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E. EXCEL'S WORLD

July – September 2025

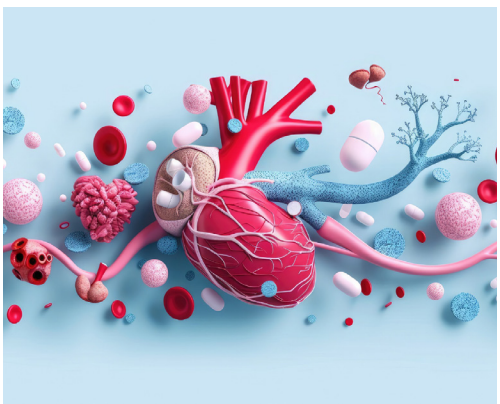
Heat on the Rise, Immunity on the Decline

Rising Temperatures' Silent Attack on Humanity

The world is heating up—and so is our body—but at what cost?

According to NASA scientists, 2024 was the hottest year on record. By July 21, Earth had already experienced its hottest day in eight decades—only to break that record the very next day. Unfortunately, this is not an isolated incident; it is rapidly becoming the new normal. Countries around the world are grappling with extreme heat, and research indicates that these heatwaves are now two to four times more likely due to human-caused climate change. The unsettling truth? While last summer may have felt unbearable, it may soon be remembered as one of the cooler ones.

But the heat is not just an environmental issue—it is a direct threat to our health. Rising temperatures are disrupting ecosystems, driving disease-carrying animals like mosquitoes and bats closer to human populations. This increases the risk of new viral diseases that our immune system is unprepared to fight.



Even worse, extreme heat weakens our immune system, fuels dangerous inflammation, and may contribute to chronic illnesses that silently build beneath the surface. With every scorching day, we edge closer to a biological meltdown—and our body is feeling the burn.

Rising Temperatures Weaken Immune Defenses

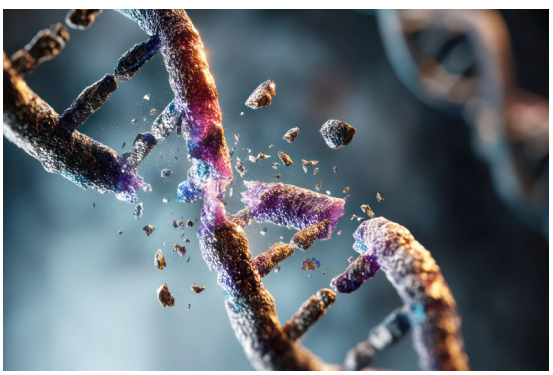
Even short-term exposure to excessive heat can weaken the immune system, increase inflammation, and raise the risk of infections and chronic conditions like heart disease.

A study on wild primates revealed that immune system performance is highly sensitive to temperature, particularly in younger individuals. Prolonged exposure to temperatures above 30°C caused a sharp drop in neopterin concentration, a key marker of immune activation. This weakened the primates' ability to fight infections, leaving them more vulnerable to illness.

Research from the University of Tokyo found that heat waves impair the immune response to influenza in mice. When exposed to a high temperature of 36°C, the mice struggled to mount an effective immune response, particularly in recognizing the influenza virus and activating antibody production. However, mice that received proper nutritional support before and after infection showed a normal immune response—suggesting that while heat waves may be unavoidable, good nutrition can help mitigate some of their harmful effects.

Another study found that for every 5°C increase in the Universal Thermal Climate Index (UTCI), inflammatory markers like monocytes and tumor necrosis factor-alpha increased, while B-cells—essential for antibody production—decreased.

In a different study, researchers using cultured mouse T cells discovered that heat exposure above normal body temperature (37°C) could trigger excessive cytokine production, increasing inflammation. Meanwhile, T helper cells—crucial for coordinating immune responses—suffered stress, DNA damage, and reduced survival rates. Heat exposure also impaired energy conversion within cells, triggering harmful byproducts, mitochondrial stress, and further DNA damage.



This alarming finding shows that extreme heat does not just increase inflammation—it sabotages our body's ability to fight infections and build immunity.

Even more concerning, patients with chronic inflammatory diseases like Crohn's disease and rheumatoid arthritis showed similar signs of DNA damage and mitochondrial dysfunction in their T helper cells—raising concerns that rising global temperatures may worsen existing conditions while making people more vulnerable to new infections.

Inflammation: The Silent, Scorching Inferno

Excessive environmental heat does more than make us sweat—it can quietly stoke chronic inflammation, putting our long-term health at risk. Unlike a fever, which is the body's temporary response to fight infection, prolonged heat exposure triggers persistent, low-grade inflammation that quietly damages tissues and organs over time.

A recent study found that extreme heat may accelerate biological aging, a process closely linked to chronic inflammation. Researchers analyzed blood samples from over 3,600 U.S. adults aged 56 and older and discovered that those living in hotter, more humid climates experienced faster aging—even after accounting for lifestyle factors.

Older adults are particularly vulnerable since their bodies are less efficient at cooling through sweating. This prolonged heat stress appears to activate epigenetic changes that impair immune responses, disrupt stress regulation, and fuel systemic inflammation—all of which can accelerate aging and disease development.

Chronic inflammation, often called the "silent killer," is a known contributor to heart disease, diabetes, cancer, Alzheimer's disease, and other serious conditions. As rising global temperatures continue to amplify inflammation, protecting our immune system and reducing inflammatory triggers has never been more urgent.

From Heat to Disease

Rising global temperatures are also changing how infectious diseases spread. While respiratory infections have traditionally peaked during colder months when people gather indoors, heatwaves are now pushing people indoors to escape extreme heat, creating similar conditions for viral spread.

Warming temperatures are also fueling the spread of other deadly pathogens. There has been an eightfold increase in *Vibrio vulnificus* (a flesh-eating bacterium) infections along the U.S. East Coast since 1988. These infections are now found as far north as Philadelphia, shifting northwards at about 48 km per year, and cases are expected to double by 2041 – 2060.

Meanwhile, researchers found that *Cryptococcus deneoformans*, a dangerous fungus, mutates five times faster when exposed to body temperature (37°C). As fungi adapt to survive in warmer conditions, their ability to infect humans may increase.

Dengue, a mosquito-borne disease, is also spreading into regions previously unaffected due to warmer, wetter climates that provide ideal mosquito breeding conditions.

Droughts, wildfires, and habitat loss are further pushing disease-carrying animals closer to human populations, raising the risk of outbreaks.

With climate change fueling extreme heat, ecosystem disruption, and weakened immune defenses, heat-driven infections are fast becoming a serious public health threat.

What We Eat Matters

Now more than ever, protecting our health is crucial—and our diet plays a key role. While we cannot fully escape the effects of rising global temperatures, we can strengthen our immune defenses by making smarter food choices. Chronic inflammation triggered by environmental heat increases the risk of conditions like heart disease, diabetes, arthritis, and cancer. Our food choices can either fuel or reduce this inflammation.

Processed meats, refined carbs, trans fats, and excessive omega-6 fats promote inflammation, while anti-inflammatory foods—like cactus, rose, berries, leafy greens, tomatoes, nuts, and mushrooms—help reduce oxidative stress, lower inflammation, and strengthen immune function.

No single food is a magic cure, but consistently choosing wholesome, plant-based foods rich in phytochemicals, antioxidants, and polysaccharides can help build resilience against chronic inflammation and disease.

	Plant Food	Key Compound	Function
	**Cactus**	Betalains, saponins	Powerful anti-inflammatory agent, supports liver health
	**Black goji berry**	Rutin, lutein, betaine	Has strong anti-inflammatory effects, supports liver health
	**Red goji berry**	Zeaxanthin	Protects against systemic inflammation
	**Rose**	Geraniol, quercetin, kaempferol	Has anti-inflammatory effects, may have antidiabetic effect, helps delay the signs of aging
	**Ginger**	Gingerol	Reduces inflammation and helps with digestion
	**Berries**	Anthocyanins	Fight inflammation and oxidative damage
	**Green leafy vegetables**	Flavonoids	Reduce inflammatory markers, improve immune response
	**Vegetables**	Carotenoids	Reduce inflammation and improve immune health
	**Olive leaf**	Hydroxytyrosol	Reduces oxidative stress and protects against inflammatory diseases, such as atherosclerosis
	**Mushrooms**	Polysaccharides	Reduce inflammation and strengthen the immune system
	**Oriental raisin tree**	Saponins, dihydromyricetin	Reduces pro-inflammatory markers
	**Luffa**	Bryonolic acid	Inhibits pro-inflammatory mediators like prostaglandins and cytokines

The Time to Act Is Now

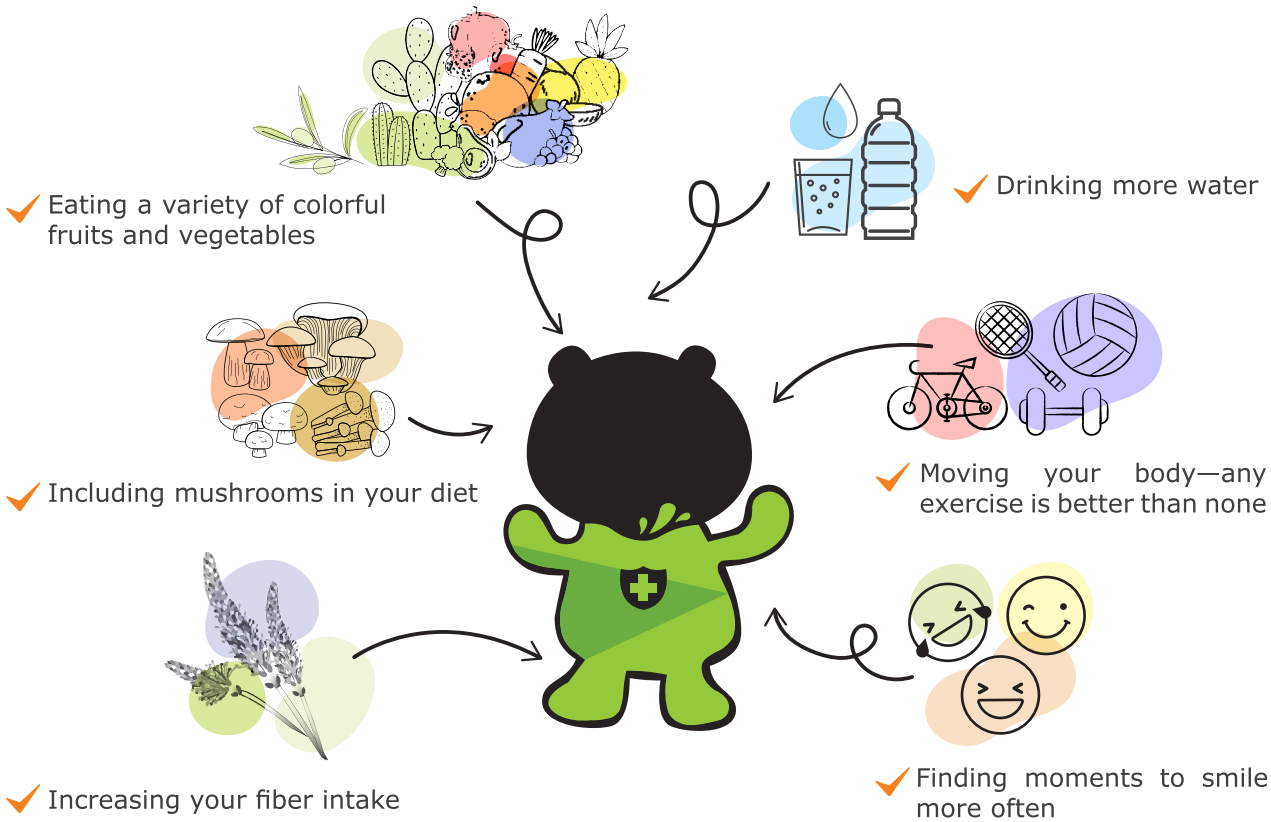
Climate change is no longer a distant threat—it is here, and it is impacting our health in ways we cannot ignore.

Too often, we only prioritize our well-being when illness strikes—waiting for a crisis before taking action. But just like a car running on contaminated fuel may seem fine at first, a neglected immune system can quietly weaken until it fails us when we need it most.

Unhealthy lifestyle habits may not cause immediate harm, but the damage builds up over time. When our body finally faces a serious threat, those weakened defenses may not be strong enough to protect us. That is why consistent healthy lifestyle habits are key—waiting until trouble appears may be too late.

Building a strong immune system does not happen overnight. Think of good health like a slow-cooked meal—rich, nourishing, and carefully prepared—not a quick, microwaved fix.

True resilience comes from the small, daily choices that strengthen our body and mind. Start today by:



Climate change is a warning we cannot ignore—and protecting our health is part of the solution. By investing in our well-being today, we will be better equipped to face the challenges of tomorrow. The time to take charge of our health is not someday—it is NOW.

The Lifelong Learning article is contributed by Dr. EE Zhang, MBChB.

The Threat of Climate Change

Climate Change and the Growing Threat to Agriculture

As the world scrambles to feed a rapidly expanding population amid increasingly unstable weather patterns, scientific research is shedding light on just how vulnerable our food systems are to a changing climate. The consensus is clear: climate change poses significant risks to agricultural productivity, global food supplies, and farmer livelihoods. As these impacts are poised to intensify as the world warms, there is an urgent need for humans everywhere to take better care of Earth's delicate ecological balance.

Extreme Weather Events and Shifting Precipitation

Farmers worldwide have long relied on stable temperature ranges and predictable rainfall to grow crops effectively. However, changes in temperature extremes—both hot and cold—are undermining these assumptions. If temperatures exceed the optimal level for a particular crop, yields can fall dramatically. Even a single season of intense heat can cause premature budding and reduce harvests. In the northwestern United States, for instance, hotter, drier summers have led to widespread crop losses from soil moisture deficits, while extreme heat events like the 2021 "heat dome" reduced yields of everything from cherries to cereal grains.

Unpredictable rainfall patterns—sometimes too little, sometimes too much—wreak havoc on fields and place stress on irrigation, which already accounts for about 70% of total global water withdrawals and supplies up to 40% of human-consumed calories. Floodwaters wash away valuable topsoil and nutrients. Droughts parch fields, causing crop failures that lead to shortages and price spikes. Many key growing regions—including parts of China, India, Pakistan, and the United States—are grappling with uncertain water availability just as their populations and irrigation demands continue to rise. Additionally, farmers in East Africa have experienced recurrent droughts, leading to significant reductions in harvest and mass displacement of communities reliant on farming.

Pests, Diseases, and Weeds Thriving

A warmer world also gives harmful insects, fungi, and weeds a chance to spread into regions where they once could not survive. This expands the areas in which pests can cause crop damage, costing farmers more in pest-control measures and lost harvests. Higher temperatures can further shorten pests' life cycles, allowing more generations to breed and multiply each year. Many farmers already spend billions of dollars annually to keep weeds and other invasive species at bay. If climate change continues unabated, both the range of pests and the costs of controlling them are likely to grow.

Heat Stress and Crop Production

Rising temperatures damage crop health in multiple ways. Some plants thrive in moderate warmth, but sustained or excessive heat impairs photosynthesis, accelerates soil moisture loss, and can shorten the growing period. Around the world, scientists warn that without concerted efforts to mitigate climate change, temperatures will continue to increase—tipping more regions beyond their comfort zones for cultivating staple crops like wheat, rice, and corn.

Saguaro Cactus Die-offs

Although deserts might seem naturally adapted to extreme heat, the southwestern United States is showing that even iconic desert flora have limits. Recent years have seen repeated heat waves—at times surpassing 46°C—that are killing or severely weakening desert plants once deemed nearly indestructible. Ecologists in Arizona and Nevada report increasing saguaro cactus mortality starting around 2020, indicating a steady die-off with each subsequent heat wave.

Napa Cabbage in South Korea

In mountainous parts of South Korea, napa cabbage struggles in higher summer temperatures. While once reliably grown at elevations with cooler nights, climate shifts now bring rising nighttime lows, increased pest pressure, and fungal infections. Farmers report rotting cabbage hearts and poor yields. Government projections suggest the region suitable for highland cabbage cultivation may shrink dramatically by mid-century. As demand for kimchi remains high, farmers face potential water shortages and unpredictable rainfall.

Taiwanese Persimmons and Global Crop Trends

In Taiwan, farmers are already reporting a drop in persimmon harvests because of hotter seasons and unpredictable typhoon activity. Similar patterns—reduced yields, heat-damaged fruit, and mounting economic losses—are playing out on multiple continents, from East African maize fields devastated by drought to U.S. cherry orchards scorched by unprecedented heat domes. A recurring theme is that many growers must either adopt new technologies or shift to different crops entirely, often at considerable expense or with uncertain outcomes.

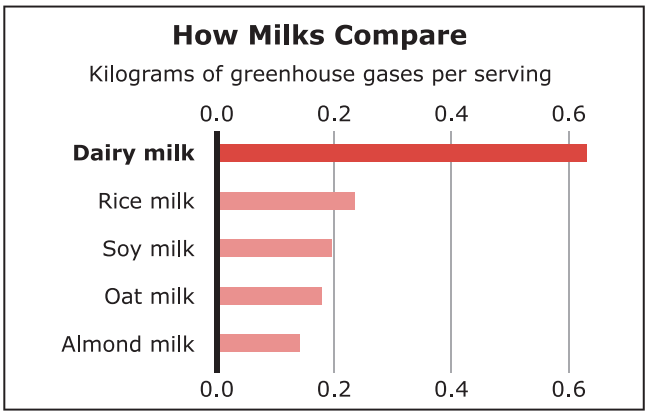
Strains on Global Food Security

Scientists from Chongqing University and The Nature Conservancy warn that shrinking harvests and declining soil fertility could intensify pressures to clear more land for agriculture, resulting in further biodiversity loss. Reductions in yield and quality due to higher temperatures, drought, or pest infestations can drive up the cost of food globally. In extreme scenarios, depleted harvests could spark social unrest or political instability. As the U.S. Department of Agriculture's Economic Research Service notes, all dimensions of food security—availability, accessibility, utilization, and stability—are threatened by climate extremes and the long-term rise in global average temperatures.

Livestock and Greenhouse Gas Emissions

Livestock production—particularly raising cattle for meat—contributes to a significant share of the world's greenhouse gas emissions. Globally, livestock is estimated to account for between 14.5% and 18% of human-induced greenhouse gas emissions, with beef cattle and dairy cattle being major culprits due to their production of methane. Methane (CH_4) is of particular concern because, while it remains in the atmosphere for a shorter time than carbon dioxide (CO_2), it is about 84 times as potent as CO_2 at trapping heat in the atmosphere over a 20-year timescale. In cattle, this methane is produced primarily through enteric fermentation, a digestive process common to ruminants such as cows, sheep, and buffalo. Microbes in a cow's rumen break down fibrous plant material and, in the process, generate methane that is expelled when the animal burps or breathes out.

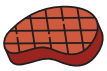
Raising meat also adds to climate pressures in other ways. Large swaths of land are cleared—often through deforestation—to create pasture or to grow feed crops. This conversion of forests and grasslands into farmland releases the carbon stored in soils and vegetation, driving up total greenhouse gas emissions. Additionally, the application of nitrogen-rich fertilizers on livestock feed crops leads to releases of nitrous oxide (N_2O), another potent greenhouse gas. In short, the high demand for meat creates a powerful feedback loop that magnifies livestock's climate impact.



Source: https://www.bbc.co.uk/news/science-environment-46459714

What is the Carbon Footprint of Your Diet?

Source: https://www.bbc.co.uk/news/science-environment-46459714



Eating **beef** 3 – 5 times a week

75g, equivalent to one typical fast food hamburger, per serving

Over an entire year your consumption of beef is contributing 1,611kg to your annual greenhouse gas emissions.

That's the equivalent of driving a regular petrol car **4,112 miles (6,618km)**.

or

the same as heating the average UK home for **255 days**.

or

like taking **5 return flights from London to Málaga**.

Your consumption of beef also uses 4,625m² land,
equal to the space of **17 tennis courts**.

Eating **lamb** 3 – 5 times a week

75g, equivalent to two lamb chops, per serving

Over an entire year your consumption of lamb is contributing 904kg to your annual greenhouse gas emissions.

That's the equivalent of driving a regular petrol car **2,307 miles (3,712km)**.

or

the same as heating the average UK home for **143 days**.

or

like taking **2 return flights from London to Málaga**.

Your consumption of lamb also uses 8,419m² land,
equal to the space of **32 tennis courts**.

Drinking **dairy milk** 3 – 5 times a week

1 glass (200ml) per serving

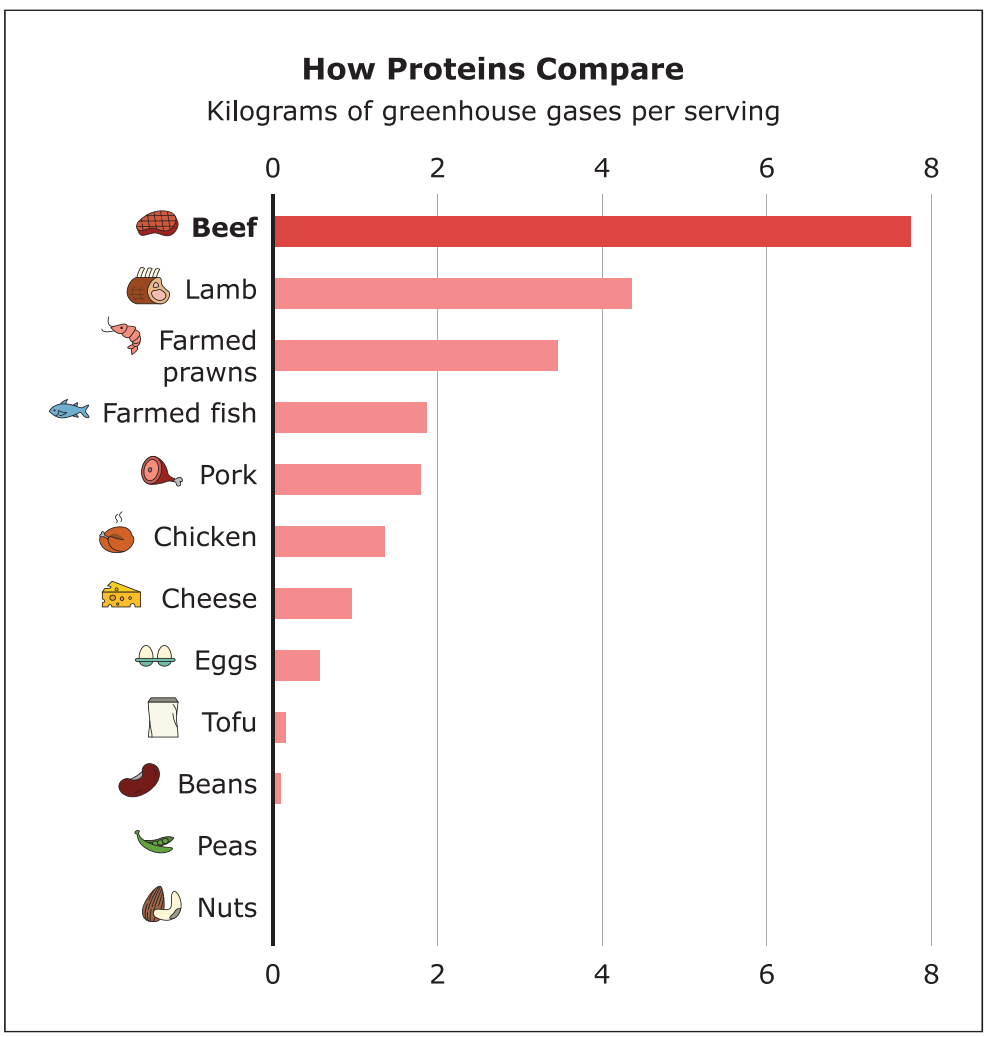
Over an entire year your consumption of dairy milk is contributing 131kg to your annual greenhouse gas emissions.

That's the equivalent of driving a regular petrol car **334 miles (538km)**. 

or

 the same as heating the average UK home for **20 days**.

Your consumption of dairy milk also uses 26,133 liters of water, 
equal to **402 showers** lasting eight minutes.
372m² land, equal to the space of **1 tennis court**. 



Source: https://www.bbc.co.uk/news/science-environment-46459714

How Eating Less Meat Can Help Protect the Earth

Shifting to a more plant-based diet is one of the most direct actions individuals can take to curb climate change. According to the Intergovernmental Panel on Climate Change (IPCC), cutting back on animal products can significantly reduce global greenhouse gas emissions.

Recent comprehensive research from Oxford University and published in *Nature Food* has brought renewed clarity to just how impactful reducing meat consumption can be. Analyzing the diets of over 55,000 participants in the United Kingdom and referencing data from more than 38,000 farms across 119 countries, the study found that diets lower in animal products have a far smaller environmental footprint than meat-rich diets:

- Vegan diets produce about 75% less heat-trapping gas, 73% less water pollution, and use 75% less land compared to diets containing at least 100 grams of meat daily (roughly the size of a deck-of-cards steak).

- Low-meat diets, defined as less than 50 grams of meat per day, have about half the impact on greenhouse gas emissions, water pollution, and land use as meat-heavy diets.

Furthermore, heavy meat eaters (at least 100 grams of meat per day) account for an average of 10kg of CO_2 daily from their diet. In contrast, light meat eaters account for around 5kg and vegetarians just 4kg. Vegan diets have the lowest totals of all, at around 2.4kg of CO_2 daily.

By choosing vegetables, grains, fruits, and legumes over meat-centric meals, consumers shrink their overall environmental footprint. Because the livestock sector is responsible for both large-scale land-use changes and a significant share of greenhouse gas emissions, even small personal changes in diet can have outsized environmental benefits. Shifting from daily or heavy meat consumption to more moderate or occasional meat intake helps spare forests from conversion to pasture and reduces the fertilizer and irrigation demands needed to grow feed crops. In turn, this spares biodiversity and frees resources for other forms of agriculture that can be more sustainable and less land-intensive.

According to additional work from Harvard T.H. Chan School of Public Health and Brigham and Women's Hospital, the healthiest plant-based diets—rich in whole grains, fruits, vegetables, nuts, and legumes—generally have a smaller environmental footprint than less healthy plant-based diets packed with refined grains and artificial sweeteners. While *any* shift away from heavy red meat consumption typically reduces greenhouse gas emissions, choosing high-quality, wholesome plant foods further amplifies these gains—leading to better outcomes for both personal health and the planet.

The implications of these findings go beyond individual meal plans. When entire communities, workplaces, or educational institutions institute "meatless days" or prominently feature plant-based options, it lowers aggregate demand for meat. This demand shift can influence farming practices, pricing structures, and ultimately the policies that support or constrain sustainable food production. Even small-scale personal actions—such as having a vegan lunch once a week or replacing beef with beans—can help build momentum for broader cultural acceptance of plant-forward diets. According to the University of Oxford's Dr. Peter Scarborough, cutting meat consumption even modestly (e.g., from high to low) can be equivalent to taking millions of cars off the road in terms of carbon savings.

A Call for Collective Responsibility

Climate change has already reduced agricultural productivity by an estimated 20% since 1970, and current trends point to further losses unless significant measures are taken. While the situation is undeniably serious—from the wilting cabbages in South Korea to the dying saguaros in Arizona—there is still time to chart a more sustainable path. We have the knowledge and tools to adapt agriculture to changing conditions, cut greenhouse gas emissions, and move toward a more sustainable and equitable global food system.

Ultimately, the fate of the world's food supply—and the ecosystems that support it—depends on humanity's willingness to change course. Every individual, including us as consumers, can play a part—reduce meat consumption and embrace more balanced, plant-forward diets, and waste fewer resources at home. These changes set us up for a more resilient, health-forward future. Plant foods such as fruits, vegetables, grains, and legumes are packed with antioxidants, vitamins, and phytochemicals that bolster our natural defenses against disease and inflammation. With the support and knowledge of Nutritional Immunology—which examines how a diet rich in plant-based nutrients supports the immune system—we can help build momentum for the wider adoption of plant-forward diets to help mitigate climate change. Embracing a plant-centric diet becomes a powerful way to care for our own health and ensure that future generations inherit a world in which both agriculture and the planet can thrive.

The Professional Development article is contributed by Elei Zhang, JD.

Knowledge is power. Knowledge is instrumental to value-creation and is a critical asset in life. It is in many ways the primary instrument of progress and innovation. However, knowledge can be messy, particularly when false. Today, information spreads rapidly and comprehensively, and websites and social media outlets are easy access points for false information.

We're here to help discern fact from fiction. Knowledge becomes powerful in the right culture—collectively sharing in the truth and continually seeking progress and ideas. Building the right knowledge base is neither a short-term effort nor a one-off project. It is a lifelong process of discovery.

Sleep Myths

Modern life is a whirlwind of work stress, personal drama, and endless social media scrolling, turning many of us into sleep-deprived zombies. It is no surprise that catching those precious Z's has become an elusive dream. According to a survey by the National Health and Nutrition Examination Survey from 2017 to early 2020, nearly 30% of folks in the United States had trouble falling or staying asleep, and about 27% were nodding off during the day. Most adults need about seven to nine hours of sleep per night to stay healthy. Skimping on sleep can lead to obesity, heart disease, dementia, anxiety, and depression. So, let us put some common sleep myths to sleep and get the facts straight for a better night's rest!

Myth:

Drinking alcohol before bedtime helps you sleep better.

Truth:

A little nightcap might help you drift off faster, but it will not keep you asleep. Alcohol boosts the production of adenosine, a chemical that induces sleepiness, but this wears off midway through the night. This often causes you to wake up before getting a full night's rest, interrupting your much-needed rapid eye movement (REM) sleep. Alcohol also reduces the amount of time you spend in REM sleep.

Myth:

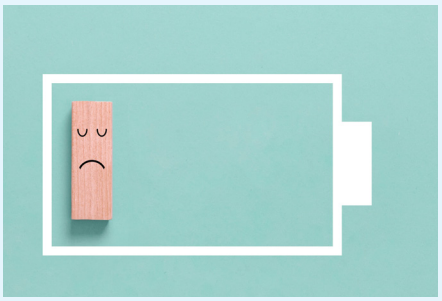
You can catch up on lost sleep.

Truth:

Picture this: you treat sleep like a bank account, withdrawing an hour on Monday and thinking you can just deposit it back on Saturday to break even. Sounds simple, right? Not quite. While you might feel a bit more alert after a weekend sleep-in, you cannot fully make up for lost sleep by "paying back" hour for hour. However, there is a silver lining! Recent research shows that "catch-up sleep" on your days off is still beneficial. People who sleep more on their free days tend to have lower inflammation levels, and since inflammation is a key player in chronic diseases, those extra weekend Z's can still help keep you healthier.

Myth:

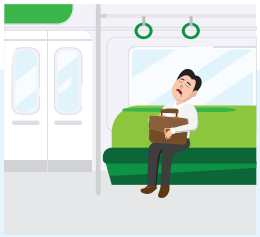
Your body naturally adapts to less sleep.



Truth:

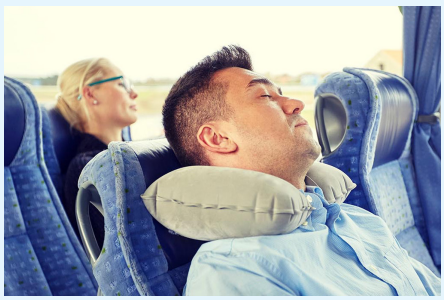
Wouldn't it be amazing if you could train your brain to function on just a few hours of sleep each night? Think of all the extra time you would have for hanging out with friends, binge-watching Netflix, and catching up on assignments! Unfortunately, your body does not work that way. You cycle through four different sleep phases several times each night. Skipping out on sleep means missing these crucial cycles, so you need a full night's rest to reap all the benefits.

Lack of sleep takes a serious toll on your brain and body. Your body does not adapt to a lack of sleep at all. After a few nights of insufficient sleep, you will probably feel sleepier during the day. This increase in daytime drowsiness might become a new normal over weeks or months without enough sleep, but it does not mean your body is functioning optimally or effectively adjusting to sleep loss. In reality, sleep deprivation hinders decision-making, memory, focus, creativity, and even lowers immune function. In fact, pulling an all-nighter is just as bad as drinking a couple of beers! After 24 hours without sleeping, your brain functions as if you have a blood alcohol content (BAC) of 0.1%, which is above the BAC limit for driving in the United States.



Myth:

It is healthy to be able to fall asleep anywhere, at any time.



Truth:

Sure, it might seem like a superpower to conk out the minute your head hits the pillow or as soon as the car, bus, or train starts moving. But in reality, it is a sign that you are sleep-deprived, and your body is desperately taking "micro-sleeps" whenever it gets a chance. Remember, aim for at least seven to nine hours of sleep each night to stay healthy.

Myth:

Working night shifts and sleeping during the day is harmless.

Truth:

Mounting evidence paints a worrying picture about the potential health fallout for people who work night shifts. While pulling an occasional all-nighter might not seem like a big deal, it messes with your circadian clock—the internal system that regulates hormone levels to promote sleep at night and alertness during the day. The disruption of the circadian rhythm increases the risk of heart attacks, diabetes, and metabolic syndrome.

Your body starts secreting sleep-promoting melatonin around 9 PM, which stays elevated throughout the night. By morning light, your body suppresses melatonin secretion and elevates cortisol levels to help you wake up. However, artificial light, including the blue light from digital devices, can affect your circadian rhythm just like sunlight.

A few late nights in a row can change your circadian clock, which is why falling asleep on Sunday after late nights on Friday and Saturday can be tough. The health risks are most evident in night shift workers who face a constant battle against their natural sleep-wake cycles. So, while it might seem manageable, working at night and sleeping during the day can take a serious toll on your health over time.

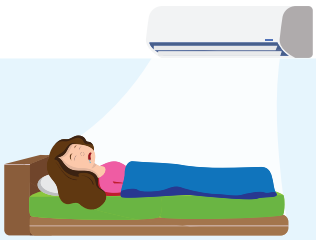
Myth:

Watching TV before bed is relaxing and will not affect your sleep.

Truth:

Watching TV before bed is a beloved ritual for many. There is nothing quite like curling up somewhere comfy and catching up on your favorite show after a long day. But here is the kicker: binge-watching is a real thing, thanks to streaming platforms like Netflix dropping entire seasons at once. While it is tempting to say "just one more episode," be aware of the value of sleep and practice some discipline.

It is totally fine to relax in the evenings, but do not add to your stress by skimping on sleep. Ideally, avoid TV and electronic devices within an hour of bedtime since the blue light they emit can interfere with the release of melatonin, the hormone that helps us sleep.



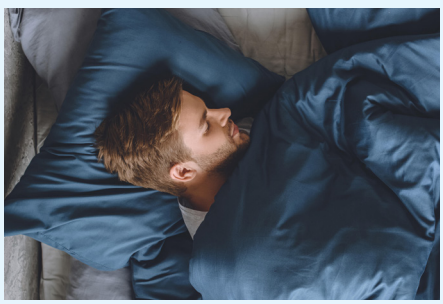
Myth:

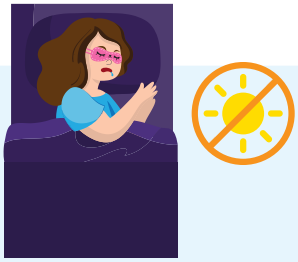
Sleeping with the air conditioner on is bad for your health.

Truth:

Whether or not sleeping with the air conditioner on is bad for your health really depends on the room temperature. It is all about finding that sweet spot! Most people sleep best in a room that is around 18°C to 20°C. During sleep, the body lowers its core temperature by releasing heat through dilated blood vessels, increasing blood flow to the skin, especially in the hands and feet. This increased circulation can make the skin feel warmer, which often leads to rashes flaring up at night. The added warmth can intensify inflammation and worsen irritation. This is why you may go to bed feeling comfortable or slightly cool, but later wake up sweating or feeling too hot.

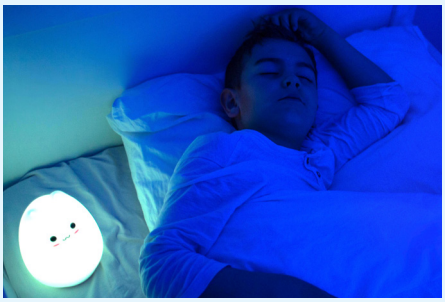
If your bedroom is already hot, combined with the rise in skin temperature, you might end up sweating under the blanket, which can mess with your sleep and cause those annoying wake-ups. So, set the air conditioner temperature to a comfortable level and sleep like a baby! If you would rather keep the fan on, that is fine too!





Myth:

You need to sleep in complete darkness.



Truth:

Some of us need a light on while sleeping to ward off imaginary monsters. Some folks keep a nightlight on to avoid stumbling during midnight bathroom breaks or for added security. However, research suggests that ambient light is not great for restorative sleep.

While some people swear by sleeping in complete darkness, others—especially children—may fear the dark. In such cases, using red light might be better since blue light and white light can interfere with melatonin production. Switching to a red night light can help increase melatonin levels.

Ultimately, whether you prefer complete darkness or a bit of light, what matters is finding what helps you wind down and sleep soundly.

Myth:

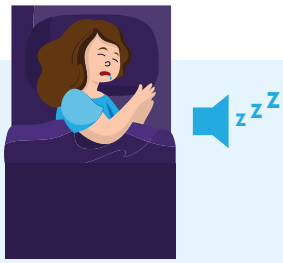
You should not drink water before bed.

Truth:

Many of us avoid drinking water before bed to prevent waking up for a midnight bathroom trip, only to wake up feeling totally dehydrated and thirsty. The trick is how much water you drink and when you drink it. Chugging a lot of water right before bedtime is not a great idea, but a small amount is perfectly fine.

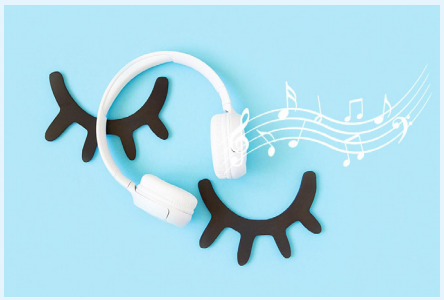
It is recommended to stop drinking a lot of water about two hours before going to bed. However, if your mouth feels parched, a small sip is okay. As a general rule, drinking less than a glass of water in those last two hours before bed is fine. Stay hydrated, but do not overdo it right before settling in for bed! After all, staying hydrated is necessary for all body systems to function well.

If you wake up in the middle of the night feeling thirsty, you do not have to bear with it and go back to sleep. You can drink some water, just remember not to gulp down a big glass of water all at once.



Myth:

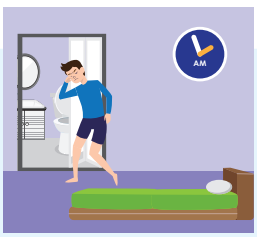
Dead silence is a must for a good night's sleep.



Truth:

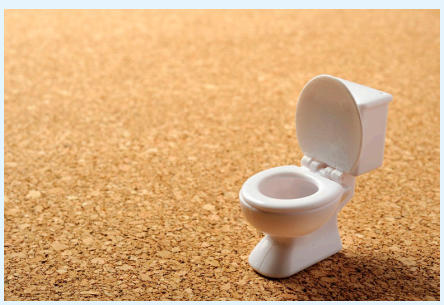
Sure, sleeping in complete silence works for many, but some people find dead silence unnerving or anxiety-inducing. This can spike adrenaline levels and keep you awake rather than relaxed. For others, silence is just too ... silent. In these cases, background noise—a fan, white noise machine, or even a familiar TV show—can fill the void and help them drift off to sleep.

Using some kind of background noise to sleep is not unusual and nothing to worry about. White noise (e.g. radio static and a whirring fan) can be especially helpful for light sleepers who wake up at the slightest sound. A constant, low noise masks other nighttime sounds like a creaky house, honking horns, or pets running around. Studies even show that white noise can improve sleep quality.



Myth:

You should not have to wake up for bathroom trips during your sleep.

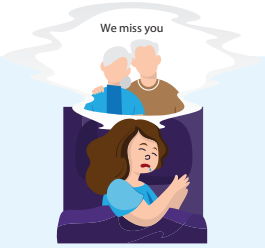


Truth:

We have all had those moments when we are snug in bed and suddenly the urge to go to the bathroom strikes—again. Is something wrong? While you sleep, your body increases levels of antidiuretic hormone (ADH), which helps you avoid nighttime bathroom trips. Even though ADH is produced throughout the day, you make more of it at night to help you sleep longer without interruption.

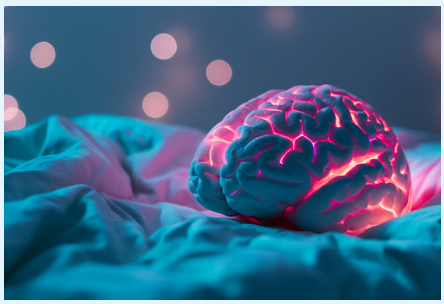
However, if ADH levels do not rise as they should, it can lead to frequent nighttime bathroom visits, a condition called nocturia. Ideally, we should be able to sleep for six to eight hours straight without needing to go to the bathroom. If you are getting up two or more times each night, that may be a sign of nocturia.

But not all nighttime trips to the bathroom are due to nocturia. Other factors can be at play, such as drinking too much in the evening, especially alcohol. Medical conditions like diabetes, kidney disease, enlarged prostate, and high blood pressure can also cause more frequent urination. Excess salt during dinner can lead to a long night as your body gets rid of the excess salt and water through urination. Additionally, certain medications, increased age, and weak pelvic floor muscles can increase bathroom trips.



Myth:

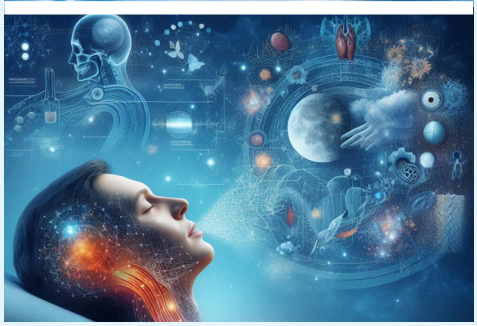
Dreams are messages from the other side.



Truth:

Dreams are one of the most fascinating and mystifying aspects of sleep. While we still have a lot to learn about why we dream, several theories offer insights into their possible purposes:

1. Memory building: During sleep, especially in the REM phase when most dreaming occurs, the brain sorts and stores information from the day, reinforcing learning and creating long-term memories.
2. Emotion processing: Dreams might be the brain's way of managing emotions by allowing you to rehearse feelings in different imagined scenarios. For example, you have been missing your loved ones. In your dream, you might find yourself having a happy conversation with them like you used to. Even though it is not real, the dream helps you feel connected, allowing your brain to process the emotions of missing them. When you wake up, you may feel a sense of comfort, as if you have bridged that emotional gap, even for a brief moment.
3. Mental housekeeping: Think of dreams as the brain's way of "straightening up," clearing away unnecessary or erroneous information.
4. Problem-solving: Sometimes, dreams can provide creative solutions to problems you are facing. Even when you are asleep, your subconscious mind is hard at work on the issues you are grappling with. For example, the solution to a math problem that you could not solve during the day might suddenly come to you in a dream at night.
5. Cognitive development: For children, dreams might aid in brain development and cognitive growth. Engaging in imaginative scenarios helps their brains practice and develop critical thinking and problem-solving skills.

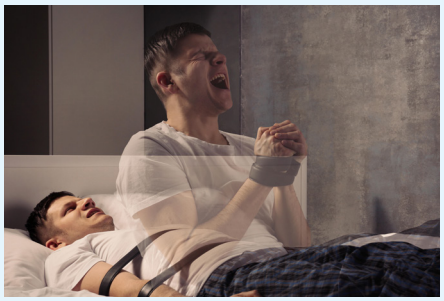


While no single theory can fully explain why we dream, it is likely that dreams serve multiple functions. Interestingly, some people remember their dreams, while others do not. Researchers have found that people who remember their dreams tend to be more wakeful during the night compared to those who rarely recall them. This suggests that frequent dream recall might be linked to less restful sleep.

In short, remembering a dream does not necessarily mean anything other than suggesting you woke up at the right time to recall it.

Myth:

Sleep paralysis is supernatural.



Truth:

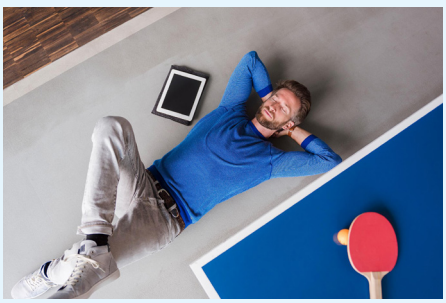
Sleep paralysis often gets wrapped up in supernatural myths. In Chinese, the older generations call it "鬼压床" (guǐ yā chuáng, which means "ghost pressing on the bed." Sleep paralysis is when you cannot move your muscles as you are waking up or falling asleep. Sometimes it can include a sleep-related hallucination, such as something standing at the end of the bed or sitting on your chest.

So, what is the real deal with sleep paralysis? It is simply a glitch between your brain and body during the transition between wakefulness and sleep. During REM sleep, when most of your dreaming happens, your brain tells your muscles to relax so that you do not act out your dreams and accidentally hurt yourself. Sleep paralysis occurs when your brain wakes up from REM sleep, but your body remains in relaxation mode. Not getting enough sleep or having an irregular sleep schedule can increase the likelihood of experiencing it. Interestingly, there is also a genetic component to sleep paralysis, suggesting it can run in families.

While sleep paralysis can be frightening, understanding its causes can help ease anxiety. So, next time it happens, just remember—it is not a ghost, just a sleepy brain glitch!

Myth:

Napping makes up for a lack of nighttime sleep.



Truth:

Think a quick nap can replace lost nighttime sleep? Think again! While a nap can provide a midday energy boost, it is not a substitute for quality sleep at night. Naps do not allow you to progress through all the sleep stages like nighttime sleep does. Plus, napping can disrupt your sleep schedule, making it harder to fall asleep at night. Long naps can leave you feeling disoriented and sluggish. No matter how tired you are, aim to keep naps under an hour to avoid disrupting your nighttime sleep. The sweet spot? Aim for around 30 minutes, ideally taken early in the afternoon. Napping is not bad for you—just keep it short and sweet!

Myth:

It is not harmful to take sleeping pills every night.

Truth:

Having trouble catching those elusive Z's and considering a nightly dose of sleeping pills? While they might seem like a lifesaver, studies show that sleeping pills are not that effective at promoting a good night's rest. Most people who take them fall asleep only eight to 20 minutes faster than those who do not, with an average increase in sleep duration of just 35 minutes.

These pills are intended for short-term use only. Using them for more than two weeks can lead to tolerance, meaning you will need higher doses to achieve the same effect. They are designed to help reset your sleep schedule, not become a nightly habit. Doctors typically avoid long-term prescriptions because of the risk of dependence and withdrawal symptoms. Many users also develop psychological reliance, believing they cannot sleep without them. Moreover, discontinuing their use can trigger a rebound effect, worsening insomnia.

Beyond the common side effects like grogginess and memory lapses, sleeping pills can cause constipation, dry mouth, and difficulty urinating. Some studies suggest regular use may increase the risk of developing dementia and parasomnias—unusual sleep-related behaviors such as sleepwalking, sleep talking, sleep eating, and even sleep driving.

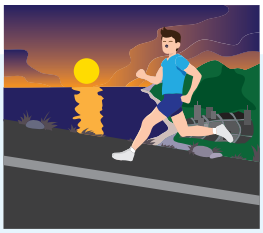
For older adults, the risks of falls and serious injuries like broken hips are heightened. So, while sleeping pills can offer temporary relief, they should be used judiciously and for the shortest duration possible!

Myth:

Snoring is harmless.

Truth:

While light, occasional snoring might seem harmless, loud and frequent snoring can signal serious health problems. Persistent snoring can be a sign of obstructive sleep apnea, a condition where the airway becomes repeatedly blocked during sleep, disrupting breathing. This not only fragments sleep but also deprives the body of essential oxygen, leading to daytime fatigue, high blood pressure, and potentially heart problems. Therefore, if you or someone you know is a regular loud snorer, seeking medical advice is crucial to identify and address any underlying issues.



Myth:

Exercising in the evenings causes sleepless nights.

Truth:

Working out is fantastic for your body and mind, and it can also help you achieve a good night's sleep. Many of us spend our days sitting behind a desk with little physical exertion, which can contribute to poor sleep quality. Physical activity helps to tire the body, making it easier to fall asleep and stay asleep. Exercise also plays a role in regulating your circadian rhythm, the natural sleep-wake cycle. A sedentary lifestyle can disrupt this cycle, making it harder to feel sleepy at night.

Research shows that moderate exercise increases the amount of slow-wave sleep we get. Slow-wave sleep is deep sleep, during which the brain and body have a chance to rejuvenate. Exercise can also help stabilize your mood and calm your mind, which is important for naturally transitioning to sleep.

However, some people find that exercising close to bedtime keeps them awake at night. For those individuals, it is best to finish exercising at least one to two hours before going to bed. This gives the brain time to wind down.

It is beneficial to exercise at any time of the day, including evenings—just make sure to give yourself a little buffer before bedtime!

Myth:

If you are tired enough, you will fall asleep.

Truth:

Being exhausted does not guarantee sleep. When we are overtired, our brain can enter a state of hyperarousal—wired but worn out—which actually makes it harder to drift off. This happens because exhaustion messes with neurochemicals and hormones in the brain, such as adenosine, which help us sleep.

Lack of sleep or staying awake too long can also keep the brain in an overstimulated state, making it more likely to latch onto stressful thoughts. A well-rested brain is better at brushing off unimportant things, but when we are sleep-deprived, we struggle to let go of even the most trivial worries—whether we realize it or not. Over time, this overloads the brain, making sleep even trickier.

Myth:

Everyone needs eight hours of sleep a night.

Truth:

While eight hours is a good number to aim for, everyone is slightly different. Most people need between seven to nine hours of sleep, with some people needing less, and some people needing more. Your optimum amount of sleep is how much sleep you need in an ideal environment, without any alarms, to wake up feeling rested and to function well during the day. Children tend to need more hours of sleep, and adults tend to need less.

The quality of sleep is also more important than the duration. Some people are early birds, and others are night owls. Expecting everyone to follow the same sleep schedule is unfair. For example, forcing an early bird to stay up late or a night owl to wake up early can seriously mess with their sleep, even if they get the recommended number of hours.

A small subset of the population has a gene mutation that allows them to function normally with as little as four hours of sleep a night! It is a minor super power that unfortunately is not common. For the rest of us, we just have to find a sleep schedule that works for us.

Myth:

Counting sheep helps you fall asleep.

Truth:

Nope, counting sheep will not magically send you to dreamland. Sleep is not something you can force—actually, the harder you try, the more it plays hard to get.

A better approach? Write down your worries before bed. This can help you realize most of them are not as big as they seem. And for the ones that *are*? Jotting down a simple action plan can help you set them aside for the night. While this will not magically solve your problems, it gives your brain a chance to process emotions and let go.

If your thoughts keep racing and sleep will not come, do not just lie there—get up, go to a quiet space, and write a little more. And to make bedtime easier, wind down at least an hour before sleep. Read a book, listen to calming music, or do whatever helps you relax—everyone is different!

Good things come in pairs. So here's another Beyond article. Enjoy!

Sunscreen Myths

Myth:

Sunscreen causes vitamin D deficiency.

Truth:

No, it does not. Sunscreen is not 100% effective at blocking ultraviolet (UV) rays, and the human body only needs a small amount of sunlight to produce enough vitamin D. Plus, sunlight can still penetrate clothing, and let's be real—who is slathering sunscreen under their clothes? Most traditional sunscreens lose effectiveness after about two hours of UV exposure because they are not photostable—that is also why sunscreen bottles are never clear. And even if you tried, no one applies sunscreen thickly or frequently enough to block all UV rays completely. In reality, many scientists agree that just 5 to 30 minutes of sun exposure a day is enough to meet vitamin D needs.

Other than sunlight, you can also get vitamin D from food sources like mushrooms, egg yolks, fatty fish, meat, and cheese. So no, sunscreen is not robbing you of vitamin D—but skipping sunscreen could be robbing you of healthy skin!

Myth:

Makeup with SPF is enough—no need for sunscreen.

Truth:

Nice try, but no! While makeup with sun protection factor (SPF) offers some sun protection, it is usually not enough to shield your skin properly. Most makeup products with sunscreen only provide SPF5 to SPF15, far below the recommended SPF30 or higher for outdoor sun protection. Another issue? Application thickness matters. To get the SPF listed on the label, you would need to apply a much thicker layer of makeup than you usually do. Since makeup is typically applied in a thin layer, the real SPF protection ends up being much lower.

Bottom line: Makeup with SPF is a bonus, not a replacement. Always apply sunscreen for proper sun protection!

Myth:

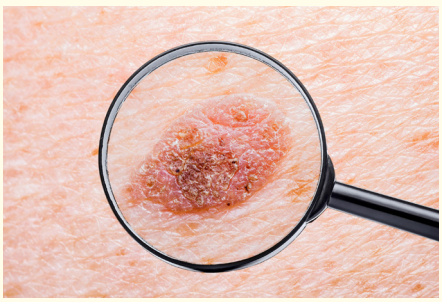
Sunscreen causes breakouts.

Truth:

Not necessarily! Acne is influenced by many factors, including hormones and lifestyle. If you have acne-prone skin, opt for a lightweight, non-comedogenic sunscreen designed to prevent clogged pores. Gel-based formulas are often good choices. Sun protection should not come at the cost of clear skin!

Myth:

Sunscreen causes cancer.



Truth:

There is no scientific evidence that sunscreen causes cancer. However, there is plenty of evidence showing that not using sunscreen increases the risk of skin cancer. Research shows that daily sunscreen use can lower the risk of squamous cell carcinoma (a type of skin cancer) by about 40% and melanoma (the most dangerous type of skin cancer) by 50%. So, the real risk is not sunscreen—it is skipping it!

Myth:

You do not need sunscreen in winter, on cloudy days, or in water.

Truth:

UV rays—not temperature—cause sun damage. That means you can still be exposed to harmful UV radiation even on cold, cloudy, or rainy days. In fact, clouds can sometimes scatter UV rays, increasing UV radiation exposure compared to a clear sky. So, if the sun is up and you are outside, UV rays are reaching your skin—no matter the season or weather.

Even if it feels cooler, your skin still absorbs UVA and UVB rays. And do not think water protects you either—UV rays can penetrate water, especially in shallow areas, and sunlight reflects off the water surface, increasing UV exposure to areas not submerged. So whether you are swimming, skiing, or just stepping outside on a cloudy day, sunscreen is still a must!

Myth:

Dark skin does not need sunscreen.

Truth:

Darker skin has more melanin, which provides some natural protection against UV rays. However, that does not mean people with darker skin are immune to sun damage. They can still get sunburned, develop dark spots, premature wrinkles, and, most importantly, skin cancer. UV radiation from the sun (and from artificial sources) affects all skin types, even if you do not burn easily. While lighter skin is more prone to burning, everyone is at risk of long-term sun damage. That is why sun protection is essential, regardless of skin tone. And no, having a tan—natural or fake—will not protect you. Tanning is a visible sign of skin damage. There is no such thing as a "safe tan."

Myth:

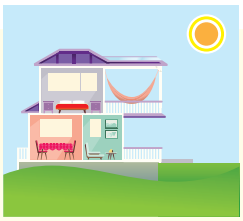
One application of sunscreen lasts all day.

Truth:

Nope! Most traditional sunscreens are not photostable, meaning they break down in sunlight and lose effectiveness over time. That is why it is generally recommended to reapply every two hours—after that, the sun protection significantly decreases. However, not all sunscreens are the same. Some formulations use more stable ingredients that last longer and do not degrade as quickly under UV exposure. But even with long-lasting formulas, factors like sweating, swimming, and rubbing can reduce their effectiveness. And no, there is no such thing as a completely waterproof sunscreen. If you are in the water or sweating heavily, some of it will wash off, so reapplication is key. Always check the label to see how often you should reapply for maximum sun protection!

Myth:

If I am indoors, I do not need sunscreen.



Truth:

Think you are safe from the sun just because you are indoors? Not quite! While standard window glass blocks most UVB rays (the ones responsible for sunburn), it does not block all of them—and it does almost nothing against UVA rays. UVA rays penetrate glass and cause premature aging. Both UVA and UVB rays increase skin cancer risk. That means if you spend a lot of time near a window—whether at home, in an office, or in a car—your skin is still exposed to damage. And let's be real—most people do not stay indoors 24/7. You will eventually step outside, even if it is just for a short time. So, do not skip sunscreen, even when you are indoors!

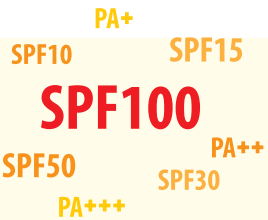
Myth:

If I use an umbrella, I do not need sunscreen.

Truth:

An umbrella might give you shade, but it will not fully protect you from UV rays. Sunlight does not just come from above—it also bounces off surfaces like concrete, water, sand, and even grass, exposing your skin to indirect UV radiation. Plus, not all umbrellas block UV rays effectively. Regular fabric umbrellas may reduce some UV exposure but do not provide complete sun protection. Unless it is specifically made with UV-blocking materials, an umbrella alone is not enough to prevent sun damage.

Bottom line: Umbrellas help, but they are not a sunscreen substitute! For proper sun protection, wear sunscreen and sunglasses even if you are carrying an umbrella.



Myth:

A higher SPF number offers much better sun protection.

Truth:

Not really! While a higher SPF does provide slightly more sun protection, the difference is not as dramatic as you might think.

Here is the approximate sun protection:

- SPF15, PA++: 93%
- SPF30, PA+++: 97%
- SPF50, PA+++/+: 98%
- SPF100, PA+++/+: 99%

See the pattern? No sunscreen blocks 100% of UV rays, and the increase in sun protection shrinks as the SPF numbers go up. More importantly, a higher SPF does not mean its sun protection lasts longer. SPF100 does not mean all-day sun protection! SPF30 or SPF50 is usually enough when applied properly. Do not fall for the SPF number hype!

There are treasure troves of mysteries in nature waiting to be discovered and explored. Countless scientists have devoted themselves to unraveling them in the hopes of improving human health and wellbeing. Their work is vital to understanding and treating disease.

We bring you their research findings in our goal to enrich and expand public knowledge.

Cactus (*Opuntia ficus-indica*)

Cactus Has Anti-inflammatory Effects

Nopal cactus (*Opuntia ficus-indica*) has the potential to significantly reduce oxidative stress in the liver. Researchers have found that nopal-fed rats had reduced reactive oxygen species (ROS) levels and lower concentrations of malondialdehyde, a marker of lipid damage caused by oxidative stress. The effects are attributed to various bioactive compounds, such as the polyphenols isorhamnetin and kaempferol, which can directly neutralize ROS.

Morán-Ramos S, Avila-Nava A, Tovar AR, Pedraza-Chaverri J, López-Romero P, Torres N. *Opuntia ficus indica* (nopal) attenuates hepatic steatosis and oxidative stress in obese Zucker (*fa/fa*) rats. *J Nutr*. 2012;142(11):1956–1963. doi.org/10.3945/jn.112.165563

Cactus Reduces Inflammation and Helps Recovery From Hangovers

Researchers explored how prickly pear cactus might reduce hangover symptoms by reducing inflammation. Volunteers were fed an extract of *Opuntia ficus-indica*, also known as prickly pear cactus. Overall hangover severity was moderately reduced, with a notable 50% drop in the risk of severe hangovers. The severity of hangover symptoms correlates with inflammation, which can be measured with C-reactive protein (CRP) levels. CRP levels were lower in participants who consumed the prickly pear cactus extract.

Wiese J, McPherson S, Odden MC, Shlipak MG. Effect of *Opuntia ficus indica* on symptoms of the alcohol hangover. *Arch Intern Med*. 2004;164(12):1334–1340. doi.org/10.1001/archinte.164.12.1334

Cactus Can Help with Wound Healing and Reduce Inflammation

This study investigated the effects of a polysaccharide extract from *Opuntia ficus-indica* cladodes on wound healing and inflammation in rats. Using a rat wound model, the extract was applied topically twice daily for 21 days, and it helped to reduce inflammation, improve tissue healing, and increase pain thresholds. It also enhanced fibroblast activity, blood vessel formation, and oxidative stress markers, demonstrating anti-inflammatory and healing benefits.

Adjafre BL, Lima IC, Alves APNN, et al. Anti-inflammatory and healing effect of the polysaccharidic extract of *Opuntia ficus-indica* cladodes in cutaneous excisional wounds in rats. *Int J Exp Pathol*. 2024;105(1):33–44. doi.org/10.1111/iep.12498

Protects Against Fatty Liver and Liver Inflammation with Cactus

Non-alcoholic fatty liver disease (NAFLD) is a condition involving excess fat buildup in the liver, along with oxidative stress and inflammation. Studies in obese rats fed a diet containing 4% *Opuntia ficus-indica* for seven weeks showed significant improvements, including a 50% reduction in liver fat, lower markers of liver damage, and better regulation of insulin. These findings suggest that cactus may help reduce liver fat and protect against liver damage, making it a potential focus for future treatments for NAFLD.

El-Mostafa K, El Kharrassi Y, Badreddine A, et al. Nopal cactus (*Opuntia ficus-indica*) as a source of bioactive compounds for nutrition, health and disease. *Molecules*. 2014;19(9):14879–14901. doi.org/10.3390/molecules190914879

Cactus Has Potential as an Alternative to Anti-inflammatory Medicine to Help Joint Issues

Extracts from *Opuntia ficus-indica* have shown potential as non-steroidal anti-inflammatory alternatives, effectively reducing inflammation and protecting cartilage in osteoarthritis. These extracts demonstrated promising results in vitro. In human chondrocyte (cells responsible for cartilage formation) cultures, the extracts reduced production of key molecules usually released in chronic inflammation. They showed better protective effects on cartilage than hyaluronic acid, a common treatment for joint issues.

Panico AM, Cardile V, Garufi F, Puglia C, Bonina F, Ronsisvalle S. Effect of hyaluronic acid and polysaccharides from *Opuntia ficus indica* (L.) cladodes on the metabolism of human chondrocyte cultures. *J Ethnopharmacol*. 2007;111(2):315–321. doi.org/10.1016/j.jep.2006.11.020

Antimicrobial Properties of Cactus

Campylobacter bacteria are a common cause of food poisoning in humans. People commonly get *Campylobacter* infections by eating raw or undercooked poultry. Extracts from the pricky pear cactus have strong antibacterial effects against *Campylobacter jejuni* and *Campylobacter coli*, reducing their ability to grow and stick to cells. Studies also show pricky pear cactus extracts can act against *Vibrio cholerae* (bacteria that cause cholera), disrupting their membrane and reducing their energy. These findings suggest prickly pear cactus could help prevent food contamination and treat gut issues caused by these bacteria.

El-Mostafa K, El Kharrassi Y, Badreddine A, et al. Nopal cactus (*Opuntia ficus-indica*) as a source of bioactive compounds for nutrition, health and disease. *Molecules*. 2014;19(9):14879–14901. doi.org/10.3390/molecules190914879

Cactus Can Help Improve Mobility by Reducing Inflammation

Consuming nopal cactus fruit juice for eight weeks improved joint mobility, particularly in the neck, back, and hips, allowing participants to be more physically active compared to a placebo group. The juice reduced the impact of pain in daily activities, such as walking, sitting, and lying. It may also help with reducing inflammation. Overall, nopal cactus juice showed promise in supporting joint mobility, physical functioning, and reducing inflammation, making it a potential natural aid for improving quality of life.

Jensen GS. Improved joint mobility associated with reduced inflammation related to consumption of nopal cactus fruit juice: results from a placebo-controlled trial using digital inclinometry to objectively document mobility of all major joints. *Clin Interv Aging*. 2020;15:2341–2352. doi.org/10.2147/CIA.S267451

Cactus is Better Than Vitamin C Supplementation at Protecting Against Oxidative Stress

Daily consumption of cactus pear fruit pulp for two weeks significantly improved oxidative stress levels in healthy individuals. Researchers compared the effects of cactus pear fruit pulp to vitamin C supplements. They found that cactus pear fruit greatly improved the oxidative stress status of their volunteers, such as a reduction in plasma markers of oxidative damage to lipids, and a higher concentration of antioxidants in plasma. Supplementation with vitamin C did not significantly affect the body's oxidative stress.

Tesoriere L, Butera D, Pintaudi AM, Allegra M, Livrea MA. Supplementation with cactus pear (*Opuntia ficus-indica*) fruit decreases oxidative stress in healthy humans: a comparative study with vitamin C. *Am J Clin Nutr*. 2004;80(2):391–395. doi.org/10.1093/ajcn/80.2.391

Cactus Can Help Lower Lipid Levels

Researchers have found that consuming cactus pear fruit can significantly lower total cholesterol and LDL ("bad") cholesterol levels, particularly in those with high cholesterol. Researchers believe this is due to the fiber content as well as its phytochemical composition, which helps in reducing oxidative stress.

Gouws C, Mortazavi R, Mellor D, McKune A, Naumovski N. The effects of prickly pear fruit and cladode (*Opuntia spp.*) consumption on blood lipids: a systematic review. *Complement Ther Med*. 2020;50:102384. doi.org/10.1016/j.ctim.2020.102384

Recover Faster From Exercise with Cactus by Reducing Oxidative Stress and Muscle Damage

Cactus pear fruit can help reduce oxidative stress and muscle damage from endurance exercise. Researchers found that it could help decrease markers of muscle damage, such as creatine kinase and lactate dehydrogenase. It also helped to improve exercise performance and perceived fatigue and to lower oxidative stress markers.

Khouloud A, Abedelmalek S, Chtourou H, Souissi N. The effect of *Opuntia ficus-indica* juice supplementation on oxidative stress, cardiovascular parameters, and biochemical markers following yo-yo intermittent recovery test. *Food Sci Nutr*. 2017;6(2):259–268. doi.org/10.1002/fsn3.529

Manage Blood Sugar Levels with Cactus

Cactus cladode (leaf) can help manage blood sugar levels. Consumption of cactus cladode was associated with significantly lower serum glucose levels in healthy people, obese people, and people with type 2 diabetes. Some studies have shown significant changes in serum insulin in both healthy participants and those with type 2 diabetes.

Gouws CA, Georgousopoulou EN, Mellor DD, McKune A, Naumovski N. Effects of the consumption of prickly pear cacti (*Opuntia spp*.) and its products on blood glucose levels and insulin: a systematic review. *Medicina (Kaunas)*. 2019;55(5):138. doi.org/10.3390/medicina55050138

Cactus Pear Fruit Can Help Support the Function of the Immune System

Researchers have found that cactus pear fruit may reduce inflammation and support the function of the immune system. A two-week supplementation with cactus pear fruit significantly decreased pro-inflammatory biomarkers, such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). It increased levels of IL-10 (an anti-inflammatory cytokine). There was also an improvement in the balance of pro- and anti-inflammatory cytokines as well as the body's overall antioxidant status. The results suggest adding cactus pear fruit into the diet can help regulate immune system mechanisms, reduce low-grade inflammation in the body, and help reduce the risks associated with chronic conditions.

Attanzio A, Tesoriere L, Vasto S, Pintaudi AM, Livrea MA, Allegra M. Short-term cactus pear [*Opuntia ficus-indica* (L.) Mill] fruit supplementation ameliorates the inflammatory profile and is associated with improved antioxidant status among healthy humans. *Food Nutr Res*. 2018;62:10.29219/fnr.v62.1262. doi.org/10.29219/fnr.v62.1262

Cactus May Help Protect Immune Tissues and Cells

Researchers exposed rats to chlorpyrifos (CPF), a pesticide, to cause damage to immune tissues and cells. The CPF reduced antioxidant enzyme activity and increased oxidative damage, resulting in DNA fragmentation, and damage to immune tissues and cells, particularly in the thymus and spleen. They found that *Opuntia ficus-indica* extract significantly mitigated these harmful effects. The cactus extract helped restore antioxidant enzyme levels, reduced the measures of oxidative stress, and helped lower the level of tissue damage caused by CPF. Research found improved histological changes in the immune tissues, suggesting that cactus may have a protective role against this type of immune damage.

Smida A, Ncibi S, Taleb J, Ben Saad A, Ncib S, Zourgui L. Immunoprotective activity and antioxidant properties of cactus (*Opuntia ficus indica*) extract against chlorpyrifos toxicity in rats. *Biomed Pharmacother*. 2017;88:844–851. doi.org/10.1016/j.biopha.2017.01.105

Cactus Has the Potential to Prevent Inflammation-based Disorders

Researchers studied the benefits of indicaxanthin, a type of betaxanthin found in cactus. In a rat model of inflammation, administration of indicaxanthin significantly reduced inflammatory cell recruitment, fluid buildup, and production of pro-inflammatory cytokines. In addition to this, indicaxanthin can also act at the gene transcriptional level to reduce inflammation by reducing the expression of genes involved in inflammation. Indicaxanthin inhibits the activation of NF-κB, a key transcription factor for the entire inflammatory cascade. This suggests that indicaxanthin has the potential to prevent inflammation-based disorders.

Allegra M, Ianaro A, Tersigni M, Panza E, Tesoriere L, Livrea MA. Indicaxanthin from cactus pear fruit exerts anti-inflammatory effects in carrageenin-induced rat pleurisy. *J Nutr*. 2014;144(2):185–192. doi.org/10.3945/jn.113.183657

Cactus Can Help Manage Allergic Diseases

A recent study highlights how kaempferol, a flavonoid found in cactus, promotes immune tolerance. This effect occurs through enhancing the development of Treg (regulatory T cell)—a type of immune cell that regulates the immune system—by modulating dendritic cell activity through several key molecular pathways. By promoting immune tolerance, kaempferol suppresses allergic inflammation. It has potential for reducing allergic inflammation and as a natural therapeutic agent for alleviating allergic symptoms.

Takahashi M, Nagata K, Watanuki Y, et al. Kaempferol exerts anti-inflammatory effects by accelerating Treg development via aryl hydrocarbon receptor-mediated and PU.1/IRF4-dependent transactivation of the *Aldh1a2*/Raldh2 gene in dendritic cells. *Allergy*. 2025;80(3):896–900. doi.org/10.1111/all.16410

Scientific research requires judgments based on professional knowledge and rigorous implementation processes. These processes consist of complex methods, any small change in which can affect the results drastically. We have provided you short summations of the research for ease of understanding. Do not use this as a basis for self-diagnosis or self-treatment.

You asked for more deep dives into health and business—and we listened. In this issue, we are bringing you richer content on the topics you care about most. To keep the experience focused and digestible, we have chosen to pause the Star Profile this time.

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