SHINE ON

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RICHARD PHIBBS

With each glistening drop of sweat, your body is benefiting both inside and out, with stronger immunity, greater endurance, and smoother skin. The latest science explains why you want to steam things up.
by Tula Karras

HOT TOPIC

By the time you feel beads of sweat forming on your brow, your body has gotten the message that its temperature has notched slightly over 98.6 degrees, whether it originated from muscles working to stoke the heat from within or a sauna warming up the surface of your skin. "Sweating is a cooling mechanism that keeps our internal core temperature in a safe zone," says Thad Wilson, Ph.D., a physiology professor at the University of Kentucky College of Medicine, who has done extensive research on sweat.

Our sweat glands are located one to two levels below our skin's surface—within the dermis and hypodermis layers, respectively—with ducts that travel up to the surface and widen at the end to form our pores. These sweat glands transport salt and other trace substances (more on those later) from the blood and fluid around cells into the central cavity of the gland; it is this salt movement that in turn pulls water into the cavity. As sweat is released through our pores, it evaporates, thereby cooling the skin. The blood within the just-under-the-surface capillaries is able to offload heat and recirculates through the body, lowering our internal temperature.

It seems as if we sweat more in our armpits or groin area, but that's because those areas are covered with clothing and not exposed to the air for evaporation," says Patti Christie, Ph.D., a lecturer in chemistry and biology at the Massachusetts Institute of Technology. The apocrine sweat glands in those hot spots also get a lot of attention because (researchers aren't sure why) they also release fats and other cellular debris that bacteria on our skin love to chomp on, creating that unmistakable musky odor. The real cooldown? That comes from eccrine sweat glands, which blanket the rest of our body.

A NATURAL CLEANSE FOR HEALTHIER SKIN

Get this: "We're always sweating a little, whether we sense it or not," Wilson says. "Part of the reason is to make sure the outermost layer of skin stays hydrated." Within its mostly water-and-salt mix, sweat also contains very minute amounts of other substances found in the fluid around our cells. Two of those are natural moisturizers: urea, which is a byproduct of protein metabolism that's predominately excreted in urine; and lactate, a molecule produced by muscles during intense exercise. Thanks mostly to that urea and lactate content, sweat helps keep our skin supple, says Erin Kil, M.D., the founder of New Bloom Dermatology in New York. "Hydrating our outer layer of skin, the stratum corneum [aka epidermis], is particularly important since it's the final barrier between outside pathogens and our body," she says. "If it gets too dry, it can't do its job as well." (A timely reminder to add moisturizer: Winter air and indoor heating can dry out skin despite this subtle sweat bath.)

Meanwhile, there's also an antiseptic effect to sweat thanks to other trace components within its cocktail. "Sweat contains antimicrobial peptides—cathelicidin, lactoferrin, and dermcidin—that can protect the skin from infections and conditions like acne and eczema," Dr. Kil says. But that doesn't mean that the longer you hang out sweaty, the better off you are. "The antibacterial benefits are meant for temporary protection—if you have a lot of sweat that sticks around for too long, it can become a bacterial breeding ground," she says. When you hit the shower, forgo traditional soap for a sulfate-free wash that cleans without stripping skin.

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Hair by Isaac Davidson/Distinct Artists; makeup by Clive Read/The Club Agency NY for MAC Cosmetics. On models: Naked Wardrobe Stretched V-Neck cross top ($48) and shorts ($58, nakedwardrobe.com). Nubian Skin Cocoa by NS Men's Brief ($34, us.nubianskin.com). Opposite page: Commando Barrel-bottom shorts ($54) and Hipster bottoms ($28, mycommando.com). Male briefs are dancer's own.

Our bodies are always sweating a bit, whether we sense it or not, partly to keep our skin hydrated.

MEET THE AMAZING DANCERS IN MOTION

The grace and grit you see on these pages owes to the artistry of four stars of the Alvin Ailey American Dance Theater (opening image, from left): Khalia Campbell, Constance Stamatiou, Solomon Dumas, and James Gilmer. December marks the storied company's return to live performances in its home theater in New York, with a national tour to over 20 cities kicking off on January 25. For the latest news and how to see these dancers in performance, follow @alvinailey or visit alvinailey.org.

KEEPING YOUR TANK FULL

The more you sweat, the more you need to pay off your sweat debt by rehydrating with water and, possibly, with electrolytes like sodium, potassium, magnesium and calcium. An hour-long workout probably won't necessitate more than drinking plain H_2O as you go, says Amy Goodson, R.D.N., a sports dietitian in Dallas. But 90-plus minutes of running or biking, or continuous exercise, or several hours in the hot sun, may require switching to a sports drink with electrolytes and sugars for energy once you cross the hour mark.

And no matter how long you plan to exercise, starting off fully hydrated is key, Goodson says. Pregame by drinking 16 to 20 ounces of water around three hours before your workout, then another 10 to 15 within two hours of start time. "If you haven't been hydrating, you can't make up for it with a single drink," she says. (Working out first thing? Get in at least 12 ounces of water before you go: We all wake up somewhat dehydrated.) "If you're not well hydrated, your heart has to work harder to pump blood to working muscles because your blood plasma is thicker," she says. For every 2 percent drop in hydration in your body, you experience about a 10 percent decrease in performance.

Plus, the more dehydrated you become as you work out, the harder exercise feels. Being severely dehydrated during your routine also can inhibit sweating. She advises drinking five to 10 ounces of water every 15 to 20 minutes during a workout (it's a good policy at any intensity) and then drinking another 16 to 20 ounces just after exercise. You'll know you're good and hydrated if your urine has a pale-lemonade-to-clear hue, a good litmus test at any point in the day.

SAUNA MAGIC+MYTH

There's been a sauna-buying boom lately as wellness seekers jump on the benefits of getting soaked. A traditional sauna heats the room to north of 175 degrees, while infrared ones use far infrared light wave lengths to penetrate skin and warm you from the inside. The same way circulation increases during exercise, it ramps up to help your cooling system as you sit in a sauna. Indeed, one review in *Mayo Clinic Proceedings* likened the cardio effects to moderate exercise.

But the hype about sweating out toxic substances? It doesn't jibe with how our bodies get rid of waste products, which is primarily through the kidneys and liver. "Even though sweat and urine share some components, like urea, there's no scientific evidence to support the sweat detox theory," Dr. Kil says. As for those few studies showing the possible presence of cadmium, lead, and arsenic in sweat, Christie finds them sketchy: "If you have so much arsenic that it's being transferred into your skin cells and showing up in your sweat, then you have much bigger problems than sweating will solve."

So why do we sometimes smell like last night's pungent dinner? Metabolized sulfuric compounds from certain foods (garlic, brussels sprouts) can show up in sweat. And after a night of hard drinking, you may give off a slight vinegary smell thanks to the diacetic acid your body metabolizes from alcohol, Dr. Kil says.

TRAIN YOUR SWEAT GLANDS

The better your body is at sweating, the better it maintains its internal temperature, one key factor in your workout performance. Folks who are fitter sweat more in anticipation of a rise in core temperature and an increased need for cooling, Wilson says. "That means they can often exercise longer and more comfortably," he says. The good news is you can train your sweat glands the way you train your heart. "We've done research showing that people who trained on an exercise bike for eight weeks subsequently have improved capacity to sweat," Wilson says. "They improved their fitness 20 percent and their sweating capacity by 30 percent," he says.

How much sweat does an exerciser lose on average during a moderate workout? About a liter for every hour of continuous cardio. For exercisers who want specifics, the new single-use Gatorade Sport Gx Sweat Patch ($25 for 2, gatorade.com, and accompanying app) sticks to your forearm and reveals your personal sweat rate during a workout. (This way, you can find out, say, the amount of water and electrolytes you'll need the next time you do that long run.) To optimize your body's cooling capacity, invest in moisture-wicking workout wear, which simulates the evaporative function by pulling sweat off skin and into the fabric. We have great picks at shape.com/wick.

DECODING SWEAT

When your body turns on the sprinklers, it's a good sign you're likely raising your core temperature up enough to benefit your immune system. "When your core temperature goes up, your body increases the number of white blood cells," Christie says. Indeed, one reason our bodies run a fever during a viral or bacterial infection is because many pathogens' proteins have a lower tolerance to heat than our own proteins, so the spike in heat helps knock out the invaders.

We also sweat when we feel intense emotions, stress, fear, excitement, in areas like our palms and face, but scientists aren't entirely sure what the function of this type of noncooling sweating serves. "A little sweat on our palms might help us get a grip on a tool or a branch, but too much would have the opposite effect," Wilson says.

And sweat has the capacity to drive the wearables of the future. "When we look at sweat in the lab, we can measure immune molecules, stress hormones, and inflammatory molecules, which can give us clues to a person's state of health and mind," says Esther Sternberg, M.D., the research director at the Andrew Weil Center for Integrative Medicine at the University of Arizona. Dr. Sternberg and her colleagues are working on a wearable patch that will map, track, and interpret those molecules, functioning similarly to a sleep or activity tracker. That means that everyday wellness warriors, in the not-too-distant future, may be able to use their sweat as a feedback loop for what's happening with their health. ■

People who are fitter actually sweat more. That means they can often exercise longer and more comfortably.