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Sun and Skin The Dark Side of Sun Exposure

People enjoy the sun. Some have even worshiped it. Sunlight is essential to many living things. But sunlight also has a dangerous side. It can harm your skin and even your eyes. The good news is you can take some simple steps to protect your body from sun damage and still enjoy the sun's healthful effects.

Our bodies were built to make good use of the sun. Sunlight helps keep our sleeping patterns on track so we can stay awake by day and sleep soundly at night. Getting too little sun, especially in winter months, can leave some people prone to a form of depression known as seasonal affective disorder. Sunlight also helps our skin make vitamin D, which is needed for normal bone function and health. Yet sunlight can also cause damage.

Sunlight travels to Earth as a mixture of both visible and invisible rays, or waves. Long waves, like radio waves, are harmless to people. But shorter waves, like ultraviolet (UV) light, can cause problems. The longest of these UV rays that reach the Earth's surface are called UVA rays. The shorter ones are called UVB rays.

Too much exposure to UVB rays can lead to sunburn. UVA rays can travel more deeply into the skin than UVB rays, but both can affect your skin's health. When UV rays enter skin cells, they upset delicate processes that affect the skin's growth and appearance.

Over time, exposure to these rays can make the skin less elastic. Skin may even become thickened and



leathery, wrinkled, or thinned like tissue paper. "The more sun exposure you have, the earlier your skin ages," says Dr. Barnett S. Kramer, a cancer prevention expert at NIH.

Your skin does have ways to prevent or repair such damage. The outermost layer of skin constantly sheds dead skin cells and replaces them. You might have noticed this type of skin repair if you've ever had a bad sunburn. Your skin may peel, but it usually looks normal in a week or 2.

"When you're exposed to ultraviolet radiation, there's a repair process that goes on constantly in each one of your exposed cells," says Dr. Stephen I. Katz, director of NIH's National Institute of Arthritis and Musculoskeletal and Skin Diseases. Still, long-term damage to your skin can remain.

As you get older, it becomes harder for skin to repair itself. Over time,

UV damage can take a toll on your skin and its underlying connective tissue. As a result, your skin may develop more wrinkles and lines.

Too much sun exposure can also raise your risk for skin cancer, the most common type of cancer in the United States. When UV light enters skin cells, it can harm the genetic material (called DNA) within.

DNA damage can cause changes to cells that make them rapidly grow and divide. This growth can lead to clumps of extra cells called a tumor, or lesion. These may be cancerous (malignant) or harmless (benign).

Skin cancer may first appear as a small spot on the skin. Some cancers reach deep into surrounding tissue. They may also spread from the skin to other organs of the body.

Each year, more than 2 million people are treated for 2 types of skin cancer: basal cell and squamous cell carcinoma. These cancers are seen in both older and younger people, and they're rarely life-threatening.

Melanoma is a less common but more serious type of skin cancer that's diagnosed in more than 68,000 Americans each year. Another 48,000 are diagnosed with an early form of

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the disease that involves only the top layer of skin. Melanomas arise from the cells that provide pigment (color) to the skin.

Your risk for melanoma is higher if members of your family have had skin cancer or if you've already had melanoma or other skin cancers. A major risk factor for melanoma is having a large number of moles, or having large flat moles with irregular



Wise Choices Block Sun Damage

- **Stay in the shade.** Limit sun exposure, especially between 10 a.m. and 4 p.m., when sunlight is most intense.
- **Use sunscreen.** Get sun protective factor (SPF) 15 or higher with both UVA and UVB protection. If you have very light skin, use SPF 30 or higher. Apply sunscreen 20-30 minutes before going outside. Reapply often, at least every 2 hours. Don't skimp.
- **Protect your eyes.** Choose sunglasses that protect the sides of your eyes and that are labeled to guard against both UVA and UVB.
- **Cover your skin.** Protective clothing and a wide-brimmed hat can help reduce sun exposure.
- **Avoid indoor tanning.** Tanning beds and sun lamps use special light bulbs that speed up tanning but also deliver harmful UV rays, increasing your risk for skin damage and cancer.

shapes. Sunburns, especially during childhood, may also raise your risk for melanoma.

"If you've had skin cancers in the past, then you're at a particularly high risk for developing another skin cancer," Kramer says. "Over the long run, there is a high rate of new lesions developing."

"One of the major factors affecting skin health is genetics, which determines the pigment content of your skin. This affects how much protection you have from natural sunlight," explains Katz. Although darker-skinned people have a lower risk for sun-related damage and disease, people of all races and skin color can still get skin cancer.

"Certain genetic mutations contribute to melanoma onset in certain people. You find much less non-melanoma skin cancer in African Americans, people from the Middle East, or even Asians from the Near East," Katz says.

The best way to protect skin health and prevent skin cancer is to limit sun exposure. Avoid prolonged time in the sun, and choose to be in the shade rather than in direct sunlight. Wear protective clothing and sunglasses, and use sunscreen between 10 a.m. and 4 p.m. Sunscreen is especially important at that time, when the sun's rays are most intense.

"The time to really start sun protective behavior is not when you reach adulthood, but years before," Kramer says. "The message to parents is, now is the time to start protecting your child against skin damage from sun overexposure, when your child is



Web Links

For more about sun exposure, click the "Links" tab at:

<http://newsinhealth.nih.gov/issue/Jul2014/Feature1>

developing sun exposure habits and when they have many more years of potential sun exposure ahead of them." Among other skin-protecting habits, teach children and teens to avoid the use of tanning beds.

Sunscreens come labeled with a sun protection factor (SPF), such as 15, 30, or 50. A sunscreen labeled SPF 15 means it will take you 15 times as long to get a sunburn as it would if you had no sunscreen on. A sunscreen labeled SPF 30 means it would take you 30 times as long to burn.

The effectiveness of sunscreens is affected by several factors. A sunscreen's active ingredients can break down over time, so be sure to check the expiration date on the container. The amount of sunscreen you use and how often you use it affects your protection from the sun. Perspiration and time spent in the water can also reduce sunscreen effectiveness.

Some people look to the sun as a source of vitamin D, but it takes just a brief time in the sun to do the trick. "You need very little exposure—something like 10 to 15 minutes a day to the backs of your hands, arms, and face—to get enough," Katz says.

Several factors—like cloudy days or having dark-colored skin—can reduce the amount of vitamin D your skin makes. But you can also get vitamin D from foods or dietary supplements. Check with your health care provider about whether you should be taking vitamin D supplements.

Limit time in the sun to protect your skin against early wrinkles, damage, and disease. "Being sun smart is a good thing," Katz says.

And if you spot a suspicious mark on your skin, Kramer advises, be sure to get it checked out. ■

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Fight Off Food Poisoning

Food Safety for Warmer Weather

In warm-weather months, who doesn't love to get outside for picnics, backyard gatherings, and of course delicious foods? But high temperatures raise your chance of getting sick from things you eat. Learn how to handle food properly to avoid the misery of food poisoning.

It can be hard to keep foods safe to eat during warmer weather. If you're eating or preparing foods outside, you may have trouble finding places to wash your hands, keep foods cold, or cook at the proper temperature—all of which are important to prevent foodborne illness.

"Food poisoning occurs if the foods you eat contain certain **microbes** or the toxins they produce," says Dr. Alison O'Brien, a food safety expert at the Uniformed Services University of the Health Sciences in

Maryland. "You can get sick directly from swallowing the toxins. Or you can get sick if the microbes get into your gut and start to multiply."

Each year, about 1 in 6 Americans get sick from tainted foods. Most foodborne illnesses arise suddenly and last only a short time. But food poisoning sometimes leads to more serious problems. Foodborne diseases kill about 3,000 people nationwide each year. Infants, older people, and those with compromised immune systems are especially at risk.

Many people know the symptoms of food poisoning: vomiting, diarrhea, abdominal pain, fever, or chills. The sickness may be mild or severe. It may last from a few hours to several days. The symptoms and length of illness depend on the type of disease-causing microbe or toxin you've swallowed.

The leading cause of foodborne disease outbreaks in the U.S. is norovirus. This highly contagious virus sickens more than 20 million people nationwide each year, leading to vomiting and diarrhea. Norovirus outbreaks can occur anywhere people gather or food is served.

"You can get norovirus when a sick food handler contaminates your food, possibly by not washing their hands well enough after touching the virus," O'Brien says. "Swallowing just a little norovirus can make you very sick."

Several types of bacteria can also cause food poisoning. Some foods you buy—such as raw meat or fruits and vegetables—may already contain bacteria that you need to wash off or cook to destroy. Bacteria can



also thrive in certain foods if not stored properly.

Bacteria like Staph and *Bacillus cereus* can make you sick quickly, within 1 to 7 hours. These bacteria produce fast-acting toxins in foods (such as meat or dairy for Staph, and starchy foods like rice for *B. cereus*). Keeping such foods refrigerated at 40 °F or colder helps slow or stop the growth of these bacteria.

Other bacteria, such as *Salmonella* and *Campylobacter* don't make you sick until they get in your body and multiply. With these microbes, it can take 12 hours or a few days for you to feel ill. "Symptoms can include fever, cramps, and sometimes bloody diarrhea," says O'Brien.

When you have a foodborne illness, you usually need to drink plenty of fluids. "But see a doctor if you have blood in your stool," O'Brien advises. "And if a child seems to have food poisoning, you should have the child seen by a doctor." ■



Wise Choices Prevent Food Poisoning

- Wash your hands for at least 20 seconds with soapy water before and after handling food and after using the bathroom.
- Wash fruits and vegetables.
- Avoid undercooked seafood, meats, and eggs. For safe cooking temperatures, see www.foodsafety.gov/keep/charts/mintemp.html.
- Keep raw meat, poultry, seafood, and their juices away from other foods.
- Keep hot foods hot and cold foods cold. Promptly refrigerate foods that can spoil.
- Use only pasteurized dairy foods, including pasteurized eggs and egg products.
- Report suspected foodborne illness to your local health department to help officials identify and stop potential outbreaks. See www.foodsafety.gov/report/poisoning/.



Definitions

Microbes

Tiny germs, like bacteria and viruses, too small to see without a microscope. Some microbes cause disease.



Web Links

For more about food poisoning, click the "Links" tab at: <http://newsinhealth.nih.gov/issue/Jul2014/Feature2>

Health Capsules

For links to more information, see these stories online:
<http://newsinhealth.nih.gov/issue/Jul2014/Capsule1>

Physical Activity Helps Seniors Stay Mobile

A carefully structured, moderate physical activity program helped vulnerable older people maintain their mobility. The new study shows that many frail older people can reap rewards from regular physical activity.

As you get older, reduced mobility can raise the risk for disease, disability, and even death. Regular physical activity offers known health benefits to a variety of people. But scientists hadn't identified a specific intervention to prevent mobility disability.

An NIH-funded study enrolled more than 1,600 adults, ages 70 to 89, who were at risk for disability. They were randomly assigned to either a moderate-intensity physical activity program or a health education program focused on successful aging.

The physical activity group gradually worked up to 150 minutes of weekly activity, including brisk walking, strength and balance training, and flexibility exercises. Sessions took place at a clinic twice a week and at home 3 or 4 times a week. The comparison group had 26 weekly health education workshops, later followed by monthly meetings.

Over the course of the study—an average of 2.6 years—the physical activity program significantly reduced the risk of major mobility disability by 18% compared to the education group. Physical activity participants were better able to maintain their ability to walk without assistance for about a quarter of a mile.

"We are gratified by these findings,"

says Dr. Richard J. Hodes, director of NIH's National Institute on Aging (NIA). "Participating in a specific program of aerobic, resistance, balance, and flexibility training activities can have substantial positive benefits for reducing risk of mobility disability."

Based on earlier research, NIA launched Go4Life, a national exercise and physical activity campaign for healthy older adults. You can learn more at <http://go4life.nia.nih.gov/> ■

Kidney Failure and Its Treatment

Your kidneys help keep you healthy by maintaining the right balance of water and other substances inside your body. But if your kidneys start to malfunction, you might not realize it for a long while. Kidney disease usually doesn't make you feel sick until the problem is serious and irreversible—a condition known as kidney failure.

The leading causes of kidney failure are diabetes and high blood pressure. African Americans, Hispanics/Latinos, and American Indians are especially at risk for kidney failure. So are people with a family history of kidney failure.

To help affected people learn more about treatment options, NIH produced a new booklet called *What I*

Need To Know About Kidney Failure and How It's Treated. It explains therapies such as kidney transplant, different types of dialysis, and conservative management. You'll also find tips for healthy eating as well as questions to ask your doctor.

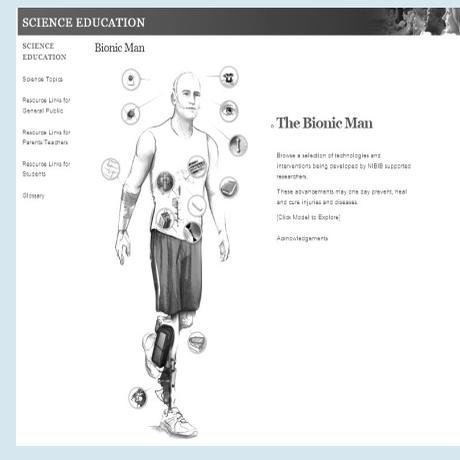
The online publication is available at <http://kidney.niddk.nih.gov/KUDiseases/pubs/howtreated/index.aspx>, along with a printable PDF of the 32-page booklet. To order a free printed booklet, call toll-free 1-800-891-5390, or e-mail nkudic@info.niddk.nih.gov.

You can find additional easy-to-read publications about kidney failure, in both English and Spanish language, at <http://kidney.niddk.nih.gov/KUDiseases/pubs/kidneyfailure/index.aspx> ■

Featured Website Bionic Man

www.nibib.nih.gov/science-education/bionic-man

How can technologies help heal our bodies and prevent disease? This interactive "bionic man" links to simple descriptions and longer articles about 14 promising tools—such as a robotic leg and an artificial kidney—being developed with NIH support.



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