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MIND & BODY

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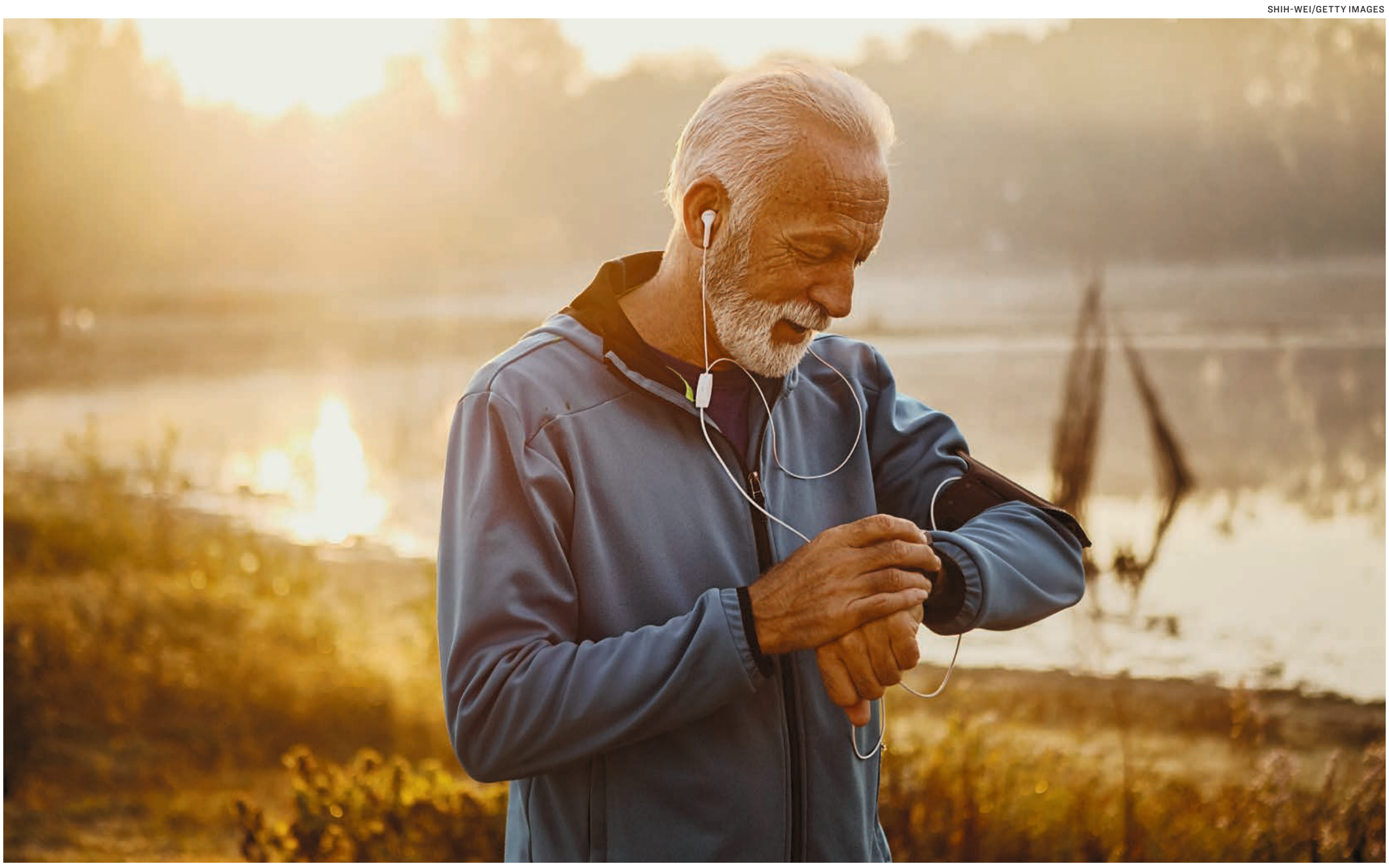


The Risks of AI's Rapid Advance in Health Care

Our personal data is being collected and sold to train AIs that even the creators often don't understand

By Conna Craig

Artificial intelligence (AI) is making headlines, and the reviews are mixed.

Though the United States leads the world in AI investment, Americans remain skeptical. According to a global survey by Ipsos, "Only 35 percent of sampled Americans agreed that products and services using AI had more benefits than drawbacks." Among surveyed countries, the United States had one of the lowest percentages of those who agreed with the statement.

Private industry has edged out academia in producing state-of-the-art AI systems; at the same time, the number of incidents of ethical misuse of AI has increased dramatically—from 10 in 2012 to more than 250 in 2021.

The field is growing in what could be called a "Wild West" of AI. According to Stanford University's AI Index Report, "AI has moved into its era of deployment; throughout 2022 and the beginning of 2023, new large-scale AI models have been released every month."

These models include Stable Diffusion, Whisper, DALL-E 2, and the ubiquitous ChatGPT. The area with the most investment? Health care.

The possibilities when it comes to AI in health care seem endless. Still, whether AI offers promise or peril remains in question.

Artificial Intelligence 101

Though there's a lot of buzz about AI, it isn't new. Theoretical work on "machine learning" is credited to Alan Turing's research beginning in 1935. The term "artificial intelligence" appeared in the early 1950s and was used in a 1955 proposal for a summer research project at Dartmouth College. The following summer, 10 scientists met to study whether machines could simulate human learning and creativity. Their findings would change the course of science.

A basic definition of AI is "software used by computers to mimic aspects of human intelligence." Under the umbrella of AI are specialties such as "machine learning" and "deep learning" that can make decisions without humans.

Scientists have used AI in medical research since the 1970s. The technology can analyze large amounts of data to provide personalized treatment recommendations and identify patterns and risks that might not be immediately apparent to a human. In the right hands, AI could revolutionize medical care.

▲ If you wear a "smart" device, your fitness tracker may be transmitting that information to a company that bundles and sells it.

Meet Sybil, AI That Detects Lung Cancer

A Massachusetts Institute of Technology research team partnered with Massachusetts General Hospital (MGH) in

Continued on ***Page 6***

PHOTO: SHUTTERSTOCK

Antioxidants May Lower Radiation Risk From Medical Imaging

Taking antioxidants before getting a medical imaging test could help reduce DNA damage and lower the risk of cancer

By Zrinka Peters

The use of medical imaging tests that emit ionizing radiation—high-energy radiation that causes electrons to separate from their atoms or molecules—has skyrocketed in recent years, leading more doctors and patients to question not only whether certain tests are being overused, but also whether damage caused by exposure can be minimized.

Several small but promising recent studies have shown that antioxidants could help reduce damage to DNA caused by radiation from these medical imaging tests.

▲ The compounds in natural, whole foods help us heal and avoid disease.

"Radiation" is a word that evokes fear, but it's important to realize that we are surrounded by naturally occurring radiation at all times, including cosmic radiation from the sun and stars, as well as radon gas released as soil and rocks break down.

These natural sources are referred to as "background radiation," and levels can

Continued on ***Page 3***

Cultivating Our GUT MICROBIOME *to Stifle Disease*

PART IX STRESS USHERS IN HARM THROUGH MICROBIOME

Our brain, gut, and microbes work in a complex interplay that affects both mind and body

In this series, *In this series, we'll share how the latest developments in this medical frontier are transforming our approaches to illness and offering new strategies to heal and prevent disease.*

Previously: *There are several strategies that can help you repair a damaged microbiome.*

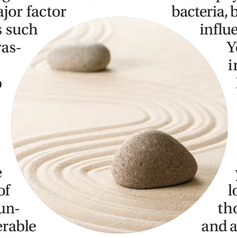
By Amy Denney

A widely cited statistic that appears in several studies says that stress-related complaints are linked to 75 percent to 90 percent of doctor visits. Stress suppresses the immune system, causes the largest volume of lost work days, triggers episodes in diseases from asthma to gastrointestinal disorders, and is a major factor in top-killing diseases such as cancer and cardiovascular disease.

The bacteria in the gut create many critical hormones and also play a role in the creation of neurotransmitters.

Stress appears to do this damage in part by influencing our gut microbiome. This symbiotic community of microbes that live inside us is made of trillions of bacteria, viruses, and fungi—and it's very vulnerable to changes in its environment, the human body.

This influence takes place via the gut-brain axis, or more specifically the gut-brain-microbiome axis, an information superhighway between the gut and the brain. Each end is sending and receiving messages that influence countless processes in the body. Disruptions at either end can cause problems at the other, including psychological and neurological disorders.



Finding ways to soothe our mind and de-stress will change the very molecules our body creates and uses.

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Modern Stress

Normal sources of stress, such as overworking the muscles, can trigger the body to strengthen itself by building stronger muscles, improving metabolism, or making the bones denser. Appropriate stress is essential to tempering the mind and body.

Unfortunately, we live in an era of inappropriate and ongoing stress from sources such as environmental contaminants, fear-mongering in the news, rising debt, and digital apps designed to trigger us to keep scrolling. This stress triggers a cascade of biochemical changes in the body.

75 to 90 PERCENT of all doctor visits in the United States are linked to stress-related complaints.

We understand some of those changes quite well, like a rise in certain hormones and a shift from the rest-and-digest roles of the parasympathetic nervous system to the fight-or-flight roles of the sympathetic nervous system. Along with shutting down digestion, this fight-or-flight state also sacrifices long-term healing and restorative functions for an immediate focus on survival by speeding up our heart rate and prompting our liver to release glucose into the bloodstream to give us a burst of energy.

Stress, according to naturopathic doctor Doni Wilson, is the root cause of most health symptoms. Wilson, author of "Master Your Stress, Reset Your Health," highlights the role stress plays in epigenetics, which is how our behaviors and environment affect our genes.

"Our environmental exposures are what turn on our genetic expression. It's the stress exposure that turns on our autoimmunity," Wilson told The Epoch Times. Wilson says the mediator of that influence, the thing that translates external stressors into internal shifts in our genes, is often our microbiome. "We know we have to be paying attention to our gut bacteria, because gut bacteria are influencing everything."

Your body contains an incredible amount of DNA, but not all of it is yours. The DNA in your own cells is fairly stable. But up to 99 percent of the DNA in your body actually belongs to microbes, and those microbes change and adapt very quickly, with corresponding changes in their DNA.

And those changes can leave us with a series of problems, reaching all the way to the brain.

Much recent work has implicated the gut microbiota in many conditions including autism, anxiety, obesity, schizophrenia, Parkinson's disease, depression, and Alzheimer's disease.

How Stress Achieves Destruction

A 2019 review of previous research, "The Microbiota-Gut-Brain Axis," took a deep look at the mechanisms by which the brain communicates with the microbiome. The review, which was published in Physiological Reviews, summarizes a complex relationship.

"The microbiota and the brain communicate with each other via various routes including the immune system, tryptophan metabolism, the vagus nerve and the enteric nervous system, involving microbial metabolites such as short-chain fatty acids, branched chain amino acids, and peptidoglycans," the authors note.

And since anything that affects the health of the microbiome inevitably affects the rest of the body, that relationship has drawn intense focus from researchers.

"Once it was understood that our commensal friends in the gut could effectively communicate with our brain, a rush of studies sought to understand the intricate processes involved," the Physiological Reviews article notes.

It's well documented that the gut and brain have an intense amount of communication, thanks to the discovery of the enteric nervous system, which has been nicknamed "the second brain" because it's a quasi-autonomous part of the nervous system with big responsibilities and a tremendous number of neurons.

Scientists are now discovering that our microbes have a big role in that interplay, in part because they create many of the key metabolites our body uses for any number of functions. Just as our cells are like little factories pumping out different chemicals and compounds, so too are our microbes.

"Over recent decades, the fields of microbiology and neuroscience have become ever more entwined," the Physiological Reviews article notes.

The bacteria in the gut create many critical hormones and also play a role in the creation of neurotransmitters.

"The gastrointestinal tract is the largest endocrine organ in mammals, secreting dozens of different signaling molecules," a 2017 article in Neurotherapeutics states.

We now also know that neurotransmitters and hormones, such as serotonin, norepinephrine, epinephrine, and dopamine, are active in the brain as well as in the gut.

"These neurotransmitters are able to regulate and control not only blood flow, but also affect gut motility, nutrient absorption, GI innate immune system, and the microbiome," notes a research review published in the Journal of Cellular Physiology in 2016.

One of those key bits of biochemistry our gut microbiome does is produce our main supply of short-chain fatty acids (SCFAs).

Research has linked chronic stress to low levels of SCFAs, which are the metabolites produced when our gut bacteria digest fiber in the colon.

Both SCFAs and the vagal nerve appear to play roles in potential pathways that influence the gut-brain axis, according to a 2020 article in Frontiers in Endocrinology.

Indirectly, SCFAs interact with the brain by inducing the secretion of gut hormones, including gamma-aminobutyric acid (GABA) and serotonin. GABA is an amino acid that has a role in promoting a calm state, and serotonin is a neurotransmitter that stabilizes mood with feelings of happiness.

If our microbes aren't creating SCFAs, we're in trouble. The acids influence neuroinflammation in the central nervous system and play a part in neurogenesis (the brain's process of making new neurons), contribute to the production of serotonin, and improve neural homeostasis and function.

Taken together, SCFAs' influence on the brain can impact emotion, cognition, and changes associated with disease and injury.

And stress can impair their very creation.

Profile of a Top Bug

Bifidobacteria appear to play a role in the gut-brain axis.

Certain strains of Bifidobacteria—more than 250 subtypes have been identified—seem to have a beneficial impact on depression and anxiety. Studies also show taking Bifidobacteria as a probiotic can reduce inflammation in diabetes, celiac disease, inflammatory bowel disease, multiple sclerosis, and psoriasis.

Bifidobacteria are among the first five species to colonize a newborn's gut. They can make up as much as 90 percent or more of a baby's microbiome, but it gradually declines by age 3 and begins to look more like an adult microbiome, with around 5 percent.

Bifidobacteria play an enormous role in early immune system development, protect against pathogens, and help to synthesize B vitamins and antioxidants. They also help to maintain healthy intestinal permeability and lower inflammatory levels, in part by producing the short-chain fatty acids acetate and lactate.

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While short-term stress can temper the mind and body, ongoing stress can fuel disease.

PETER DAZELEY/GETTY IMAGES

Prioritizing Anti-Stress Activities

One stress-reducing activity that can influence the composition of the microbiome is practicing mindfulness, particularly meditation, which seems to get a nod in almost every functional physician's playbook.

"I'm a big fan of meditation. Meditation is a very simple but powerful tool," integrative physician Dr. Akil Palanisamy told The Epoch Times.

Wilson said choosing what she calls "anti-stress" activities every day will help the body return to homeostasis after stress triggers, improve the microbiome, and even allow for weight loss. She uses the acronym CARE—clean eating, adequate sleep, recovery, and exercise—as a reminder to choose daily self-care.

"For a lot of people, when they are stressed, they hold onto weight," she said. "Once we are doing the anti-stress activities daily, we're sending all the right signals to the body. We need to get better at integrating that into every day.""For a lot of people, when they are stressed they hold onto weight," she said. "Once we are doing the anti-stress activities daily, we're sending all the right signals to the body. We need to get better at integrating that into every day."

This concludes our series: Cultivating Our Gut Microbiome to Stifle Disease.

WAYS TO REDUCE STRESS

Dr. William Li offers the following tips for reducing stress, in his book "Eat to Beat Your Diet: Burn Fat, Heal Your Metabolism, and Live Longer."

Get Support: Talk to a trusted friend about your struggles, and consider speaking to a trained therapist if you need more support.

Meditate: Mindfulness practices such as meditation train the brain to stay focused on the present, rather than thinking about the past and the future, which can trigger fears, depression, and worry.

Drink Tea: Certain teas such as green tea and chamomile tea can help to reduce stress and anxiety.

Improve Your Sleep: Sleep quality is associated with the state of the microbiome.

Exercise Regularly: Physical activity can help to relieve stress, improve sleep, improve chronic pain, and regulate the microbiome.

Delegate: Let some things go that don't need to be done by you—prioritize tasks or assign them to others.

Breathe: Breathing exercises can lower cortisol, a hormone associated with stress that can suppress the immune system.

Manage Anger: Avoid those things that trigger anger, if you're able. Address anger with humor, exercise, or professional help.

Practice Regular Self-Care: Do those things you know help you lower your stress, and prioritize a few minutes each day to tend to your own needs.

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Berries, nuts, legumes, and dark green, leafy vegetables are full of antioxidants that combat free radicals.

Antioxidants May Lower Radiation Risk From Medical Imaging

Continued from Page 1

vary from place to place, but the American Cancer Society estimates that, on average, Americans are exposed to about 3 millisieverts of radiation from natural sources each year.

Some level of exposure to ionizing radiation is just a normal and unavoidable part of life. In fact, we even rely on some radiation for our health, using ultraviolet radiation from sunlight, for example, to create vitamin D in our skin.

Interestingly, though, human exposure to radiation has risen significantly in recent decades, due to manmade sources.

Harvard Health explains: "Exposure to ionizing radiation from natural or background sources hasn't changed since about 1980, but Americans' total per capita radiation exposure has nearly doubled, and experts believe the main reason is increased use of medical imaging. The proportion of total radiation exposure that comes from medical sources has grown from 15 percent in the early 1980s to 50 percent today.

"Over 80 million CT scans are [now] performed in the United States each year, compared with just three million in 1980."

There's no question that medical imaging tests have revolutionized the diagnosis and treatment of many conditions and have greatly reduced the need for exploratory surgeries. They are an invaluable medical tool. But the huge increase in the number of higher-radiation dose tests, such as CT scans and nuclear imaging, has many patients and doctors wondering about the cumulative risk of repeated low-dose radiation exposure and its potential link to cancer development down the road.

Some medical images are more dangerous than others. For the chest area, a single CT scan, for example, exposes the patient to at least 150 times the amount of radiation than a chest X-ray does, according to RadiologyInfo.org. And if contrast is used, the radiation dose is approximately doubled.

Ionizing radiation produces free radicals, which are atoms or molecules that have an odd number of electrons in their outer shell, making them unstable and in search of another electron. Free radicals scavenge electrons from surrounding cells, in turn causing damage to those cells. Antioxidants work to stabilize free radicals by donating an electron, thereby stopping the scavenging action of the free radical in its tracks. This is a normal process that is always occurring in the background of our ordinary life activities.

While most damage is repaired by the body's own sophisticated cell repair mechanisms, a small amount is not. These unrepaired cells can contribute to causing cancer in the future. Problems occur when the number of free radicals overwhelms the body's ability to neutralize them.

That's why minimizing exposure to ionizing radiation, as well as other environmental factors that increase the number of free radicals, such as pollution, tobacco smoke, and toxic chemicals, is important.

It's especially important for children and adolescents to avoid unnecessary radiation because they are still growing and therefore more susceptible to the damaging effects of radiation. They also have more years of life ahead of them during which damaged cells could become cancerous.

80 MILLION CT SCANS PER YEAR

Today, more than 80 million computerized tomography (CT) scans are performed in the United States each year, compared with just 3 million in 1980.

One large Australian study, which analyzed the medical records of nearly 11 million children and adolescents who received CT scans between 1985 and 2005, found a 24 percent increased risk of cancer following a single scan, and an additional 16 percent increased risk with each additional scan. While the radiation doses of most CT scans today are likely lower than they were back in the 1980s and '90s, those numbers are still concerning.

With the increase in exposure to ionizing radiation has come an increased interest in ways to reduce related DNA damage.

Dr. Kieran Murphy, an interventional neuroradiologist, and colleagues at Toronto Western Hospital studied the effects of consuming an oral antioxidant cocktail containing vitamin C, lipoic acid, B-carotene, and N-acetylcysteine prior to exposure to ionizing radiation on five patients, compared to a five-patient control group.

They found the antioxidants had a significant protective effect on DNA.

The study, which was published in the Journal of Vascular and Interventional Radiology in March 2017, concluded that "antioxidants may provide an effective means to protect patients and health care professionals from radiation-induced DNA damage during imaging studies."

> It's especially important for children and adolescents to avoid unnecessary radiation because they are still growing and therefore more susceptible to the damaging effects of radiation.

Murphy has spearheaded research in this area, and his company, Cora Therapeutics, now sells an antioxidant formulation that is specifically designed to help reduce radiation-induced damage.

Other studies have found similar protective effects using vitamin C, vitamins E and beta-carotene, selenium, and coenzyme Q10, although many questions remain about which antioxidants or combinations of antioxidants are most effective, as well as optimal timing and dosage.

It's important to note that the protective effects were seen when antioxidants were taken prior to imaging tests being done to reduce the damaging effects of free radicals on DNA—not afterward.

While questions remain about diet versus supplements, and the best type and amount of antioxidants to help reduce radiation-induced cell damage, including plenty of antioxidant-rich foods in the diet, such as berries, nuts, legumes, and cruciferous vegetables (such as broccoli, kale, and Brussels sprouts) may be an effective way to further reduce your risk.

Zrinka Peters is a freelance writer focussing on health, wellness, and education topics. She has a BA in English Literature from Simon Fraser University in Canada and has been published in a wide variety of print and online publications including Health Digest, Parent.com, Today's Catholic Teacher, and Education.com

Medical imaging brings risks due to radiation exposure. It's best to only get an X-ray or CT scan if truly necessary.

AMERICA *The* FLUORIDATED

PART IX THE BOMBSHELL REPORT THAT COULD CHANGE OUR WATER

A controversial government report has become ground zero in a battle over the safety of fluoridating our water supply

By Christy Prais

In this series, *we explore the contentious findings surrounding fluoridation of the U.S. public water supply, and answer the question of whether water fluoridation poses a risk and what we should do about it.*

Previously: *An ongoing lawsuit brought against the EPA by the Fluoride Action Network has uncovered concerning admissions from both EPA and CDC officials.*

To fluoridate or not to fluoridate? That is a question that may soon be weighed across the United States.

The future of U.S. community water fluoridation programs hinges largely on the National Toxicology Program's (NTP's) six-year systematic review, a report that takes a critical look at the available science but has become mired in government interference and controversy.

Draft releases of the NTP's fluoride report—revealed as part of an ongoing lawsuit—affirm the science that links fluoride to lower intelligence in children. Multiple studies have found fluoride is a neurodevelopmental toxin.

The "NTP Monograph on the State of the Science Concerning Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects: A Systematic Review," as it's officially called, has been beset with unprecedented delays in a contentious battle over statistics, verbiage, and final conclusions.

The report, or monograph, is significant because it assesses all research and studies regarding the neurotoxic effects of fluoridated water exposure and raises questions about long-term health effects.

A two-year delay in the release of this pivotal monograph has become a major element in an ongoing lawsuit brought against the Environmental Protection Agency (EPA) by the Fluoride Action Network (FAN), which seeks to ban chemical fluoride additives from the U.S. public drinking water supply.

Between September 2019 and February 2022, the report went though five separate peer-review processes and three revised draft iterations that incorporated all suggestions and comments from all five peer-review processes.

IQ
REDUCTION LINKED TO FLOURIDE

Draft releases of the report revealed as part of an ongoing lawsuit affirm the science that links fluoride to lower intelligence in children, supporting multiple studies concluding that fluoride is a neurodevelopmental toxin.

> Human epidemiological evidence supports a conclusion of 'moderate confidence' that fluoride is a developmental neurotoxin.
>
> Dr. Jack Kall, executive chair, International Academy of Oral Medicine and Toxicology

Despite the extensive peer reviews and draft revisions, internal Centers for Disease Control and Prevention (CDC) emails revealed government officials blocked the release of the May 2022 draft that was considered final by the NTP.

Court documents show that an undisclosed working group then started a review process to "adjudicate" undisclosed comments made by "agency subject matter experts."

The May 2022 draft wasn't made public until March 15 and was only released as a result of months of legal motions, subpoenas, extensive negotiations with the U.S. Department of Justice (DOJ)—which is representing the EPA in court—and a court order.

The NTP's Controversial Findings

The National Toxicology Program (NTP) is an interagency government program run by the Department of Health and Human Services to protect the American public from toxins. The NTP is under the department's National Institute for Environmental Health Sciences.

The NTP started its fluoride toxicity review in 2015, according to minutes of a meeting of the program's Board of Scientific Counselors in December 2015.

Dr. Kristina Thayer, director of NTP Office of Health Assessment and Translation, told the board that the review would evaluate fluoride exposure and the potential for developmental neurobehavioral effects. She highlighted findings from the 2006 National Research Council report and a 2015 review done for Ireland's Department of Health, which highlighted potential neurological effects.

The NTP's review on fluoride looked at data from more than 500 studies on fluoride exposure and neurotoxicity that included more than 150 human studies as well as non-human mammal and vitro studies.

Out of the studies reviewed, 29 of the human studies were rated high quality and the report included a meta-analysis of more than 50 studies on fluoride exposure and children's IQ.

The meta-analysis in the most recent version of the NTP draft review concluded that "52 of 55 studies reported an inverse association between fluoride exposure and children's IQ."

In other words, the more fluoride children are exposed to, the lower their IQ. The estimated drop, based on a range of studies, is approximately seven IQ points.

Although a drop in seven IQ points may not seem like a big deal, it has detrimental effects on the population as a whole, explained Christine Till, a clinical neuropsychologist and adjunct scientist at the neuroscience and mental health program at Sick Kids Hospital in Toronto, in a May presentation. Till was involved in one of the most recent studies on fluoride as part of Health Canada's Maternal-Infant Research on Environmental Chemicals research platform.

Till stressed that just a five-point decrease in a population's IQ would increase the number of people classified as intellectually disabled to 9.5 million from 6 million and the number of people considered gifted would drop to 2.4 million from 6 million.

To understand the significance of that cost, it helps to consider the effects at scale. A May 2021 review published in the journal Children titled "Monetary Valuation of Children's Cognitive Outcomes in Economic Evaluations from a Societal Perspective: A Review" estimated the "implied lifetime monetary valuation of an IQ point in the United States" to be between $10,600 and $13,100. In other words, if 100 million people lost five IQ points, it would amount to $5.3 trillion to $6.55 trillion in total lost income.

Another concerning finding in the review is that there is no obvious safe threshold for fluoride exposure.

Till stressed that data in the NTP report show that there is a drop in children's IQ even between the lower ranges from zero to 2.0 mg/L of urinary fluoride levels. Measurement of fluoride levels in urine is a method used for the estimation of fluoride exposure levels.

KLAUS VEDFELT/GETTY IMAGES

Children are at greater risk of the developmental side effects of fluoridated water.

"The potential for adverse health effects of early-life exposure to fluoride are of huge public health significance," she said.

Dr. Jack Kall, executive chair of the Board of Directors of the International Academy of Oral Medicine and Toxicology, noted other concerning findings of the review in a recent interview on "Discovering True Health."

"Human epidemiological evidence supports a conclusion of 'moderate confidence' that fluoride is a developmental neurotoxin," Kall said.

Confidence ratings in the report range between one and four, with four being the highest confidence. Moderate confidence is three out of four.

Kall noted that a moderate ranking is where serious scientists start asking some very hard questions around safety, such as "If there is that level of confidence, shouldn't we be implementing some changes around exposure to this [fluoride]"?

Kall also stressed that the review revealed people are exposed to enough fluoride to experience harm, according to the research.

"Fluoride exposures experienced by pregnant women and children in the U.S. today are within the range where human studies have found reduced IQ," Kall said.

The possible health risks of fluoride exposure are most concerning for pregnant women and young children.

MLADEN MITRINOVIC/SHUTTERSTOCK

Unprecedented Delays, Lack of Transparency

What's unique about the NTP—normally—is its track record of transparency. A large number of their most recent reports had a public peer-review process lasting a few days, and court documents note that drafts of NTP reports were always provided to the public.

According to court records, the government insisted the May 2022 draft of the report—which was the draft considered by the NTP as final—"should not be released to the public." Emails obtained through the lawsuit, however, show that the American Dental Association, the nation's largest lobbying group on pro-fluoride issues, had already been provided with a copy.

The association went on to urge the NTP to exclude any statements of neurotoxicity of fluoride from the report, saying such claims aren't supported by scientific evidence.

According to an NTP press release, the CDC, FDA, and NIH experts expressed concerns that their previous comments on the meta-analysis weren't adequately addressed, although the NTP authors disagreed with the agency experts' comments and criticisms in many cases.

The members of the working group adjudicating the report remain undisclosed, as do the comments and concerns they are adjudicating.

Government Interference

Many doctors, scientists, and experts witnessing the prolonged process say the government has tried to quash and dilute the report for political purposes. The possibility that a major public health program had unintended side effects is no doubt a significant issue for those that supported it as mounting evidence of neurotoxicity came to light.

Internal CDC emails obtained through a Freedom of Information Act request by FAN's attorney Michael Connett reveal how authorities responded to the unreleased May 2022 draft of the Fluoride Toxicity Report.

"We have set May 18, 2022, for publication of the monograph. The monograph will be posted to the NTP website, and we will email a notice of the posting to NTP listserv subscribers," Mary Wolfe told CDC officials in a May 11, 2022, email. Wolfe is the deputy director for policy and communication at the Division of Translational Toxicology, which functions somewhat like a communications arm for the NTP.

Several back-and-forth emails ensued from CDC official Karen Hacker regarding clarification around whether the report publication had National Institutes of Health clearance and whether it also would be going through a Health and Human Services interagency review.

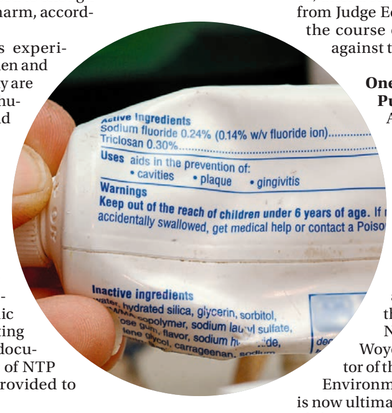
Later that same day, Wolfe clarified, "My reply noted that we believe the current findings, as stated in the monograph, reflect the scope of our evaluation and the available scientific literature, and no revision is needed."

Hacker pushed back, wanting to set up a meeting as soon as possible "to discuss the roll-out and messaging."

Then something happened behind the scenes that wasn't captured in the emails released.

A June 3, 2022, email from Nicole Johnson, associate director for policy, partnerships, and strategic communications at the CDC Division of Oral Health, stated, "The latest we heard (yesterday) is that ASH Levine [Assistant Secretary of Health Rachel Leland Levine] has put the report on hold until further notice."

The May 2022 monograph draft on fluoride wasn't released until March 15, after a subpoena and court order from Judge Edward M. Chen during the course of the current lawsuit against the EPA.



The American Dental Association has taken a strong pro-fluoride stance in the ongoing debate about the safety of fluoride.

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One Step Closer to Publication

After the forced release of the draft, two public meetings were held, one on May 4 and the other on May 16, where the NTP's board of counselors voted unanimously to accept the recommendations of their working group and move forward with the completion process.

NTP Director Richard Woychik, who is also director of the National Institute for Environmental Health Sciences, is now ultimately responsible for deciding on the final publication. He said in his closing remarks that he will be working with the members of the working group and the NTP authors to make revisions and try to get the report to publication as quickly as possible, hopefully in the next several weeks.

Woychik mentioned that he would also be consulting with their partner organizations, the U.S. Food and Drug Administration and the CDC, in the finalization process.

Next Week: Keeping fluoride out of your drinking water will often depend on an effective home filtration system—but not all water filters are created equal.

Christy A. Prais received her business degree from Florida International University. She is the founder and host of Discovering True Health, a YouTube channel and podcast dedicated to health and wellness. Prais also serves on the advisory board at the Fostering Care Healing School. She is a contributing journalist for The Epoch Times.

> Fluoride exposures experienced by pregnant women and children in the United States today are within the range where human studies have found reduced IQ.
>
> Dr. Jack Kall, executive chair, International Academy of Oral Medicine and Toxicology

7
IQ POINT DROP

The estimated IQ drop from fluoride exposure—based on multiple studies—was seven IQ points.

The Story of Asbestos

Dr. Jack Kall noted that the last time major delays like this were witnessed in the process of an NTP review was with the now-highly regulated cancer-causing substance asbestos. However, "the delays have been much worse with the NTP report on fluoride," he said.

Similarly to the chemical fluoride additive, asbestos is big business in the United States.

Despite the known health hazards documented as early as 1898, a 2023 asbestos global market report says the global asbestos market size grew from $950 million in 2022 to $1.01 billion in 2023 and is expected to grow to $1.53 billion in 2027.

More than 60 countries have banned asbestos, but the United States has only partially banned it. In 2020, the EPA found an unreasonable risk to human health and has proposed to ban it under the Toxic Substances Control Act but hasn't yet done so.

The 2022 market size of fluorosilicic acid, which is the chemical fluoride additive most used in 75 percent of the U.S. public water supply, was $1.1 billion and expected to grow to $1.57 billion by 2023, per a Reports and Data press release.

KPG-PAYLESS/SHUTTERSTOCK

A Timeline of the NTP Fluoride Report

The timeline of events for the NTP report on fluoride is as follows:

2015: A meeting of the NTP's board reveals a program is being developed to review the potential neurotoxicity of fluoride.

2016: The NTP publishes its first report on fluoride, titled "Systematic Literature Review on the Effects of Fluoride on Learning and Memory in Animal Studies."

September 2019: The NTP publicly releases a draft of its second report on fluoride, titled "Systematic Review of Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects." The review looks at both animal and human studies, but focuses more on human studies.

September 2019–March 2020: The second report draft is peer reviewed by the National Academies of Sciences, Engineering, and Medicine (NASEM).

September 2020: The NTP incorporates NASEM's suggestions from the peer review and released a revised report.

September 2020–February 2021: A second peer review is conducted by NASEM on the revised 2020 report.

July 2021–July 2022: The report is reviewed by various Department of Health and Human Services entities.

November 2021: The NTP incorporates NASEM's comments from the second-round peer process and completes another revised 2021 draft.

November 2021–February 2022: The 2021 draft undergoes a peer-review process by five external non-government scientists.

January 2022: The NTP states, "Pending general reviewer agreement with our document, we anticipate public availability of a revised final state of the science report by the end of March."

May 2022: The NTP incorporates all comments from all five external peer reviewers and completes a finalized copy of the report. It decides to publicly release the report on May 18, 2022.

June 2022: Government officials decide to put the report on "hold," according to emails obtained via the Freedom of Information Act.

October 2022–May 2023: Another review is done by an undisclosed working group set by the NTP's board to adjudicate 325 comments and criticisms on the report received from external peer reviewers and federal agency experts.

March 15, 2023: After months of legal motions, subpoenas, extensive negotiations, and a court order, the National Institute for Environmental Health Sciences publicly releases the NTP's final report that was intended to be published in May 2022. The final report include a September 2022 marked-up "working" draft with reviewers' comments and NTP authors' responses, with names redacted.

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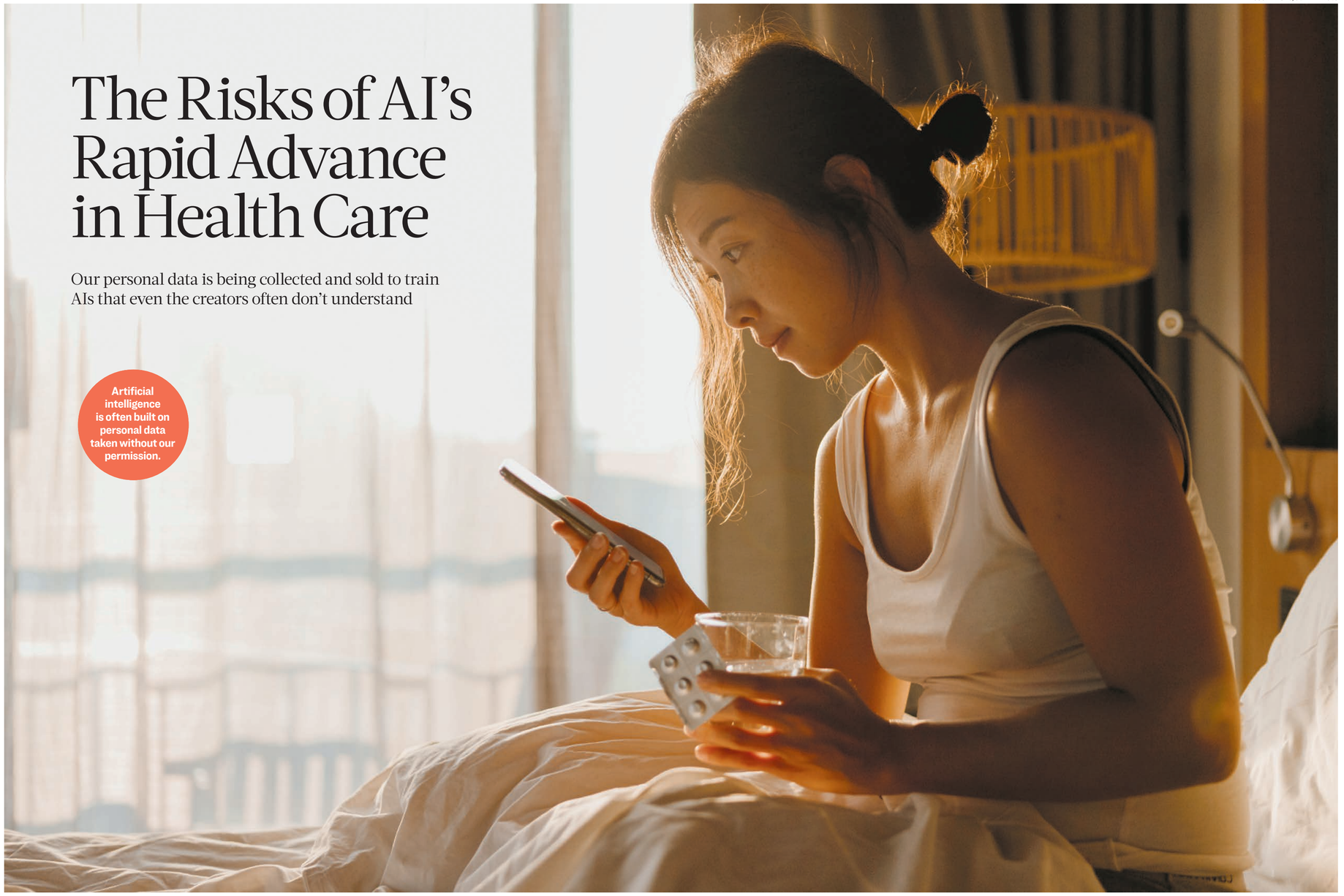

The Risks of AI's Rapid Advance in Health Care

Our personal data is being collected and sold to train AIs that even the creators often don't understand

Artificial intelligence is often built on personal data taken without our permission.

Continued from Page 1

Boston and Chang Gung Memorial Hospital in Taiwan to create an AI tool that assesses lung cancer risk. Introduced in January 2023, "Sybil" uses a single low-dose CT scan to predict cancer that will occur within one to six years, with remarkably high accuracy—up to 94 percent in a clinical trial.

In the Journal of Clinical Oncology, researchers summed up Sybil's early success: "Sybil was able to forecast both short-term and long-term lung cancer risk" and "maintained its accuracy across diverse sets of patients from the United States and Taiwan."

Lung cancer is the deadliest cancer in the world "because it's relatively common and relatively hard to treat, especially once it has reached an advanced stage," stated Dr. Florian Fintelmann, a radiologist physician-scientist at MGH, associate professor of radiology at Harvard Medical School, and part of the research team. Fintelmann noted that the five-year survival rate is 70 percent for early detection but drops to 10 percent for advanced detection.

Sybil's ability to predict cancer outcomes can lead to more widespread screening, especially in underserved populations, which would align with guidance from the U.S. Food and Drug Administration (FDA) on improved clinical trial enrollment among members of minority communities.

Exponential Growth in FDA Approval of AI Applications

Although Sybil awaits approval by the FDA, 521 AI algorithms have already been approved.

Three-quarters of these are in medical imaging, and another 56 are cardiology-related applications.

Because machine learning evolves with new data, the FDA will require applications for AI to include predetermined change control plans (PCCPs). Accordingly, it has recently issued a draft guidance on PCCPs.

This is to ensure AI "can be safely, effectively, and rapidly modified, updated, and improved in response to new data," Brendan O'Leary, deputy director of the Digital Health Center of Excellence in the FDA's Center for Devices and Radiological Health, said in a statement.

If the guidance is approved, developers can update AI devices without submitting a new application to the FDA.

It's likely that, even with the FDA's increased data requirements, there will be no slowing the development of AI devices and algorithms.

What Could Possibly Go Wrong?

AI was created to imitate how humans think, reason, and solve problems. Humans are fallible and have biases, and AI may be no better.

Unreliable Data Generate Risk

AI's judgment is based on the data it's fed. "Data bias" occurs when an algorithm is trained with poor or incomplete data, which leads to faulty predictions.

While numerous studies have claimed that AI could assess skin cancer more accurately than human doctors could, one group of researchers decided to challenge AI's ability to identify skin conditions.

The researchers began with 25,331 training images from two datasets—one from Vienna and the other from Barcelona—including eight skin diseases. Then, they added images—from Turkey, New Zealand, Sweden, and Argentina—that had not been used in the training data and included additional skin diseases.

AI misclassified nearly half (47.1 percent) of the images from outside the training datasets. According to the researchers, this would "lead to a substantial number of unnecessary biopsies if current state-of-the-art AI technologies were clinically deployed."

Even the most promising AI requires real-world clinical trials before it can be adopted.

> The number of incidents of ethical misuse of AI has increased dramatically–from 10 in 2012 to more than 250 in 2021.

The Past Is Not Always Prologue

How do AI developers measure the success of their algorithms? Usually, they conduct studies with datasets from the past.

As Eugenio Santoro of the Mario Negri Institute of Pharmacological Research wrote, "Many of these are retrospective and based on previously assembled datasets, while few are prospective ones conducted in real clinical settings, and very few are those based on randomized controlled clinical trials."

In other words, there can be important differences between the data used to evaluate whether an AI works properly and the data that the AI will actually have to work with in a clinical setting. That could lead to problems in AI efficacy.

A Robot Whispering in Your Ear

Humans can be influenced by computer- or AI-generated data—even when those data are incorrect. So to what extent, if any, could AI bias medical professionals?

In an experiment conducted by German and Dutch researchers, 27 radiologists read 50 mammograms. The radiologists were given (fake) AI-generated categorizations for the mammograms, half of which were incorrect. (Categorizations suggest the next steps in treatment.)

"Experienced radiologists, those with more than 15 years of experience on average, saw their accuracy fall from 82 percent to 45.5 percent when the purported AI suggested the incorrect category," the study authors wrote.

The researchers wrote that safeguards are needed to avoid this kind of bias, and one of the safeguards is that we should know "the reasoning process" of AI—that is, what takes place in the so-called "black box."

Mystery Inside the Black Box

The theoretical place containing the goings-on between input (data) and output is called a "black box."

Because machine learning can teach itself, some of what's happening inside the black box remains mysterious, even to AI's creators.

In AI, accuracy is everything. The prevailing idea is that to achieve this accuracy, AI must be complicated and uninterpretable. However, scientists are beginning to challenge that notion.

According to a paper published in the Harvard Data Science Review, "The so-called accuracy–interpretability tradeoff is revealed to be a fallacy: More interpretable models often become more (and not less) accurate."

Furthermore, the authors wrote, "When scientists understand what they are doing when they build models, they can produce AI systems that are better able to serve the humans who rely upon them."

Because of its opacity, the black box also contributes to distrust.

In a white paper published by the Italian Society of Medical and Interventional Radiology this May, the authors noted, "Even experts at the highest level may struggle to fully understand the so-called 'black-box' models."

The white paper authors refer to "explainable AI" as an important aspect of AI adoption, calling for developers to move from "black box" models to "glass box" models.

> Scientists have used AI in medical research since the 1970s.

And it's not just what happens inside the box that's hidden; the training data fed into AI algorithms might surprise you.

Who Owns the Data Anyway?

We learn, from infancy, from the people around us. Likewise, AI doesn't exist in a vacuum. Before it can work its magic, it needs data.

And those data come from you and me.

If you use a health app online or wear a "smart" device, your fitness tracker may be keeping track of every step you take and transmitting that information to a company that bundles and sells it.

If you check the local weather on a smartphone, chances are you have turned on your phone's location tracking. Did you know that the app tracks everywhere you go and how much time you spend there and can infer from those data what religion you practice, whether or not you vote, and even your age?

What about medical data? Most Americans are familiar with the Health Insurance Portability and Accountability Act (HIPAA), which protects our privacy related to health information.

However, there are gaps in HIPAA. "Numerous apps and websites outside the scope of HIPAA's narrow 'covered entities' are entirely free to legally collect, aggregate, and sell, license, and share Americans' health information on the open market," Justin Sherman, senior fellow and research lead at Duke University Sanford School of Public Policy's data brokerage project, stated in his written testimony to the U.S. House Committee on Energy and Commerce.

Some of the data come directly from hospitals. According to VentureBeat, "Google maintains a 10-year research partnership with the Mayo Clinic that grants the company limited access to anonymized data it can use to train algorithms."

In what it calls "a move to democratize research on artificial intelligence and medicine," Stanford University maintains "the world's largest free repository of AI-ready annotated medical imaging datasets."

"What drives this technology, whether you're a surgeon or an obstetrician, is data," said Dr. Matthew Lungren, co-director of Stanford's Center for Artificial Intelligence in Medicine and Imaging and an assistant professor of radiology at Stanford, in an article on Stanford's Institute for Human-Centered AI website.

"We want to double down on the idea that medical data is a public good and that it should be open to the talents of researchers anywhere in the world."

Is that really what we want—for our medical data to be a "public good"?

Conna Craig is a researcher and writer focused on public policy, health, and children's issues. She has advised decision-makers in two White House administrations and holds a bachelor's degree from Harvard College.

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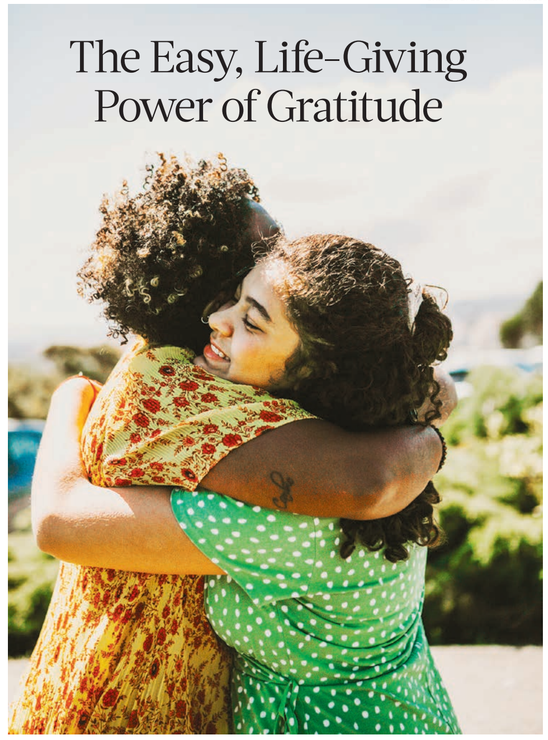

The Easy, Life-Giving Power of Gratitude

Researchers are affirming that giving thanks has the power to improve our health and our happiness

By Mike Donghia

Research into gratitude has skyrocketed in the past 10 years, finding that a daily gratitude habit can have an enduring positive effect on our mental health, happiness, and physical well-being.

An article in the Journal of Personality and Social Psychology from 2003 looked at three different studies in which participants were asked to write down what they were grateful for on a weekly or daily basis. Consistently, those groups reported greater well-being than control groups, across a number of dimensions.

In another study, published in Personality and Individual Differences in 2013, researchers found that an individual's gratitude as measured in surveys was a very strong predictor of physical health.

A study published in Frontiers in Psychology in 2019 reported that participants who were asked to write daily gratitude lists for two weeks showed a remarkable change. "The gratitude intervention managed to increase positive affect, subjective happiness and life satisfaction, and reduce negative affect and depression symptoms," the authors reported.

Cultivating Gratitude

Here are some practical ways to start cultivating the often underrated virtue of gratitude.

Start a Gratitude Journal

One of the most time-tested ways of cultivating the gratitude habit is daily practice. Designate a certain time each day to write down a few things you are grateful for. These can be big or small. The key is to begin focusing your attention on the positive aspects of your life that you aren't fully savoring.

If You Feel Grateful, Say It

Too often, we feel grateful for something someone did, or simply the kind of person they are, but we don't tell them. Maybe we're afraid it will come across as strange or weird in a world where such compliments are rare. But deep down, most people treasure these words and will remember them for a long time.

Be Mindful of Your Blessings

Mindfulness and gratitude go hand in hand. There are likely dozens of good things in your life that you aren't fully appreciating because you take them for granted. Two examples in my own life are good health and restful sleep. I never seem to realize their value until they are temporarily taken from me. But it doesn't have to be this way.

Don't Dwell on the Negatives

In a way, this tip is simply the inverse of gratitude. Gratitude is the art of noticing and savoring what is good in life and directing that thankfulness to someone or something. We also have to avoid filling our mind with all the ways in which life isn't exactly what we want it to be, or else this lens will become our default way of viewing every situation.

Live Generously

It might not seem obvious in today's "everyone-for-themselves" world, but one of the surest ways to become happier and more grateful is to invest more into the lives of others. Living generously and sharing our blessings has a way of shifting our perspectives so that the small inconveniences of life seem less important in comparison. Volunteering is a great way to be generous, but so are stepping out to help a neighbor and reaching out to someone you know is facing struggles.

Take Pride in Small Victories

Ambition is a praiseworthy quality when it's harnessed for good, but it can leave some people forever unsatisfied. Don't get so focused on the future and so intent on achievements that you completely lose the ability to celebrate the small wins and enjoy the journey along the way.

The Lasting Effect of Gratitude

By embracing the practice of gratitude, you aren't only building a better life for yourself, but you're also improving the world around you. Don't underestimate the effect that a single kind word can have on someone's day or even their whole year. Grateful people are quick to notice the good in others and point it out. That's the power of gratitude in action.

If gratitude came easily, you would already be doing it, but for many of us, it isn't our default way of thinking. At one level, that's a reflection of our culture. We are bombarded by messages that tell us to want more, be better, or dislike those who have what we don't. It's become normal to focus on what's bothering us and complain about what isn't good enough in our lives. Thankfully, it's never too late to change this.

There's no secret formula to becoming a more grateful person; it's just a choice you make over and over. For many people, one of the most powerful ways to begin is simply reflecting on what they have to be grateful for as a regular daily habit.

Start your gratitude journey today and enjoy the amazing benefits—and then spread those benefits out to those around you.

Mike (and his wife, Mollie) blog at This Evergreen Home where they share their experience with living simply, intentionally, and relationally in this modern world. You can follow along by subscribing to their twice-weekly newsletter.

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In choosing and using OTC medications, we need to be self-informed about potential side effects, correct dosage, and possible contraindications.

Beware of Combining These Common Over-the-Counter Medications

Many drugs contain the same or similar ingredients, making accidental overdose a common and dangerous consequence

By Allison DeMajistre

Effective remedies for our everyday ailments are readily available as over-the-counter (OTC) medications we can pick up any time at the pharmacy or local grocery store. They are easy, relatively inexpensive fixes for headaches, cold and flu symptoms, constipation, diarrhea, and other minor infirmities the entire family can sometimes suffer.

Approximately 70 percent of Americans take OTC medications to treat their cold and flu symptoms. While OTC medications are considered generally safe, they come with risks, even when taken as directed.

A study conducted from 2017 to 2019 found that 26,735 people in the United States went to the emergency department for harm caused by taking OTC cough and cold medications, and more than 60 percent took the OTC medications for reasons other than their intended use.

Many over-the-counter medications can be dangerous to pregnant women and fetal development and should be avoided unless otherwise directed by a doctor or other medical professional.

Consider trying natural remedies such as saline irrigation for stuffy noses, rest, and plenty of fluids for children with colds before turning to OTC medications.

Potentially Dangerous OTC Drug Combinations

Inaccurate self-diagnosis isn't the only way OTC medications can be harmful; safety depends on using the medicines properly and thoroughly reading the drug label, which many people fail to do. Even then, spotting these potentially dangerous OTC medication combinations isn't always easy.

> Because of the various risks and side effects of NSAIDs, it's important to talk with your doctor about which one to take and for how long.

Tylenol and OTC Cold and Flu Medication

Many OTC cold and flu medications contain acetaminophen to relieve symptoms such as sore throat, headache, and fever. Many people don't know that acetaminophen is the off-brand name for Tylenol. Even though acetaminophen is in more than 600 different OTC and prescription medications and is one of the most trusted and used pain and fever relievers, it has potentially dangerous (and sometimes deadly) side effects. Every year, approximately 60,000 people are admitted to the hospital for acetaminophen overdose.

Recommended dosages for acetaminophen are based on weight, age, and dosing frequency. However, the maximum recommended dose can still lead to liver damage if taken for an extended period of time, and exceeding that dose could lead to acetaminophen poisoning, the most common cause of acute liver damage and failure in Western countries. Acute liver failure is life-threatening, often requiring a liver transplant.

If you drink alcohol, you may want to consult with your doctor before taking any products that contain acetaminophen. Dr. James Walker, a clinical physician and general practitioner, told The Epoch Times: "The liver metabolizes both alcohol and acetaminophen, and they compete for the same enzymes. If you consume alcohol, your liver will be busy metabolizing the alcohol, causing more of the acetaminophen to convert into a toxic byproduct that can injure liver cells."

Common OTC cold and flu medications such as Dayquil, Mucinex, and Theraflu contain acetaminophen in different dosages. Beware of combining these with other OTC medications containing acetaminophen to prevent overdose.

Signs and symptoms of acetaminophen poisoning include vomiting, abdominal pain, and confusion. Head straight to the emergency room if you're experiencing any of these symptoms after taking a high dose of acetaminophen. Immediate treatment with activated charcoal along with N-acetyl cysteine, the antidote for acetaminophen poisoning, could save your liver and life.

When buying cold and flu medications, read the label for the drug name. Acetaminophen may be classified as a pain reliever or fever reducer on the packaging, but it's still the same ingredient. Also, look for acetaminophen abbreviations such as APAP, AC, and Acetam. It may be listed as paracetamol in some European countries, Australia, New Zealand, and India.

Ibuprofen, Naproxen, and Aspirin

A doctor can prescribe nonsteroidal anti-inflammatory drugs (NSAIDs) in higher strengths but they're also readily available OTC. An estimated 30 million people take NSAIDs daily throughout the United States to treat acute and chronic pain and inflammation and to reduce high fevers.

Although NSAIDs are widely used, they can also potentially be unsafe for everyone and can cause dangerous side effects, especially when taken in excess or accidentally combining different classes of NSAIDs simultaneously.

The most popular NSAIDs include:

- Ibuprofen (Advil, Motrin, Nuprin)
- Naproxen (Aleve, Naprosyn)
- Aspirin (Ecotrin, Bayer)

NSAIDs—widely available over-the-counter painkillers—may be more dangerous than they appear, with possible side effects on the renal, cardiovascular, hepatic, and hematologic systems of the body.

Every year, approximately

60,000

PEOPLE

are admitted to the hospital for acetaminophen overdose.

ACETAMINOPHEN, commonly sold under the brand name Tylenol, is found in many over-the-counter cold medications. Be sure to know the ingredients of all the products you are taking to avoid inadvertent acetaminophen overdose.

It's important to know the names of the different brands of NSAIDs to avoid accidentally combining them since they come with many risks and can cause serious stomach, kidney, and heart problems.

NSAIDs block an enzyme in your body called cyclooxygenase (COX). There are two COX types: COX-1 and COX-2. Both types are enzymes involved in the body's production of prostaglandins, chemicals that affect pain, fever, and inflammation.

COX-1 also protects the stomach lining and supports platelet function, whereas COX-2 is mainly produced in response to inflammation. NSAIDs work by inhibiting these enzymes, which is why they are also called COX inhibitors.

Aspirin and naproxen are COX-1 inhibitors, and ibuprofen is a nonselective COX inhibitor that blocks both COX-1 and COX-2 enzymes. Aspirin, naproxen, and ibuprofen increase the risk of bleeding, particularly in the stomach. They can also cause kidney problems since they inhibit blood flow to the kidneys.

Because of the various risks and side effects of NSAIDs, it's important to talk with your doctor about which one to take and for how long, which will depend on your medical history. If you've had stomach, kidney, or heart problems, it may be wise to use NSAIDs cautiously or not at all.

Benadryl and Dramamine

Many people don't realize that Benadryl (diphenhydramine) and Dramamine (dimenhydrinate) are both antihistamines. Taking them together can cause excessive drowsiness, blurred vision, difficulty urinating, constipation, and heart rhythm irregularities.

Benadryl is often taken for allergy symptoms such as runny nose and itchy eyes, and Dramamine is commonly taken for motion sickness and nausea. The problem is that they're both in a class of drugs called anticholinergics that are found in several other prescription medications used to treat respiratory disorders, urinary incontinence, and Parkinson's disease.

In 2015, the American Association of Poison Control Centers reported almost 14,000 anticholinergic toxicities. Although none of the cases in 2015 were fatal, reports in prior years found up to 51 fatal cases of anticholinergic toxicity.

In addition, long-term use of anticholinergics has been associated with dementia in the elderly.

Several common anticholinergic medications can interact with OTC antihistamines, so it's important to check with your physician or pharmacist to ensure you're not unknowingly combining these medications. Also, if you have conditions such as an enlarged prostate, urinary retention, glaucoma, muscle problems, or hyperthyroidism, be sure to inform your health care provider before taking these medications.

Increased OTC Drug Risks for Children, Pregnant Women, and Seniors

OTC medications could harm anyone, but older adults, pregnant women, and children are often more vulnerable and at greater risk.

Risks for Children

Knowing what children can take and at what age is essential. The American Academy of Pediatrics (AAP) has specific age recommendations for giving children acetaminophen and ibuprofen. For the most up-to-date advice, always check with your child's doctor.

Aspirin isn't recommended for children or teens due to its association with the onset of Reye's syndrome. While the cause is unknown, Walker explained that there's a strong association with the use of aspirin during viral illnesses.

"Reye's syndrome is a rare but severe condition that causes swelling in the liver and brain. It most often affects children and teenagers recovering from viral infections like the flu or chickenpox," Walker said.

The AAP doesn't recommend cough or cold medication for children under 6 years old.

Some safe and effective cold treatments for children include saline irrigation for stuffy noses, rest, and plenty of fluids.

Risks During Pregnancy

Some OTC medicines are known to cause problems during pregnancy. Before using any OTC medicine while you're pregnant, it's always best to speak with your doctor.

"NSAIDs during pregnancy can cause risk to both the mother and the baby," Walker said. "These include potential problems with the baby's kidney development and risk of premature closure of the ductus arteriosus, a vital fetal blood vessel. For the mother, NSAIDs can increase the risk of bleeding during delivery."

NSAIDs such as ibuprofen (Motrin, Advil), naproxen (Aleve), and aspirin (acetylsalicylate) are all known to cause serious issues with blood flow in the baby if used during the last three months of pregnancy (after 28 weeks). Aspirin may also increase bleeding risk in both mother and baby during pregnancy or delivery.

The FDA also recommends avoiding NSAID use at 20 weeks or later because of the risk of low amniotic fluid.

Decongestants and some antihistamines have risks, especially since there is limited safety data on the use of OTC medications during pregnancy.

Natural remedies for coughs and colds during pregnancy are similar to recommendations for children; rest, fluids, and a healthy diet will speed recovery and lessen symptoms.

Risks for Older Adults

Seniors are more at risk for OTC drug interactions and side effects, explained Walker.

"As we age, our body's physiological changes can affect how we process medications. Kidney and liver function, vital for drug metabolism and elimination, often decrease, leading to higher levels of drugs in the body. Also, age-related changes in body composition, such as increased fat and decreased muscle mass, can alter how drugs are distributed within the body," he said.

Many older adults are unfamiliar with the appropriate dosing of OTC medications and how they interact with other medications they may be taking, putting them at risk for significant harm.

According to a study published in the Journal of Research in Social and Administrative Pharmacy, more than half of the adverse drug events (ADEs) involving seniors are caused by OTC medications, particularly NSAIDs. Four of the 10 most frequently used drugs available OTC include ibuprofen, aspirin, acetaminophen, and diphenhydramine.

Diphenhydramine is a notable culprit in ADEs among seniors, increasing the risk of falling and also anticholinergic toxicity, since 40 percent of elderly people taking diphenhydramine also combine it with other prescribed anticholinergic drugs for sleep.

Dangerous drug interactions can be prevented with a careful assessment of all OTC medications and prescription medications used simultaneously, while also considering individual health conditions.

In Conclusion

While OTC medications can be helpful for the occasional treatment of minor aches and pains or nagging cold or allergy symptoms, it's important to consider their potential to cause significant harm when not used as directed or when combined with other medications.

Before using OTC medications, it's always advisable to consult with your doctor or pharmacist about your symptoms, health history, and the other medications you're taking, especially for those at increased risk.

Allison DeMajistre, BSN, RN, CCRN is a freelance medical writer for The Epoch Times. She is a registered nurse who previously worked in critical care. She specializes in cardiology-related topics.

FOOD AS MEDICINE

Strange, Nutritious, and Delicious: Jackfruit

This tropical fruit has an impressive nutritional profile but isn't eaten often by Americans

By Sandra Cesca

Tropical fruits appear in markets each spring in much of the United States. Besides being refreshingly delicious, these foods have numerous bioactive compounds that help reduce inflammation, high blood pressure, and even one's risk of developing cancer.

One of the strangest-looking among them is jackfruit (Artocarpus heterophyllus), which is available from March through August and can weigh as much as 100 pounds when mature, though the ones seen in stores typically fall somewhere in the range of 10 to 25 pounds. The fruit's knobby green exterior hides a white sticky flesh filled with seed pits, each surrounded by a delicious yellow flesh.

In tropical countries where jackfruit grows, it's considered a miracle fruit due to its high concentration of vitamins, minerals, and fiber. It's the national fruit of Bangladesh. India is the world's largest producer, followed by Thailand, Indonesia, Mexico, and Nepal. The average American, however, likely hasn't even tried it.

The unripe flesh can be dried and eaten as a meat substitute in vegetarian and vegan dishes. The ripe flesh can be eaten plain or made into cakes, custards, curries, and smoothies. The yellow seed envelope is sweet and delicious, and the seed pits can be roasted and eaten as a snack.

> Since ancient times, jackfruit has been known for its therapeutic qualities, including anticancer, antimicrobial, antifungal, anti-inflammatory, antidiabetic, and antioxidant effects.

Nutritional Qualities

The nutritional and medicinal properties of jackfruit are numerous. It's a complete protein source due to its nine essential amino acids, though it's low in protein overall and has very little of one of those amino acids.

The jackfruit's most common vitamins and minerals include vitamins A, C, thiamine, niacin, riboflavin, calcium, phosphorus, potassium, iron, copper, magnesium, manganese, and zinc.

Although jackfruit contains sugar, most of which is fructose, the fiber and protein in jackfruit help slow sugar metabolism, giving it a medium glycemic index suitable for those with Type 2 diabetes. One-half cup of fresh pulp only contains 94 calories.

Bioactive Compounds

A bioactive compound is a chemical substance found in plants that may promote good health, according to the National Cancer Institute. Phytonutrients are substances produced in plants to protect themselves. Many can also be bioactive compounds that benefit the human body when consumed. Common phytonutrients include carotenoids, flavonoids, coumarins, indoles, isoflavones, and resveratrol.

Recently, flavonoids have gained scientific interest due to their positive effects on health and their potential use in the management of chronic diseases. Phytonutrient properties, particularly polyphenols, play a role in metabolic syndrome, especially inflammation and oxidation as noted in an article in Current Opinion in Food Science in 2016.

Since ancient times, jackfruit, which is rich in these beneficial compounds, has been known for its therapeutic qualities, including anticancer, antimicrobial, antifungal, anti-inflammatory, antidiabetic, and antioxidant effects.

It's also high in potassium, which helps lower blood pressure and improve cardiovascular health, thus reducing the risk of heart disease and stroke.

The iron in jackfruit helps to prevent anemia and aids in proper blood circulation, while the fruit's copper content plays an essential role in thyroid metabolism.

Niacin, another nutrient found in jackfruit, is necessary for energy metabolism, nerve function, and the synthesis of certain hormones.

Some of the phytonutrients found in jackfruit have been studied regarding their effects on mental health conditions, including stress, anxiety, depression, and insomnia. An investigation into the flavonoid epigallocatechin gallate looked at its effect on stress and mood. Another study in Nutritional Neuroscience in 2018 showed that carotenoids significantly reduced stress, cortisol, and symptoms of emotional and physical health. Further research is needed to confirm the benefits of jackfruit and its therapeutic use for mental health.

Anti-Aging Properties

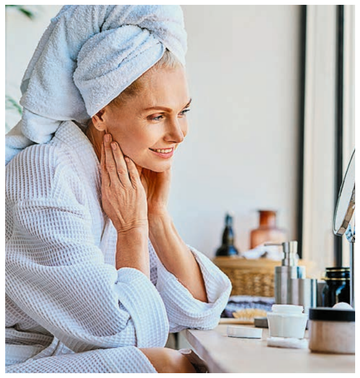
The vitamin A in jackfruit supports eye health and can counteract age-related macular degeneration and cataracts. Vitamin C helps the skin's natural aging process through sun protection and collagen production. It also plays a huge role in maintaining the immune system to fight inflammation and degenerative diseases such as cancer, cardiovascular disease, and damage from free radicals.

The high magnesium and calcium content of jackfruit helps prevent bone-related disorders such as osteoporosis. Research suggests magnesium may help alleviate insomnia.

The dietary fiber in jackfruit helps the digestive system function properly. This can reduce constipation problems, colon and rectal cancer, hernia, and hemorrhoids. This fiber can also help lower glucose and cholesterol levels, thus reducing the risk of obesity.

To obtain the best nutritional quality, flavor, and taste from any tropical fruit, eat it fresh and raw, including the skin of most, though not jackfruit. Fruit gradually loses its nutritional value and disease-fighting qualities after picking, so it's important to eat it promptly.

Sandra Cesca is a freelance writer and photographer focusing on holistic health, wellness, organic foods, healthy lifestyle choices, and whole-person medical care. Her background includes allopathic medicine, naturopathy, homeopathy, organic and biodynamic farming, and yoga practices.



Brimming with vitamin C—an antioxidant that contributes to healthy skin and a youthful appearance—jackfruit supports the building of collagen, the fight against free radicals, and nurtures a healthy immune system—all important properties of anti-aging.

ALL PHOTOS BY SHUTTERSTOCK

Most Americans may never have seen—let alone tasted—the delicious, nutrient-rich jackfruit, which is common in many tropical countries.

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Give your thymus a vacation: A regular meditation practice can reduce the toll stress takes on this important immune system organ.

The Miraculous IMMUNE SYSTEM

PART IX PROTECTING THE THYMUS

This critical immune organ can regenerate with surprising benefits—even after chemotherapy

Though not an organ we tend to think of often—as we do, say, the heart—the thymus gland plays an enormous role in the surveillance and protection of the body against potentially deadly invasion.

In this series, The Miraculous Immune System," *we explore the true power of immunity and the organs that work tirelessly to protect the body.*

Previously: *The thymus may shrink after training T cells, but it continues to play critical roles—many of which we are only beginning to understand.*

By Yuhong Dong & Chris Chen

The thymus is extremely sensitive to acute stress–induced atrophy and is often referred to as a 'barometer of stress' for the body.

The little-known thymus gland is one of the body's most essential immunological organs, beginning to develop before birth and reaching its peak function between the ages of 7 and 25.

The thymus is like a military base that trains soldiers—T cells—to battle for the immune system against dangers such as COVID-19 and cancer.

Despite its critical role, the thymus gland's ability to stimulate effective T cell generation declines with age. Thymus atrophy or degradation may contribute to the overall reduction in immunological function that occurs with aging.

We will discuss further the association between the thymus and autoimmune diseases, factors that can cause thymus gland atrophy—and strategies for protecting and preserving thymus function in order to maintain a strong and healthy immune system throughout life.

Factors Inducing Thymic Atrophy

Gradual thymus gland atrophy with age is a well-known physiological phenomenon; it's a complex process that can be hastened by various triggers such as malnutrition, bacterial or viral infections, stressful situations, and alcoholism.

Jarrod Dudakov, an assistant professor at the University of Washington Department of Immunology, released a paper in Frontiers in Immunology that provides an in-depth review of the reasons for thymic atrophy.

Lack of Nutrients

When the body is deprived of nutrients, digestive disorders develop, resulting in a decline in thymus function and accelerated thymus degeneration.

Furthermore, a shortage of micronutrients in the body, such as zinc and antioxidants, may hasten thymic atrophy.

Stress

The thymus is extremely sensitive to acute stress-induced atrophy and is often referred to as a "barometer of stress" for the body. The more stress one has, the more likely the thymus will shrink and undergo acute thymic atrophy.

Despite its warrior qualities, the thymus gland is no match for chemotherapy and suffers catastrophic harm from its application, resulting in atrophy.

Glucocorticoids are potent cell death inducers and can cause the thymus to shrink quickly by making thymus cells die. Under stressful situations, glucocorticoids target thymocytes, an important type of thymus cell.

Bacterial Infection

Although less studied, bacterial infections also undermine thymic function, mostly by inducing premature apoptosis (programmed cell death) in the thymus, resulting in acute thymic atrophy, according to the Dudakov paper.

Infections with Streptococcus suis can cause thymic atrophy by activating pro-apoptotic pathways in thymocytes. Additionally, infection with Mycobacterium tuberculosis can cause thymic atrophy by altering glucocorticoid levels.

SARS-CoV-2 Infection

Another study, published in the Canadian Journal of Microbiology, revealed that patients with COVID-19 (caused by SARS-CoV-2) may have pathological alterations that affect thymus development and may have fewer lymphocytes. Whether this affects thymic atrophy wasn't confirmed.

Alcohol Addiction

A Russian autopsy study found that the volume of thymus tissue was significantly smaller in 54 people addicted to alcohol than in 53 nonalcoholic age-matched controls. The study reported similar findings regarding spleen tissue.

Lack of Sleep

Studies have established that lack of sleep contributes to thymic atrophy.

Iatrogenic Thymic Atrophy

The application of immunosuppressive therapy, such as chemo- and radiotherapy in cancer management or before transplantation, not only damages tumor cells and peripheral immune cells, but also has catastrophic effects on the thymic microenvironment, resulting in fewer T lymphocytes.

The thymus is extremely sensitive to chemotherapy, and 90 percent of the patients studied during the administration of chemotherapy showed thymus atrophy, with a decrease in thymic volume by an average of 43 percent during the first course of chemotherapy and 36 percent during the second.

The Thymus Can Regenerate

Although the thymus can degenerate, it also has a powerful ability to regenerate. In the chemotherapy study described above, thymus regrowth was observed in 90 percent of the patients studied.

T cell regeneration after chemotherapy depends on residual thymic function and age.

A study conducted by the Scripps Research Institute found that the thymus plays a role in the recovery of the T cell population after chemotherapy-induced lymphopenia. The enlargement of the thymus gland was evident in adult patients ages 18 to 49 but not in elderly patients (ages 70 to 91).

The study suggests that the adult thymus has the ability to regenerate and play a significant role in rebuilding the peripheral T cell pool after chemotherapy-induced lymphopenia, at least up to middle age.

Another study found that the thymus could regenerate an important white blood cell (CD4+ T lymphocytes) in children undergoing chemotherapy, but that ability declined with age, even shortly after adolescence. The study highlights the importance of preserving residual thymic function in patients before undergoing chemotherapy in order to facilitate rapid T cell regeneration.

The importance of the immune cells the thymus creates has triggered interest in finding ways to induce thymus regeneration. Scientists have proposed a number of therapeutic strategies to boost thymus regeneration, including cytokines, growth factors, hormones or hormone-like mediators, and cell-based approaches.

Dudakov proposed numerous techniques for protecting the thymus, including one to directly activate cells capable of producing thymocytes in the bone marrow or in the thymus. He stated that inducing these precursor cell populations to evolve into mature thymocytes can improve thymic function.

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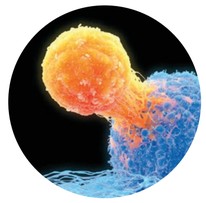


T CELLS— the body's defenders against infection and cancerous invaders—call into battle other immune cells to help kill infected ones.

MYCOBACTERIUM TUBERCULOSIS, most commonly known to attack the lungs, can also cause thymic atrophy.

GOT SLEEP? A sufficient amount of sleep will support the thymus gland, the immune system, and overall health and well-being.

MIX AND MATCH STUDIO/SHUTTERSTOCK

Strategies to Protect the Thymus

There are numerous simple and effective techniques to help preserve the thymus and boost immunity.

Consuming Thymus-Friendly Foods

Many nutrients act as co-factors in the synthesis, secretion, and activity of thymic hormones. Specific nutritional deficits can result in diminished thymic hormone activity and poor immunological function.

Some of the most important nutrients for thymus protection are zinc, vitamin E, and vitamin C. These nutrients promote thymic hormone activity and cell-mediated immunity.

A 2022 immunology study confirmed that zinc supplementation can alleviate thymic atrophy by enhancing immune cells.

Foods rich in these thymus-supporting nutrients include:

- Zinc: oysters, beef, chicken, tofu, pork, nuts, seeds, lentils, yogurt, oatmeal, and mushrooms.
- Vitamin C: guava, bell peppers, kiwi, strawberries, oranges, papaya, broccoli, tomatoes, kale, and snow peas.
- Vitamin E: sunflower seeds, almonds, spinach, avocados, pumpkin, kiwi, trout, shrimp, olive oil, wheat germ oil, and broccoli—the primary dietetic sources of vitamin E are plant oils, such as soybean, sunflower, corn, and walnut.

Reducing Stress

Numerous studies have proven that meditation is an effective stress management method. According to the Harvard Health Journal, research has even indicated that mindfulness meditation may have a longer-lasting effect on stress reduction than taking a vacation.

Exercising Regularly

A study in the journal Aging Cell compared the immune systems of adults aged 55 to 79 who have been physically active for most of their lives with those of inactive older adults and of young adults who don't exercise regularly.

The researchers observed that individuals who regularly cycled had higher levels of cytokines that help safeguard the thymus, such as IL-7, in their blood. Levels of IL-6, a cytokine that causes thymic atrophy, were lower in cyclists.

Researchers also observed less of a reduction in immune function with age in the cyclists. The study suggests that physical activity helps slow down some of the age-related changes that occur in the immune system.

Moreover, extensive evidence suggests that exercise has positive effects on the immune system. It's widely recognized that moderate-intensity exercise lasting up to 45 minutes provides benefits to the body's immune response, especially for older adults and individuals with chronic conditions.

Exercise increases blood flow, allowing nutrients to reach the body's most critical areas and removing waste materials.

Exercise also increases body temperature, which makes it more difficult for infectious microorganisms to survive. Additionally, it can improve sleep, which strengthens the immune system.

Getting Adequate Sleep

Getting enough sleep is crucial for a strong immune system and overall well-being. Getting seven to nine hours of restful sleep each night helps support the health of the thymus gland and keeps the immune system working at its best.

Avoiding Exposure to Environmental Pollutants

Exposure to contaminants such as environmental toxins, cigarette smoke, alcohol, and hazardous chemicals can affect the thymus.

Medication use should be avoided as much as possible. Drugs such as corticosteroids can have a harmful effect on thymus function if used chronically or excessively. Work with a health care expert to explore alternative treatments or reduce the duration and dosage of drugs.

To summarize, a healthy thymus is vital to immune health. Healthy lifestyle choices can prevent thymus atrophy and encourage regeneration. These specific strategies protect the thymus and help preserve its function throughout life.

Next Week: Bone marrow, though mysterious, has essential functions, and it needs to be safeguarded to optimize health.

New Generation of Dangerous Disinfectants Takes Hold During COVID

Unregulated quaternary ammonium compounds present a rising concern as their use skyrockets and limited data point to their toxicity

By Sheramy Tsai

As the world grappled with the COVID-19 pandemic, another insidious threat may have been overlooked. In our fervor to fight the virus, potentially harmful substances seeped unnoticed into many of our homes, schools, hospitals, and workplaces.

A new review in Environmental Science & Technology, the product of a collaborative effort by 26 scientists, casts a spotlight on the burgeoning use of quaternary ammonium compounds, or QACs. These pervasive chemicals have seen their usage spike amid the pandemic, and the researchers are urging us to reassess their safety.

Unraveling the QAC Journey

QACs are common chemicals with many applications, often camouflaged under innocuous labels. QACs serve as antimicrobials, preservatives, and antistatic agents in cleaning and disinfecting products. They're also present in many personal care items, including eye drops, shampoo, nasal sprays, and mouthwash.

First introduced in the 1940s, QACs have been around for decades. However, the COVID-19 pandemic supercharged the prevalence of QACs in our lives, according to a policy analysis by the Toxic Use Reduction Institute at the University of Massachusetts–Lowell. The U.S. Food and Drug Administration's (FDA's) 2016 ban on 19 other antimicrobials significantly expanded the use of these products.

In March 2020, the U.S. Environmental Protection Agency (EPA) introduced List N, a searchable database to identify products effective against SARS-CoV-2, the virus that causes COVID-19. A peer-reviewed paper published in the Environmental Science & Technology Letters highlights that approximately half of the products listed rely on specific QACs as active ingredients, with more than 200 QAC-based products making the list.

One of the most disturbing ripple effects is the potential for QACs to promote antimicrobial resistance.

Ripple Effects

The widespread use of QACs has caused waves of toxic effects on our environment and health. As the use of these chemicals increases, so do their harmful effects.

Researchers demonstrate that aquatic organisms, often barometers of environmental health, show signs of acute and chronic toxicity due to escalating QAC concentrations.

"QAC concentrations in aquatic ecosystems are approaching protective toxicity thresholds," the authors wrote.

In the same vein, we're beginning to see worrying signs of the potential effects of QACs on human health. A 2021 study published in Environmental Science and Technology revealed that the concentration of QACs in blood samples taken during the COVID-19 pandemic was significantly higher than those taken before the pandemic.

According to the Environmental Science & Technology review, people have skin irritation, respiratory problems, and metabolic struggles because of QAC exposure. Animal studies demonstrate that the adverse effects may extend to developmental and reproductive toxicity, which could have far-reaching implications for future generations.

Unfortunately, our most vulnerable groups have been disproportionately exposed to these compounds. With their frequent hand-to-mouth behavior, young children in schools and daycares are particularly at risk.

"School staff and their students used disinfectants extensively during the COVID-19 pandemic, in some cases unsafely and without instruction on proper handling and use," the authors wrote.

Moreover, the elderly and those with compromised health, often confined to health care facilities, may also have been exposed to higher levels of QACs because of rigorous cleaning protocols.

One of the most disturbing ripple effects is the potential for QACs to promote antimicrobial resistance.

"Following the COVID-19 pandemic, an increase in antibiotic resistance was observed. This phenomenon was likely caused by a confluence of factors, of which the increased use of QAC-based disinfectants may be one," the authors wrote.

This resistance—created by the very weapons meant to combat pathogens—could undermine the effectiveness of vital antimicrobial treatments in the future, leaving us vulnerable to myriad diseases.

Hidden in Plain Sight

Identifying QACs is often challenging for consumers because of the complex and varied ways these chemicals are listed. Products don't list QACs as such, instead disclosing the full name of the active ingredient.

With hundreds of QAC variants in circulation, such as the frequently used benzalkonium chlorides, spotting them can be difficult. These compounds, which might appear as BAC, BZK, BKC, or ADBAC, are widely present in disinfecting wipes, sprays, and hand sanitizers. Other QACs can be identified by "ammonium chloride" at the end of their names.

The best way to steer clear of QACs is to scrutinize the product ingredient list and safety data sheets if available, a daunting task for the average consumer.

Regulatory Loopholes and Challenges

Further complicating the matter is how we monitor and manage QACs in the United States, which depends on what we use them for. As a result, this system can lead to increased scrutiny of some uses of QACs while others might slip through the cracks.

According to the study authors, QACs are regulated by the EPA if used as pesticides and by the FDA for uses in pharmaceuticals, cosmetics, and food additives.

Other QAC uses fall under the less strict oversight of the Toxic Substances Control Act. However, inconsistencies in the assessment process and product information reveal a need for more uniform regulation and transparency.

Adding to this challenge, QACs are grouped based on a system from 1988 that's much like sorting books by size rather than content, according to the authors. This outdated method "is insufficient to address the wide range of QAC chemistries, potential toxicities, and exposure scenarios," they wrote.

As a result, we may not fully understand the risks when exposed to different QACs from various sources, as when we use multiple cleaning products at once. In fact, some QACs have gone through little to no meaningful testing for their health effects, and a majority haven't gone through enough.

"Most QACs have not undergone rigorous regulatory assessment for potential adverse human and ecological health effects," the authors wrote.

Back to Basics

During the uncertainty of the COVID-19 pandemic, many turned to powerful disinfectants containing QACs. However, we've since learned that the risk of contracting COVID-19 from surfaces is low.

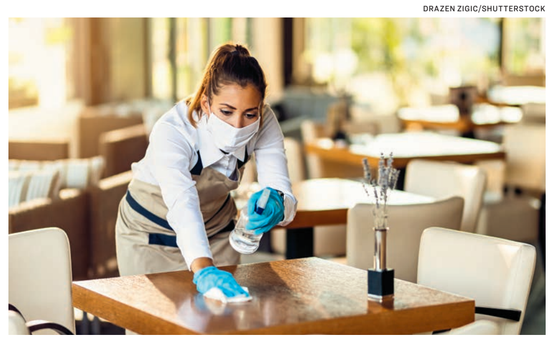
"In most situations, cleaning surfaces using soap or detergent, and not disinfecting, is enough to reduce risk," the U.S. Centers for Disease Control and Prevention stated.

If disinfection is needed, it should be focused on high-touch areas such as door handles and shared keyboards.

Soap and water are usually adequate to neutralize SARS-CoV-2 on most surfaces. This simple and sustainable approach to maintaining hygiene minimizes potential health and environmental harms.

Sheramy Tsai, BSN, RN, is a seasoned nurse with a decade-long writing career. An alumnus of Middlebury College and Johns Hopkins, Sheramy combines her writing and nursing expertise to deliver impactful content. Living in Vermont, she balances her professional life with sustainable living and raising three children.

DRAZEN ZIGIC/SHUTTERSTOCK



QAC cleansers and hand sanitizers can be hard to spot because of the various different names for these increasingly common and potentially dangerous chemicals.

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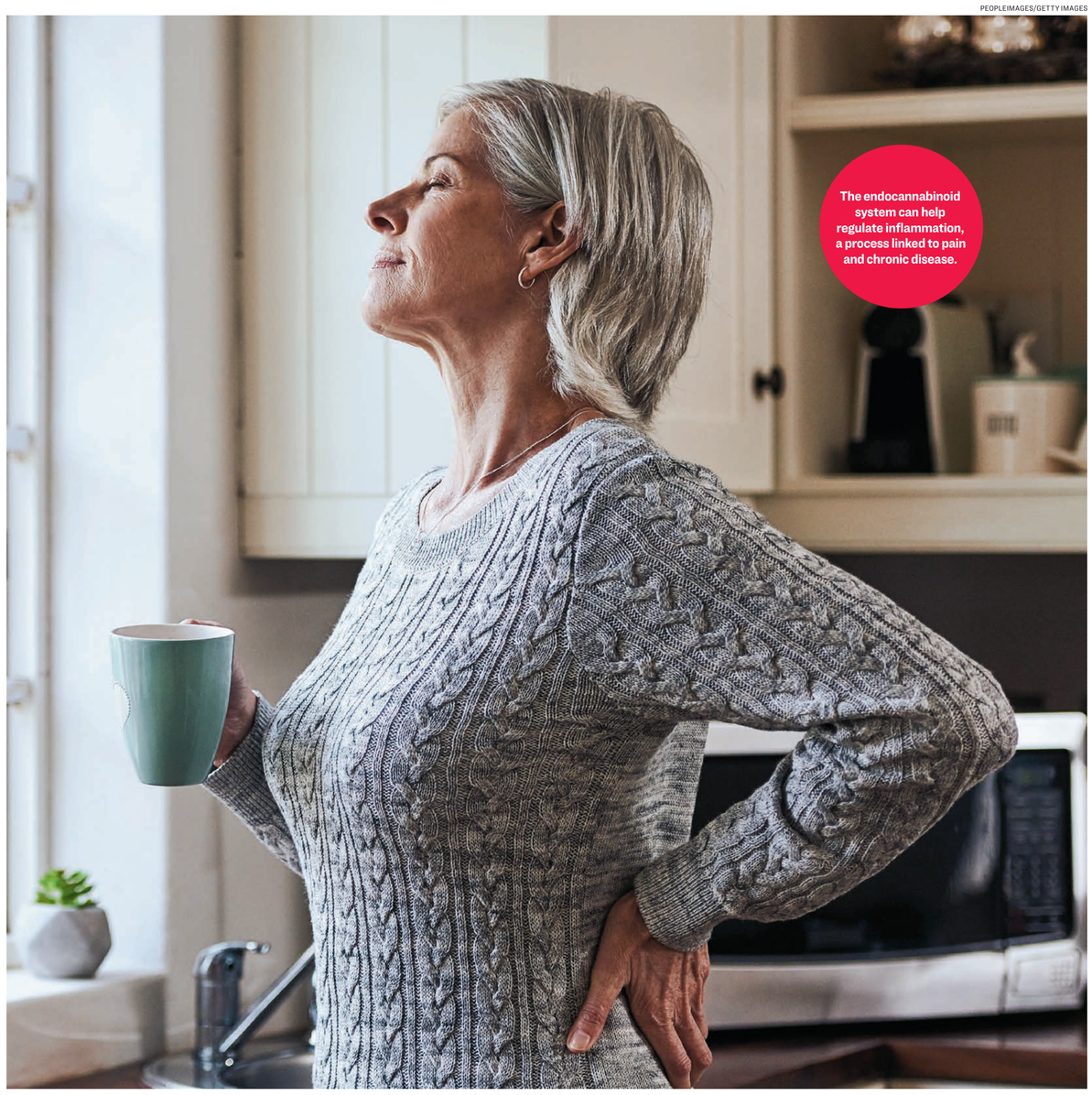

The endocannabinoid system can help regulate inflammation, a process linked to pain and chronic disease.

The Endocannabinoid System: A Missing Link

JANO TANTONGCO

Our endocannabinoid system (ECS) is a critical layer of our physiology, like our cardiovascular or nervous systems—and it was only discovered in the 1990s.

We're just scratching the surface of its vital roles in homeostasis and immunity and, perhaps most notably, its role in neurodegenerative disease.

As scientists probe the ECS, they're finding its influence in nearly all realms of the body. A keen eye toward lifestyle and certain supplements can help keep this system in tiptop shape.

As scientists probe the endocannabinoid system, they're finding its influence in nearly all realms of the body.

How the Endocannabinoid System Works

Dr. Christina Campbell, a functional medicine practitioner and board-certified osteopathic physician, told The Epoch Times that she began her investigation into cannabinoids when she began suffering debilitating migraines. She had to schedule her emergency room shifts around the migraine attacks, often employing earplugs and sunglasses for relief.

"I was losing half of my life to that," Campbell said. "Once I dove into the research and saw just how wide-reaching and important this system was ... that was when I said, 'Okay, well, I really need to know everything about this, because how many people can this really help?'

"The endocannabinoid system is incredibly important because it is a master control system."

The endocannabinoid system can be seen as a layer that builds on top of our nervous system, the vast bodily system made up of cells called neurons. Neurons branch out from the brain and spinal cord and extend throughout our physiology to transmit signals that govern almost everything we do.

Continued on ***Page 18***

The endocannabinoid system is like a feedback system for the nervous system, regulating the function of several systems.

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The Shocking Truth About Towels

Bacterial growth on wet towels can rival that of a toilet after just 3 days

ELLEN WAN & WEBER LEE

Who would think the innocuous bathroom towel could pose a threat to one's health? An indispensable tool in our bathing routine, seemingly clean or lightly used bath towels coupled with a potentially humid bathroom environment can harbor a stunning amount of bacteria.

Germs contained in towels can cause skin disease, hair loss, and urinary tract infections and can even spread drug-resistant bacteria that can be fatal.

Most bacteria in towels come from the user's body, face, and hands. With the high humidity usually found in a bathroom, it becomes a highly favorable environment for rapid bacterial growth. Towels that appear clean to the naked eye may be full of tens of thousands of bacteria, posing potentially serious health threats.

Bacteria on towels pose three major health risks:

1. Breed and Spread Bacteria

A Japanese life encyclopedia TV program called "Non Stop" tested the bacterial content of bath towels and found that freshly washed towels contained 190,000 counts of bacteria. After one day of use, the number increased to 17 million—nearly 90 times more than before use. The bacterial count three days after use soared to 87 million and was as high as 94 million on towels used for one week without being washed.

Noritoshi Ri, director of the Hygiene & Microbiology Research Center, Tokyo, explained in the TV program that the bacteria count on a towel after one week of use can reach 10 billion-plus—equivalent to that of a drainage pipe.

2. Cause Skin Diseases

William Chao, a toxicologist, certified diplomate of the American Board of Toxicology, and professor at Chung Yuan Christian University in Taiwan, said that if towels are left unwashed for three days, they will contain a variety of germs and that using them for cleaning is "like wiping your body against a toilet." In addition to E. coli—most abundant on and in toilets—more types of bacteria could be found according to the different physical conditions of the towel's user, including Staphylococcus aureus, Salmonella, and Legionella.

Wiping your body with unclean towels can lead to skin problems. William Chao said that the germs contained in a towel are prone to causing skin allergies, folliculitis, hair loss, and other skin diseases. Many people have the habit of sharing towels, including couples and families with children.

If one of the users has an infection, the towel may become a breeding ground for the bacteria, causing mutual and repeated infections. When one towel user is undergoing treatment for an ailment, there's the chance that the germ will reside with the partner and soon return to the initiator, creating a cycle. This is quite often the case with the fungal infection athlete's foot (Tinea pedis) and viral warts.

Chao noted that if your body is itchy after a bath, or if you often have allergies or infections, it's recommended to check the cleanliness of your bathroom environment. Within a family, it's recommended that each use their own towel.

Rin Doi, director of a Japanese dermatology clinic, said in the same TV program that for people with skin allergies, or for the tender skin of infants and young children, using towels with high bacterial content will cause infection. Especially if there's a wound, as it's more likely to become inflamed and purulent.

3. Bring Higher Risk of Death

In 2003, The New England Journal of Medicine published a study of methicillin-resistant Staphylococcus aureus among players and staff members of a professional football team. Drug-resistant Staphylococcus aureus is immune to common antibiotics such as oxacillin, penicillin, amoxicillin, and cephalosporin. In addition to players sharing saunas, whirlpools, therapy equipment, and the turf of the playing fields, they also frequently shared towels to wipe their sweat, hands, and faces.

The study found several factors that might facilitate the transmission of infection: frequent skin abrasions among players, a lack of regular access to hand hygiene for trainers who provided wound care, skipping of showers by players before the use of communal whirlpools, and sharing of towels.

According to the "Global Antimicrobial Resistance and Use Surveillance System" report published by the World Health Organization in late 2022, drug-resistant bacteria are becoming more prevalent in communities and can cause life-threatening bloodstream infections.

The report states that Klebsiella pneumoniae and Acinetobacter bacteria that cause blood infections in hospitals have 50 percent resistance to antibiotics and that 8 percent of blood infections caused by Klebsiella pneumoniae are also resistant to the antibiotics typically used as a last resort, Carbapenems, increasing the risk of death from uncontrollable diseases.

The report also showed a 15 percent increase in bloodstream infections and gonorrhea infections caused by drug-resistant E. coli and Salmonella compared with 2017.

Many people have the habit of sharing towels, including families with children and couples.

These superbugs can also reside on your towels. According to a 2014 study on kitchen towels, coliform bacteria were detected in 89 percent of the kitchen towels in 82 households, and E. coli was detected in 25.6 percent of the towels. Moreover, researchers also discovered Klebsiella pneumoniae and salmonella in the towels.

Washing Towels to Remove Odor

Miscellaneous bacteria that multiply due to unclean towels will produce odors. Japanese towel critic Tetsuya Abe demonstrated on a TV show how to wash towels. He first boils a towel in hot water for three to four minutes, then rinses it with water, and the odor (bacteria) on the towel disappears.

Kensuke Kanzaki, director of the long-established Japanese laundromat "Hakuyosha," recommends using sodium percarbonate to help with towel cleaning. Sodium percarbonate, baking soda, and citric acid are known as the "Three Treasures of Cleaning." They're not only nontoxic, odorless, and pollution-free, but also have bleaching, decontamination, and odor-removal properties.

Kensuke Kanzaki said in an online article that the use of sodium percarbonate is very simple. Just put the towel into the washbasin, sprinkle one cup of sodium percarbonate evenly on the towel, add water at 140 to 176 degrees Fahrenheit, soak for 30 minutes, and then clean it in the usual way.

One great way to deter bacterial growth and dry your towel is to hang it outside in the sun after use.

BRIZMAKER/SHUTTERSTOCK

Fresh air and sunshine go a long way in keeping towel bacteria to a minimum.

ALL IMAGES BY SHUTTERSTOCK

Understanding how gut bacteria affect Parkinson's disease opens up new therapeutic possibilities.

Changes in Gut Bacteria May Cause Parkinson's: Study

Research links disruptions in the microbiome to Parkinson's and implicates Desulfovibrio bacteria's metabolic processes

GEORGE CITRONER

A recent study reveals a potential connection between Parkinson's disease and the gut microbiome, suggesting that infection with a specific bacteria, known as Desulfovibrio, contributes to the development of the degenerative brain disorder.

Researchers at the University of Helsinki observed that the presence of these bacterial strains in Parkinson's patients could lead to the aggregation of alpha-synuclein, a protein closely associated with the disease.

To further investigate this association in humans, the researchers analyzed stool samples from 10 Parkinson's patients and 10 healthy individuals. The findings show that all Parkinson's patients had Desulfovibrio bacteria in their gut microbiome, establishing the link between these bacteria and the disease.

People with Parkinson's also exhibited higher levels of Desulfovibrio bacteria compared to those without the condition, with a noticeable correlation between bacterial concentration and the severity of the symptoms.

Gut May Be Where Parkinson's Disease Starts

"The cause of Parkinson's disease has gone unknown despite attempts to identify it throughout the last two centuries," Per Saris, professor of microbiology at the University of Helsinki and study co-author, said in a statement.

It's estimated that individual genes cause only about 10 to 15 percent of Parkinson's cases.

"Our findings are significant," Saris said. They suggest that certain strains of Desulfovibrio bacteria are highly likely to be a causative factor in Parkinson's. He also noted that environmental factors are the primary cause of the condition.

The study discovered that Desulfovibrio strains obtained from individuals without Parkinson's disease didn't induce alpha-synuclein aggregation to the same extent.

The current study builds on previous research by Saris and team, which initially identified a higher prevalence and abundance of Desulfovibrio strains in Parkinson's patients, particularly in those with more pronounced symptoms, compared to healthy individuals.

Desulfovibrio bacteria produce hydrogen sulfide as a result of their metabolic processes.

Hydrogen sulfide is a gas neurotransmitter and can play an important role in the development of Parkinson's, Dr. Mary Kay Ross, a fellow of the American College of Emergency Physicians and founder of the Brain Health & Research Institute, told The Epoch Times.

"Hydrogen sulfide can also raise the iron content in the cytoplasm, which exacerbates that alpha-synuclein aggregation," Ross said.

The excessive presence of Lactobacillus, a probiotic, and the imbalance of various other bacteria also play a role in Parkinson's patients, Dr. Guy Schwartz, co-director of the Stony Brook Parkinson's and Movement Disorders Center at Stony Brook Medicine, told The Epoch Times.

"That's a deviation from the normal, healthy, non-Parkinson's disease colonization of the colon," Schwartz said.

Similar patterns are also seen in diseases such as autism and irritable bowel syndrome.

"That, we believe, is sort of the genesis of disease processes," he said.

Constipation, Parkinson's, and the Gut

The abundant bacteria may produce harmful substances or hinder the growth of beneficial bacteria that may play a role in preventing Parkinson's disease, Schwartz said.

Constipation, an early symptom of the degenerative disorder, might be linked to this microbial imbalance.

"Intestinal motility is also decreased with the high levels of hydrogen sulfide, which leads to constipation, seen in Parkinson's; increased inflammation; and enhanced central nervous system damage," Ross said.

Constipation exacerbates the problem.

"The fecal matter doesn't flow at a normal rate, in a normal volume, and this causes backup, and this backup is into the small intestine, and bacteria don't belong in the small intestines," Schwartz said.

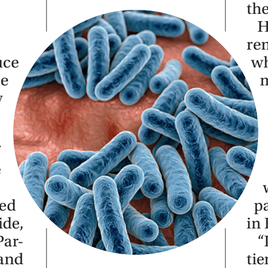
This leads to colonies of bacteria from the colon accumulating in the small intestine.

"These have a deleterious effect. We call it small intestinal bacterial overgrowth, and it's not unique to Parkinson's disease. Gastroenterologists are well familiar with it, and they treat it with antibiotics," he said.

Treatments for Patients With Abnormal Microbiome

"My Parkinson's patients seem to always have very abnormal microbiomes," Ross said.

Studies have shed light on the intriguing link between the gut microbiome and Parkinson's disease.



Studies have found that people with Parkinson's disease carried Desulfovibrio bacteria in their gut microbiome. Scientists think that this bacterial strain may have a connection with the severity of Parkinson's disease.

Dietary treatments, including the use of probiotics, may become an important new way to treat Parkinson's disease.

She noted that in her practice, she attends to many patients with Parkinson's disease, and as part of her assessment, she routinely examines their microbiome using the Thorne Gut Health Test. This comprehensive test looks at shotgun metagenomics sequencing, providing a detailed analysis of digestion-related factors.

"We have tried to treat these patients using a blend of prebiotic fibers to feed the desired bacteria and change the microbial environment, but the Parkinson's patients have only gotten worse, and then better once we stopped the prebiotics," Ross said.

There was concern regarding the possibility of bacteria metabolizing drugs such as dopamine, potentially exacerbating the symptoms, according to Ross.

However, she said she has achieved remarkable results by addressing diet, which can influence the microbiome; making lifestyle changes; and using a device called a Portable Neuromodulation Stimulator, or PoNS, in an "off-label" manner to deliver translingual neuromodulation.

The PoNS device, typically used in walking therapy for multiple sclerosis patients, has shown promising outcomes in Ross's Parkinson's patients.

"I have found that my Parkinson's patients with severe gait abnormalities and tremors respond well," Ross said. "With this multimodal approach, I can lessen their disease symptoms by about 50 to 70 percent."

The Possible Role of the Gut-Brain Connection in Parkinson's

Studies have shed light on the intriguing link between the gut microbiome and Parkinson's disease, suggesting a potential role of the gut-brain axis in the development and progression of the condition.

The feeling of "butterflies" in our gut is linked to our nervous system, Ross explained, highlighting that this is a genuine phenomenon and an indicator of the functioning of the gut-brain axis.

"The gut-brain axis is a bidirectional communication system between the gastrointestinal tract, the gut, and the central nervous system—the brain," she said.

"There is a great deal of emerging research that suggests that alterations in the microbiome or the gut-brain axis can impact neurodegenerative diseases through several different mechanisms."

Understanding the influence of the gut-brain axis on neurodegenerative diseases opens up novel opportunities for therapeutic interventions. These approaches may involve dietary modifications, the use of probiotics, and fecal microbiota transplantation to target the microbiome.

"However, further research is needed to fully comprehend the intricate mechanisms involved and develop effective interventions," Ross said.

Simple Exercises to Prevent Knee Joint Pain

As we age, knee pain becomes increasingly likely but there are steps we can take to support this vital joint

WU KUO-PIN

In daily life, almost everyone has experienced knee joint pain. However, some people have pain that worsens and even becomes so severe that walking becomes difficult.

Knee joint pain can be roughly divided into the following stages based on a patient's age:

- Gestation period: up to 20 years old.
- Preclinical period: between 20 and 40 years old.
- Clinical period: between 40 and 60 years old.
- Disability period: between 60 and 80 years old.

In other words, anytime after 40, knee joint pain is prone to occur.

Generally, the most common source of pain is the "medial crease" on the inner side of the knee joint. Friction on the medial side of the knee joint can cause physical damage (chondrocyte, interstitial destruction) or chemical corrosion from inflammation of a synovial membrane, and the cartilage fragments produced by these injuries can cause third-degree friction and serious pain.

From an anatomical point of view, the medial crease of the knee joint is a joint capsule made of soft tissue. The crease will become inflamed and swollen under repeated friction and compression (this can happen up to 1 million times a year). In addition, the chemical enzymes released by this inflamed tissue will corrode the surrounding cartilage, resulting in knee joint degeneration, which could be more destructive than the original physical damage.

Key Reasons for Knee Degeneration and Pain

Clinical observation shows that many patients with knee joint degeneration and pain often have leg length discrepancy (one leg longer than the other), which causes uneven force exerted on the legs and knees while walking. After further inspection, most of these patients are found to have an issue of too-tight tendons in the knee-popliteal fossa (Weizhong acupoint), and even a large tendon knot formed in the knee-popliteal fossa, forming a cyst that seriously affects walking.

Because the tendons in the knee-popliteal fossa are too tight, the space to maneuver between the cartilages of the entire knee joint gets smaller, and the pressure increases. Long-term friction and inflammation tense the knee joint's inner and outer tendons and accelerate knee degeneration, resulting in a vicious cycle. Therefore, when treating knee joint pain, properly adjusting the length of the legs (likely with the help of orthotic shoes) and relaxing the tendons in the knee-popliteal fossa will significantly improve the condition.

Unfavorable Knee Movements

From a practical point of view, all excessive and repeated knee-bending actions are bad for the knee joint and should be avoided as much as possible. For example:

- The knee joint is bent suddenly or bent at 90 degrees for a long time.
- Repeated bending and straightening of the knee joint (such as riding a bicycle).
- Repetitive squatting and kneeling.
- Going up and down stairs or hiking.

When treating knee joint pain, properly adjusting the length of the legs and relaxing the tendons in the knee-popliteal fossa will significantly improve the condition.

In addition, improper sitting and standing postures will also impact the knee joint. For example, when sitting with feet crossed, the body leaning sideways or standing on one side will cause pelvic skew, scoliosis, and leg length discrepancy. When the legs become unequal, muscle tension in both legs is uneven (especially the bladder meridian at the back), and the tighter leg is likely to feel more significant stress and more pain in the knee joint. Therefore, one should always have a proper sitting and standing posture. This is an essential yet straightforward secret to maintaining health.

When sitting down or standing up, put your palms on your knees and sit down or stand up slowly. This action can reduce the pressure on the knee joint and reduce damage.

Acupuncture or Massage Therapy to Enhance Knee Recovery

Acupuncture and massage therapy can help reduce inflammation and swelling to relieve pain due to knee joint degeneration. When the inside and outside tendons around the joint can relax, stress is reduced, and joint self-recovery is encouraged.

A traditional Chinese medicine doctor may apply acupuncture to several points, some of them distant from the knee. These can all help relieve the inflammation contributing to joint pain.

One acupoint that is on the knee that can be massaged or treated with acupuncture is the Dubi acupoint.

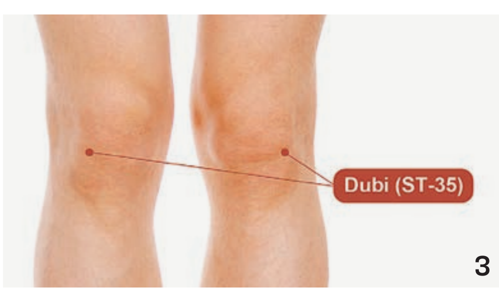
Acupuncture at this point can eliminate inflammation in the knee joint capsule and improve circulation disorders.

Dr. Wu Kuo-pin is the superintendent of Taiwan Xinyitang Heart Clinic. In 2008, he started to study traditional Chinese medicine and obtained a bachelor's degree from China Medical University in Taiwan.

1. Massage therapy and acupuncture can improve blood flow to the knee and reduce swelling.

2. Many people with knee issues have tight tendons in the area of Weizhong acupoint.

3. Treating the Dubi acupoint with acupuncture can alleviate inflammation in the knee.



3 Simple Exercises to Keep Healthy Knee Joints, Slow Degeneration

When you feel pain, jamming, or hear a friction noise on the inside of the knee joint, it may mean it is time to take better care of the knee. Here are three simple exercises that can help prevent degenerative knee pain.

1. Strengthen the Quadriceps Muscles

Strengthening the quadriceps muscles will help stabilize the knee joints. Straighten one foot with the toes turned upward in a sitting posture so thigh muscles become tense. Hold this posture for 10 seconds, then lower the calf slowly.

Do 10 to 20 times for each foot. The best time to do this exercise is when you first wake up and your feet are more flexible.

2. Knee Hug

Hold one calf close to the ankle in a sitting position with both hands. Let the calf retract as far as possible toward the buttocks, then bend the knee joint to the maximum angle for 30 seconds.

After that, straighten the leg and gently bend and stretch the leg five times.

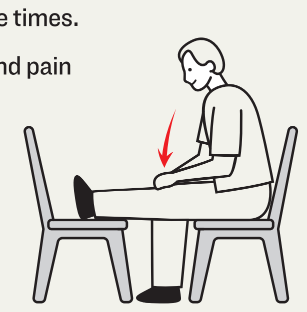
Repeat the above steps five times.

3. Knee Press

In a sitting position, straighten one leg so the heel and the far end of the calf are resting on another chair. Press down on the knee with both hands from top to bottom for 30 seconds. Be careful not to shake or vibrate the joint.

Put the leg down, and then gently stretch it five times.

Repeat the above steps five times.



Long-term inflammation and pain will make the knee joint increasingly tense. The knee hug exercise pulls the tendons in front of the knee joint while the knee press pulls them behind it. These two exercises will relax the tight knee joint, reduce pressure between the knee cartilages, and make the joint more flexible.

Take Note

Usually, the more painful the knee joint is, the less desirable it is to move, and the condition will only worsen. When the knee joint is in pain, doing the above three exercises can slowly relieve the condition.

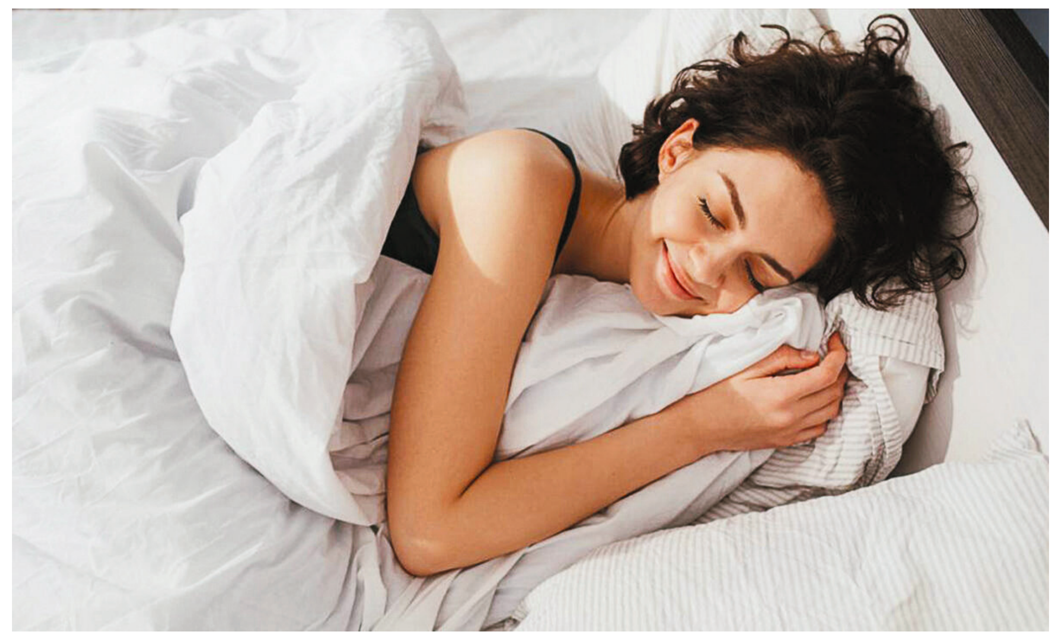
Do the above exercises once in the morning, at noon, and at night.

FOOD AS MEDICINE

6 Foods to Help You Sleep

Eating enough of these foods, and their sleep-inducing nutrients, can help you get the rest your brain and body need

OLENA YAKOBCHUK/SHUTTERSTOCK



Rejuvenating sleep bestows vitality, happiness, and mental clarity in life. Taking steps in our daily life to support sleep is well worth the effort.

DAVID CHU

Sleep is vital to human health. It allows our bodies to rest, repair, and rebuild. Sleep deprivation affects work performance, efficiency, and productivity.

Lack of sleep also increases the risk of chronic diseases such as Type 2 diabetes, heart disease, obesity, and depression.

According to the U.S. Centers for Disease Control and Prevention, about one-third of adults in the United States frequently do not get enough sleep.

Fortunately, certain foods can promote sleep and regulate your sleep cycle. Here are six healthy foods that can help improve sleep quality.

1. Almonds

Almonds are rich in melatonin, a biorhythm hormone produced by the pineal gland, which regulates the sleep-wake rhythm in the human body.

A 2007 study published in the medical journal Scoliosis mentioned that melatonin can help treat sleep disorders and tumors. It helps regulate mood, emotional disturbance, reproduction, the cardiovascular system, and aging.

Data from the U.S. Department of Agriculture show that every 100-gram serving of almonds contains 270 milligrams of magnesium and 269 milligrams of calcium.

Magnesium and calcium are minerals that promote muscle relaxation and sleep.

Magnesium is one of the most essential minerals in the human body, maintaining balance in more than 300 enzyme systems.

It impacts our circadian rhythm. Research shows that magnesium may also benefit older people's sleep and brain function.

A 2012 study published in the Journal of Research in Medical Sciences revealed that magnesium supplementation could improve subjective and objective indicators of insomnia in the elderly. These indicators include sleep efficiency, duration, latency, waking up, serum renin, melatonin, and serum cortisol concentration.

2. Chamomile Tea

Chamomile is widely known as a mild sedative and sleep inducer. A cup of soothing chamomile tea helps many people fall asleep. A study published in Phytotherapy Research in 2019 points out that symptoms and sleep quality of patients with generalized anxiety disorder (GAD) significantly improved after chamomile treatment.

In the study, chamomile was found to be practical and safe for GAD and sleep quality.

However, the study found no evidence that chamomile impacts anxiety and insomnia. Large-scale, randomized, and controlled trials are needed to determine this.

That said, chamomile preparations, such as tea and essential oil aromatherapy, have been used for treating insomnia and inducing calmness. The cells in chamomile bind with benzodiazepine receptors in the brain to create a calming effect.

It is worth noting that chamomile may aggravate asthma, so asthma patients should not consume it.

Pregnant women also should consult their medical care providers before using chamomile, as it may increase the risk of miscarriage.

3. Kiwis

Kiwi is rich in nutrients such as vitamin C, potassium, and vitamin E.

Eating kiwi before bed can help people with sleep disorders fall asleep faster, stay asleep longer, and reduce the frequency with which they wake up at night.

In a 2011 study published in the Asia Pacific Journal of Clinical Nutrition, 24 subjects aged 20 to 55 (two men and 22 women) consumed two kiwis an hour before bed every night for four weeks.

After four weeks of kiwi consumption, the test subjects could fall asleep faster, and their total sleep time and efficiency improved.

Kiwi contains a high amount of the neurotransmitter and hormone serotonin. Serotonin, together with dopamine, affects sleep quality and sleep duration.

The brain also needs serotonin to produce melatonin, a hormone regulating the sleep-wake cycle.

Hence, serotonin is crucial for your sleep.

A 2006 study showed that serotonin affects sleep and day-night rhythm through different receptors.

4. Bananas

Bananas are rich in vitamin B6, vitamin C, potassium, fiber, magnesium, and manganese. Vitamin B6, a water-soluble vitamin, plays a role in synthesizing constant nutrients. It also acts as a coenzyme in pathways involving neurotransmitters such as serotonin.

Vitamin B6 is often used as an ingredient in sleep drugs.

A clinical study published in the Journal of Perceptual and Motor Skills in 2002 revealed that vitamin B6 supplements can enhance the ability to recall dreams, affect perceptions of dreams, and make dreaming a more vivid and colorful experience.

A study published in Nutrients in 2020 found vitamin C is also necessary for sleep. Vitamin C lengthens sleep duration in healthy people and cancer patients, and it reduces the impacts of sleep disorders and the potential risk of sleep apnea.

Vitamin C is also necessary for many metabolic reactions and for antioxidant protection during exercise. Supplementing with vitamin C may also alleviate movement disorder symptoms.

Cherries

Cherry is an antioxidant-rich and anti-inflammatory fruit containing polyphenols and vitamin C.

Research shows that consuming cherry concentrate increases exogenous melatonin. (Melatonin made in the body is described as endogenous; melatonin obtained from food is called exogenous.) Since exogenous melatonin is conducive to improving the duration and quality of sleep in healthy men and women, it may also help control sleep disorders.

A study published in the American Journal of Therapeutics in 2018 showed that sour cherry juice and its active ingredient, procyanidin B-2, could safely and effectively improve insomnia.

Unlike hypnotic drugs, cherry juice will not increase one's risk of falling or other side effects.

6. Milk

Drinking a glass of warm milk before bed is a common home remedy for insomnia. Rich in calcium, milk promotes bone health and lowers the risk of osteoporosis.

Milk is also abundant in tryptophan and vitamin D, both of which are connected to improved sleep.

Tryptophan can be converted into serotonin and melatonin, resulting in relaxation and sleepiness.

Almonds are rich in melatonin, a biorhythm hormone produced by the pineal gland, which regulates the sleep-wake rhythm in the human body.

Supplementing with tryptophan stimulates serotonin activity and promotes sleep, while serotonin released to the brain and midbrain is a crucial inhibitor of insomnia.

A review published in Nutrients in 2022 discovered that vitamin D is also critical in regulating sleep.

A systematic review in the 2020 International Journal of Environmental Research and Public Health showed that eating a balanced diet, including milk and dairy products, can improve sleep quality.

Some Veggies Are Healthier When Cooked

A bit of heat can unlock more of the nutrients in some of your favorite vegetables

DEVON ANDRE

Eating more vegetables, in any form, is a good idea. Whether you prefer them raw or cooked, they're a terrific source of vitamins, minerals, fiber, and plenty of healthful compounds.

But sometimes cooking them can make a difference, turning nutrient-dense foods into superfoods. There are a few instances where heat activates antioxidants, making them more accessible to you. In some cases, the heat breaks down cell walls, so nutrients are easier to digest and absorb.

If you want to unlock the full potential of your diet and get as many healthful nutrients as possible, here are some vegetables with enhanced nutrition when cooked.

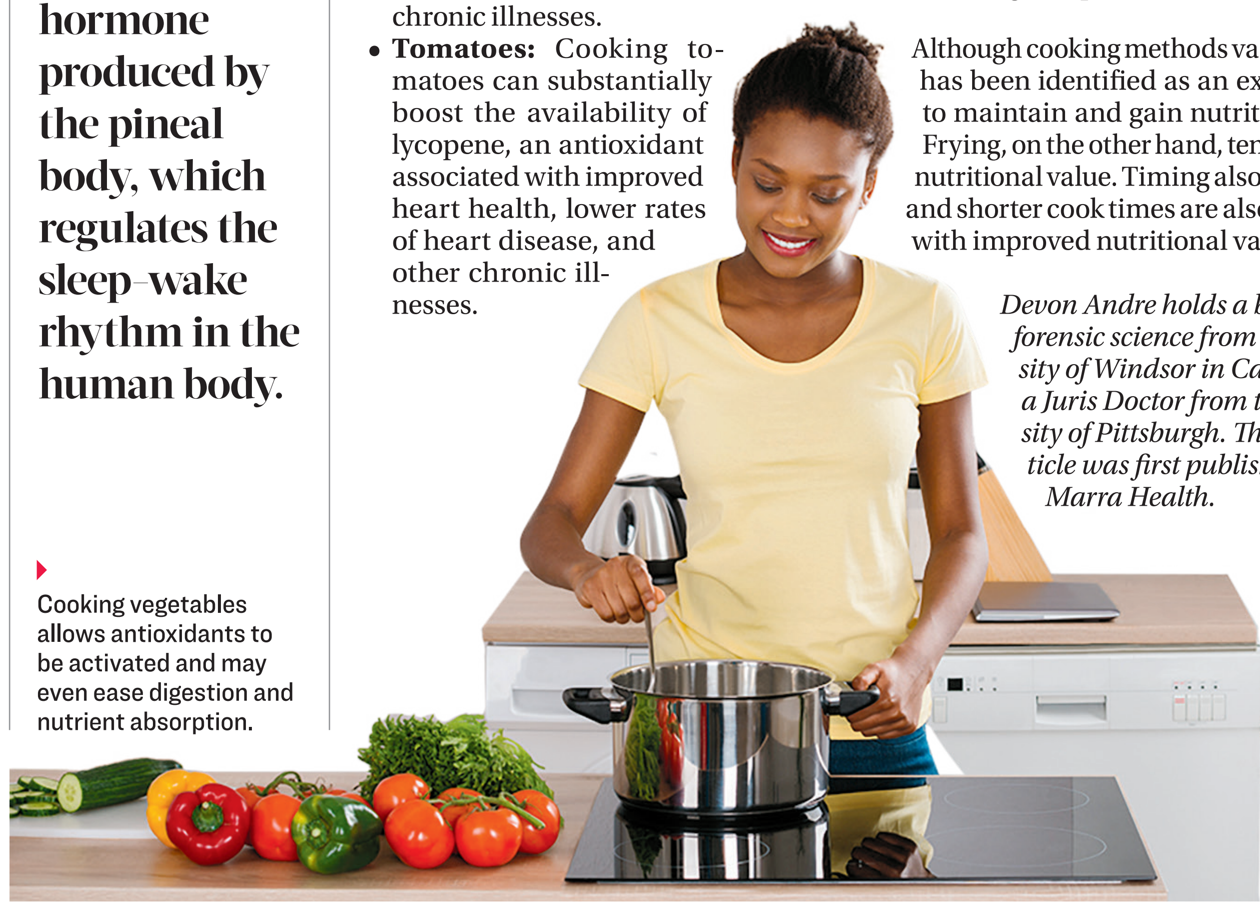
- **Spinach:** When cooked, much more iron and calcium become available from spinach. Oxalate acid blocks these nutrients from being absorbed, but it breaks down under high temperatures.
- **Mushrooms:** Many nutrients in mushrooms, such as potassium, niacin, zinc, and magnesium, are all doubled during cooking.
- **Carrots:** Carotenoids are a powerful antioxidant in carrots, and there's research to suggest levels go up by 14 percent when they're boiled or steamed until tender. On the other hand, pan-frying carrots results in a reduction in carotenoid availability.

Almonds are rich in melatonin, a biorhythm hormone produced by the pineal body, which regulates the sleep-wake rhythm in the human body.

- **Asparagus:** Multiple studies have shown that asparagus gets a nutritional boost from cooking. Antioxidants, in addition to six other nutrients, can jump by more than 16 percent. Another study shows that cooking asparagus could double its levels of phenolic acid, which can promote a lower risk for some serious chronic illnesses.
- **Tomatoes:** Cooking tomatoes can substantially boost the availability of lycopene, an antioxidant associated with improved heart health, lower rates of heart disease, and other chronic illnesses.
- **Broccoli and Cauliflower:** Uncooked broccoli and cauliflower can cause all kinds of digestive problems, such as pain, gas, and bloating. Cooking these cruciferous vegetables not only makes them easier on your stomach but also activates enzymes that enhance disease-busting compounds.

Although cooking methods vary, steaming has been identified as an excellent way to maintain and gain nutritional value. Frying, on the other hand, tends to inhibit nutritional value. Timing also plays a role, and shorter cook times are also associated with improved nutritional value.

Devon Andre holds a bachelor's of forensic science from the University of Windsor in Canada and a Juris Doctor from the University of Pittsburgh. This article was first published on Bel Marra Health.



Cooking vegetables allows antioxidants to be activated and may even ease digestion and nutrient absorption.

FILADENDRON/GETTY IMAGES

The endocannabinoid system is a critical cellular communication system that affects growth and development, as well as eating, anxiety, learning, memory, reproduction, and metabolism.

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The Endocannabinoid System: A Missing Link

Continued from ***Page 13***

Neurons communicate with other cells via electrical signals across gaps called synapses that act like traffic intersections of the nervous system.

Generally, these signals stimulate neurons to release neurotransmitters—such as dopamine or serotonin—which are molecules that bind to the receptors of other neurons, determining what kinds of signals are communicated. Usually, the direction of the signal travels from the sender neuron, designated as "pre-synaptic," to the recipient neuron, designated as "post-synaptic." However, endocannabinoids are unique in that they flow backward, sending signals from the post-synaptic neuron back to the pre-synaptic, which alters how signals of other neurotransmitters are received by the former. This unique mode of communication, coupled with their widespread distribution and importance in the body, has led to this collection of neurotransmitters, receptors, and enzymes to be conceptualized as the endocannabinoid system.

THC (tetrahydrocannabinol) was discovered in 1964 and was identified as one of the primary psychoactive components of the cannabis plant. It's responsible for the "high" that marijuana users report. Cannabidiol (CBD) was also discovered as one of the plant's primary nonpsychoactive compounds. These have become known as phytocannabinoids to indicate cannabinoids that come from the plant itself.

However, it wasn't until 1990 that scientists discovered the receptor that THC and CBD were binding to, dubbed CB1. Cannabis's active ingredients weren't the only thing binding to CB1. Not long after, researchers isolated "anandamide," (coined from the Sanskrit word ananda, meaning bliss), the first of our body's own endocannabinoids to be discovered. From there, they detected receptor CB2 and began the ongoing unraveling of how the ECS works.

CB1 and CB2 are typically regarded as the main receptors of the ECS. CB1 is incredibly prolific in the brain, central nervous system, and peripheral nervous system. CB2 is more present in immune cells but is also found to a lesser degree in the nervous system. However, both receptors have also been found throughout the body, including in the cardiovascular system, skeletal muscle, bones, skin, eyes, and reproductive system.

> **"The endocannabinoid system is incredibly important because it is a master control system.**
>
> *Dr. Christina Campbell, functional medicine practitioner*

Safeguarding the Brain

Perhaps most noteworthy is the ECS's role in brain and neurological health. The CB1 receptor has the ability to modulate neurotransmission, meaning that it can alter the way other neurotransmitters function, as described in a 1999 study in The Journal of Neuroscience.

It's also involved in the creation of neurons and even impacts how the brain wires itself as it matures, as explained in an overview published in Philosophical Transactions of the Royal Society of London in 2012. As reported in the same journal that year, endocannabinoids themselves can even affect both short-term and long-term "plasticity" of neural synapses, a key factor in how the brain forms—or doesn't form—connections.

Because of its widespread distribution in the brain and nervous system, the ECS has an impact on eating, anxiety, learning, memory, reproduction, metabolism, growth, and development. Subsequently, its malfunction is correlated with the onset of neurodegenerative illness.

A 2007 study in Pharmacological Research found an imbalance in the ECS in patients with Alzheimer's disease, suggesting its "possible role in inflammatory processes and in neuroprotection." They also observed that in Huntington's disease, there was a loss of CB1 receptors and a decrease in endocannabinoids in parts of the brain involved in movement control.

There's also evidence that the ECS activates when the body suffers neurological injury. In a study published in 2010 in Life Sciences, scientists found that the system activates distinct pathways in response to "pathogenic events or stimuli" to enhance tissue repair and cell survival. They concluded that neuronal injury activates the ECS in the central nervous system as an "intrinsic neuroprotective response." A study published in Brain in 2007 shows that anandamide was elevated in relapsing multiple sclerosis patients.

Following these findings, researchers have experimented with the therapeutic application of cannabinoids to help protect the brain from trauma. Scientists found that application of CBD "significantly reduced" how much brain tissue died after a stroke in mice, in a 2005 study published in Stroke. They speculated that the effect may come from CBD's effect of increasing blood flow to the brain.

Even the psychoactive THC has shown the potential to benefit the brain. One study published in Nature Medicine in 2017 found that a long-term low dose of THC helped reverse age-related decline in cognitive ability in mice. Another study, published a year later in Neurotoxicity Research, shows that THC enhanced neurogenesis and improvement in both the learning and memory of rats. However, so far, THC's medical applications appear limited compared to cannabinoids such as CBD. The compound also comes with risks because of its psychoactive nature.

Bolstering Immunity

Campbell explained that cannabinoids can also have a powerful impact on our immunity by reducing inflammation, including by regulating cytokine release. Cytokines are an important immune response to fight off bacteria, viruses, and other pathogens, but the body can also overproduce them, leading to a cytokine "storm," which is also the mechanism behind certain complications related to COVID-19.

The CB2 receptor is actually present in various types of immune cells and impacts how our immune system responds to infection, atherosclerosis, and even cancer, as noted in a study in Immunogenetics in 2006. A review paper published in Cannabis and Cannabinoid Research in 2016 noted that endocannabinoids such as anandamide could be considered "master regulators" of immunity, given how they can fine-tune how various immune cells function and their ability to modulate inflammation.

In a review paper published in Future Medicinal Chemistry in 2010, researchers wrote that several studies show that cannabinoids downregulate cytokines. In general, they concluded that cannabinoids, both those native to the body and exogenous ones, "constitute a potent treatment modality against inflammatory disorders."

"Some people don't have that turn-off switch [for inflammation] that works really well. So this can be a really great way to help reduce inflammation ... especially for those people who can't do it for themselves at all," Campbell said.

By acting on receptor CB2, anandamide helps maintain the balance of the "immune homeostasis" in our intestines and pancreas, according to a 2017 study published in Biological Sciences. The gut is home to a vast microbiome that requires a delicate balance, a function that the study authors described as "one of the most fundamental properties of the immune system.

Maintaining Our Delicate Balance

The ECS also plays a powerful role in our quality of life by helping our bodies autonomously adjust toward homeostasis, our self-regulating process that ensures that we're surviving and thriving.

For example, in the realm of eating, the system senses whether our body is energy deficient, what gastrointestinal load looks like, and how we experience satisfaction and perceive nutrition from our food, as published in the International Journal of Obesity in 2009.

Endocannabinoids are integral to our reward system. Much research has focused on dopamine and its role in motivating and reinforcing our desire to seek out basic necessities, such as food and sex. However, more research has shown that the pleasurable sensation from rewarding stimuli might be more connected to the activation of the ECS, according to a 2017 review in Neuropsychopharmacology.

In fact, because scientists knew about the ECS's role in stimulating hunger, they attempted to formulate a weight-loss drug that blocked the CB1 receptor. The drug, known as rimonabant, seemed to work well, but it was soon pulled off the shelf because it was disrupting the ECS from regulating mood, thereby causing some users to become suicidal, as reported in Pharmacology Biochemistry and Behavior in 2010.

Solutions and Supplements

Campbell recommends addressing certain key lifestyle factors to improve ECS function. Among them are stress, systemic inflammation, lack of sunlight, and a disrupted circadian rhythm, which she called "one of the biggest mistakes most of us make in the modern world."

"The problem is that most of us are chronically inflamed, chronically sick, on multiple medications, over toxic-loaded. Our system is really overstressed, and so we're not making enough cannabinoids to keep ourselves moving," she said.

Endocannabinoids are derived from omega-6 and omega-3 fatty acids, as explained in "Cannabinoids in Health and Disease," published in 2016, but they must be in proper balance for the ECS to function properly. Research has borne out that the ideal omega-6 to omega-3 ratio is about 4 to 1, as reported in Biomedicine and Pharmacotherapy in 2002. Unfortunately, the typical Western diet sits at about 15 to 1, predisposing many people to all kinds of illnesses.

Research in mice has shown that those imbalanced ratios—leading to omega-3 deficiency—can impair the ECS's functioning in the brain and may have a role in other kinds of disease, as published in a 2017 review paper in Lipids. Stepping up omega-3 consumption can help level off this ratio. Omega-3-rich foods include fatty fish such as salmon, anchovies, mackerel, and tuna; kale; walnuts; and eggs from flaxseed-fed chickens.

Supplementation with phytocannabinoids can be crucial in supporting our ECSs. Campbell recommends a full-spectrum, hemp-derived CBD oil such as Kokua Vida; hemp is a variety of the cannabis plant that's typically cultivated for industrial use. As such, it has a very low concentration of THC, as opposed to the popularly known marijuana. Campbell serves on Kokua Vida's scientific advisory board and is one of their affiliates.

Although CBD hails from the marijuana plant, it doesn't contain psychoactive properties and is used as a natural remedy for ailments such as chronic pain, anxiety, inflammation, and insomnia.

Like every other system in our body, the health of the endocannabinoid system depends on us living a healthy lifestyle.

When choosing a full-spectrum supplement, she advises consumers to make sure to look out for a certificate of analysis conducted by a third party to ensure high quality and purity. Full-spectrum products generally contain a trace amount of THC, and its psychoactive properties are significantly dampened because all the other cannabinoids "compete" for the same receptors. As of 2018, CBD products derived from hemp are federally legal.

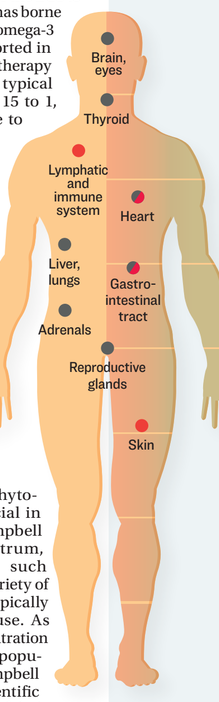
There are also similar supplements without THC that are classified as "broad spectrum." Narrower in scope, there are also "isolate" products available that only contain one or several types of cannabinoids, such as formulations that only contain CBD.

Campbell also recommended the supplement PEA (palmitoylethanolamide), an endocannabinoid-like fatty acid that can boost our ECSs and complement the use of phytocannabinoids such as CBD. It helps activate CB1 and CB2 receptors by putting the brakes on the body's breakdown of the endocannabinoid anandamide.

She tells her patients to try different products to see what works best but advocates for full-spectrum supplements as the ideal option.

"Honestly, all across essential oils of all plants, including cannabis ... the plant really knows what it's doing, and all of those different components together, they really work synergistically together," Campbell said.

Jano Tantongco is a writer and digital creative based in New York. He covers health, culture, and politics.



THE ENDO-CANNABINOID SYSTEM

This system uses a network of special receptors and neurotransmitters to send signals back to the brain from the rest of the nervous system across neurons.

CB1 Receptors

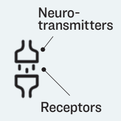
CB1 receptors are primarily found in the brain and central nervous system. They dictate appetite, motor activity, pain perception, short-termmemory, and thinking.

CB2 Receptors

CB2 receptors are mostly in the peripheral organs. The receptors mostly regulate the immune system.

Neuron Receptors

Neurons are intracellular couriers that send and receive electrical messages throughout the nervous system.



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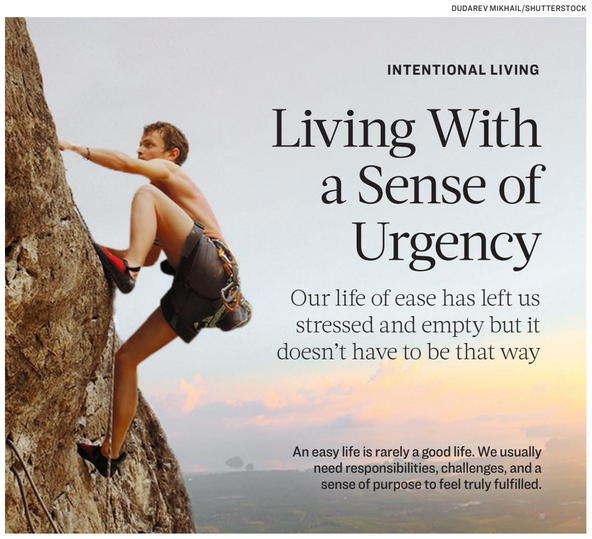


INTENTIONAL LIVING

Living With a Sense of Urgency

Our life of ease has left us stressed and empty but it doesn't have to be that way

An easy life is rarely a good life. We usually need responsibilities, challenges, and a sense of purpose to feel truly fulfilled.

MIKE DONGHIA

On the surface, so many of us feel our lives are too busy. We're stressed and overwhelmed and can't find the time for all the things we want to do.

On the other hand, we've never had more automation, convenience, and collective wealth than we do now. And according to time use surveys published online at OurWorldInData.org, we're working fewer hours and enjoying more leisure time than ever—a trend decades in the making.

What explains this divergence between our perception of increasing busyness and facts that suggest a gentler pace of life?

My Theory of Ease

My theory is this: for many people (not all), life has gotten objectively easier, but we don't feel the benefits because, at the very same time, the smartphone revolution has connected us at nearly every hour of the day with a constant deluge of low-level demands.

The demands are subtle, but collectively powerful.

For example, going on vacation used to be a simple thing, a chance to get away and enjoy some scenic time away from work. But now, we're exposed to hundreds of possibilities about how great a vacation could be. Planning this "dream" vacation, documenting it on social media, and keeping up with your friends doing the same, has become another type of work.

The same goes for interior design, fashion, various hobbies, political developments, sports news, and whatever else you might be into.

On top of that, we "have to" read dozens of reviews before we buy a product, research the best restaurants before going out, and spend countless hours "exploring our options" before making relatively low-stakes decisions.

Even when we just sit still to unwind, the phone leaps to our fingers and triggers all kinds of low-grade stress, be it through stimulating video games or scrolling to find something new and entertaining.

Are You Entertained?

I don't know the entire effects of this radical change in how we spend our time, but it doesn't look good.

People are busy and stressed, but what are they doing with their extra time? Much of it is being absorbed by screens in a way that adds very little value to our lives. It's entertainment by another name.

This kind of behavior is only possible in a world of relative peace, prosperity, and comfort: a world where "wasting time" doesn't lead to catastrophic results and there is very little sense of urgency.

The Fuel of Life

On the one hand, it's amazing that we've reached this place. Kudos to us for creating a country so wealthy that the average person can spend hours a day watching TV and messing around on their phone. But is this really human flourishing? We need to harness this wealth for something greater than leisure.

From personal experience, and observing the lives of great men and women I've encountered in biographies, it seems clear to me that humans can't flourish without a healthy sense of urgency in their lives. In a similar way that the load of an arch actually strengthens the structure, humans appear to be stronger (and happier) when they bear responsibilities, take on challenges, and live with purpose.

> **It's only when we have big audacious goals, frightening deadlines, and real skin in the game that we can prioritize our lives and ensure we focus on what matters and push aside what is trivial.**

For this sense of purpose to be beneficial, it can't just be an extra or an add-on to your life. It has to drive you. Fulfilling your purpose has to be fuel for going faster and further. We need some real stress in our lives to push out the fake stress from the silliness on our smartphones.

Add a Spring to Your Step

The fact is, humans will always fill their time with something. And no matter what we fill it with, we'll overreact at times or feel stressed and worried about others.

It's only when we have big audacious goals, frightening deadlines, and real skin in the game that we can prioritize our lives and ensure we focus on what matters and push aside what is trivial.

The real weight of these responsibilities will bring a remarkable clarity to our lives. That clarity will in turn add a spring to our step, urgency to our action, and a purpose to our existence. This is the life we were meant to live.

Do Hard Things

Is your life lacking urgency? Have you not found what you were looking for in a life of ease and comfort? Has it backfired and left you more stressed and anxious?

You can turn that around. Decide what impact you want to leave in your world, with your family, your friends, and your community. Create a plan to go straight after those goals.

The bigger the goals, the better. Don't wait for the perfect time to get started. You may never feel "ready." Make real commitments that can't be shirked and put some skin in the game so the prospect of failure frightens you—and the hope of success compels you.

Don't fall for the fool's game of comfort-seeking and ease. Do hard things for the sake of others, and find the happiness you deeply desire.

Mike (and his wife, Mollie) blog at This Evergreen Home where they share their experience with living simply, intentionally, and relationally in this modern world. You can follow along by subscribing to their twice-weekly newsletter.

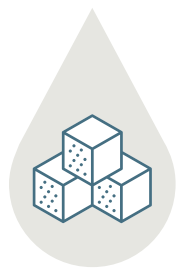
Fat-Burning Sitting Exercise Lowers Blood Sugar

Lifting heels to contract a small muscle in the calf raises metabolism to high levels for hours without fatigue

AMY DENNEY

An experimental physiological study involving a small muscle called the soleus might be a wake-up call for anyone using their sedentary job or lifestyle as an excuse for poor metabolism.

Subjects experienced distinct health benefits—including sustained elevated oxidative metabolism—from doing "soleus pushups" for hours while sitting. The soleus, one of 600 muscles in the human body, runs from just below the knee to the heel and is one of three muscles that make up the calf.



BOGDAN FLORESCU/THE EPOCH TIMES

13 PERCENT

of U.S. adults suffer from diabetes.

The effectiveness of the exercise, detailed in the study published in iScience in September 2022, has been touted as a potential solution for the rising rates of Type 2 diabetes. About 13 percent of U.S. adults have diabetes, and more than a third meet the criteria for prediabetes. Metabolic dysfunction also increases the risk of dementia, cancer, cardiovascular disease, and COVID-19 complications.

The low-effort soleus pushup offers evidence that we don't need to expend massive amounts of effort or do prolonged training at the gym to improve metabolic health. But critics have said it's too soon to jump to conclusions based on one study and that perpetually lifting the heels for hours is unrealistic.

Mark Hamilton, co-author of the study and professor of health and human performance at the University of Houston, said in a news release that soleus pushups are more effective at sustaining elevated oxidative metabolism than other methods, such as exercise, weight loss, and intermittent fasting.

"We never dreamed that this muscle has this type of capacity. It's been inside our bodies all along, but no one ever investigated how to use it to optimize our health, until now," he said. "When activated correctly, the soleus muscle can raise local oxidative metabolism to high levels for hours, not just minutes, and does so by using a different fuel mixture."

The soleus is a skeletal muscle, and that group of muscles is largely responsible for clearance of glucose from the blood.

Dr. Srikanth Nithyanandam, a sports medicine doctor, told The Epoch Times that soleus pushups should be considered only by those who absolutely cannot escape a sedentary lifestyle because of health risks or disability. In those rare situations, they can use a continuous glucose monitor to check for effectiveness.

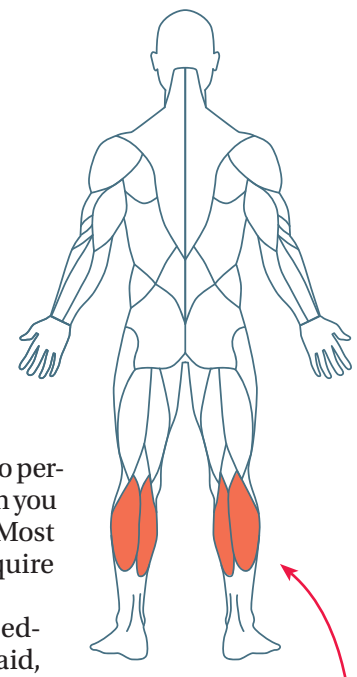
"I don't think I would tell my patients to start doing this," he said. "Can you work and be able to perform a movement? Can you focus on two things? Most sedentary jobs still require a lot of focus."

More research is needed, Nithyanandam said, in part to explore what might happen if the person were regularly interrupted, and partly to conduct the experiment on subjects with diabetes.

The study used 25 volunteer subjects who were relatively unfit and inactive but represented a range of ages and body mass indexes.

Participants were monitored with a device to ensure they were performing the exercise correctly. Essentially, the heel rises while the front of the foot stays on the ground, and when the heel reaches the top of its range of motion, it moves back down.

Normally, the body is designed to limit the use of the soleus, a fatigue-resistant and slow-contracting muscle that aids in standing. During the pushups, the soleus uses as much energy as possible. Participants did the exercise continuously for three hours.



The soleus is a skeletal muscle, and that group of muscles is largely responsible for clearing glucose from the blood.

Soleus pushups offer a low-effort way to improve overall health.

"The soleus pushup looks simple from the outside, but sometimes what we see with our naked eye isn't the whole story. It's a very specific movement that right now requires wearable technology and experience to optimize the health benefits," Hamilton said.

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Soleus pushups can be done at your desk by keeping your knees at 90 degrees and lifting your heels up and down with your toes on the floor.