office of Research on Women’s Health (ORWH)**  
[www.orwh.od.nih.gov](http://www.orwh.od.nih.gov)  
301-402-1770

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