

ORGAN GRINDER



**ATHLETES
DEMAND
MORE OF THEIR
BODIES —
INSIDE AND OUT.
HERE'S HOW
TO KEEP YOUR
MOST CRITICAL
ORGAN
SYSTEMS IN
TIPTOP SHAPE.**

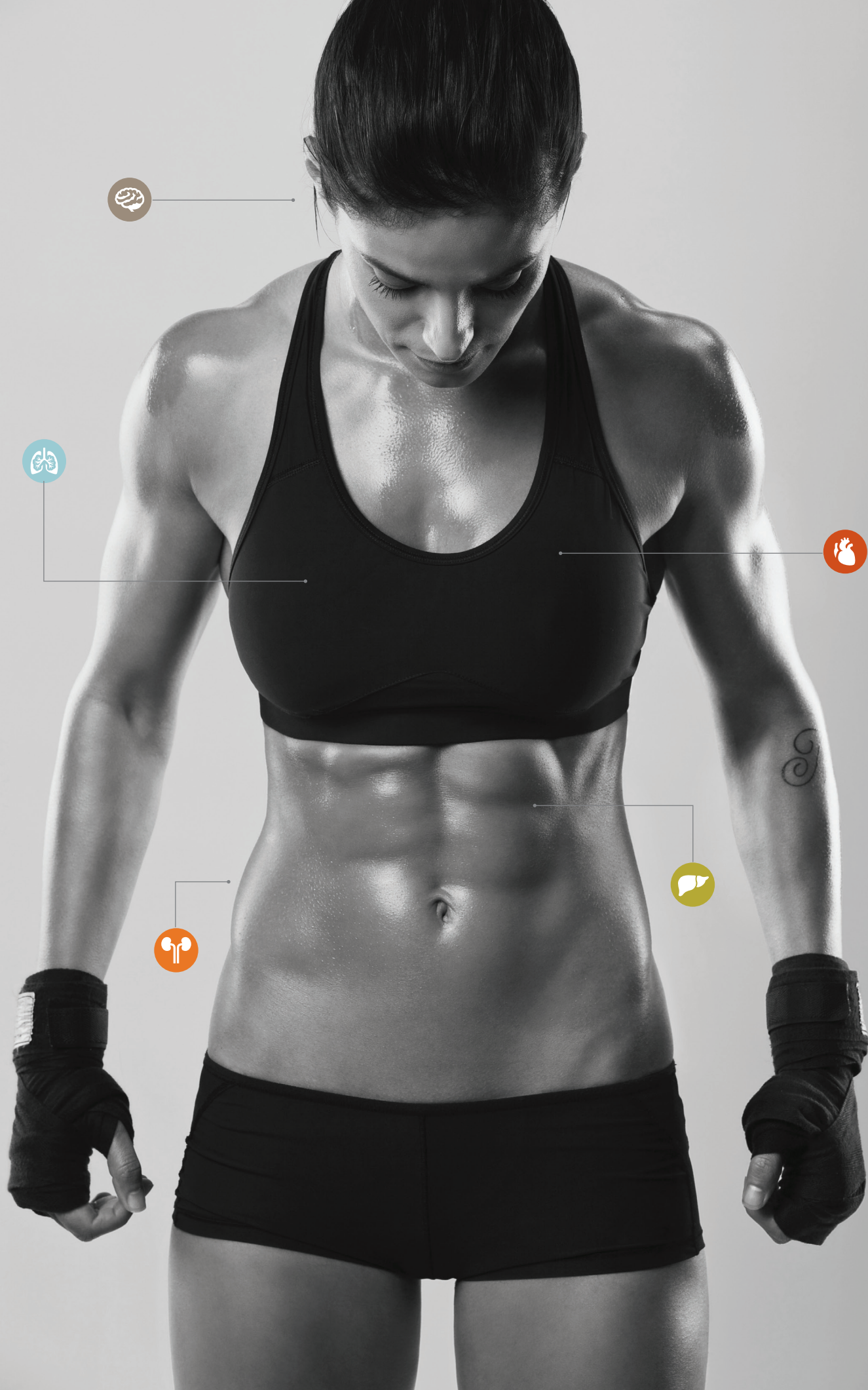
BY JILL SCHILDHOUSE

**THE LEG
BONE'S
CONNECTED
TO THE
KNEE BONE.
AND THE
KNEE BONE'S
CONNECTED
TO THE
THIGHBONE.**

Remember back when you learned this ditty as a kid to help understand how your skeleton fits together? Well, similar sentiments could be sung about your organs and how they, too, are interconnected.

"Every organ depends on the other to work properly," says Mauricio Heilbron, M.D., vice chief of staff at St. Mary's Medical Center in Long Beach, California. "The heart can start acting up when the kidneys don't filter properly, the kidneys can have problems when the heart isn't pumping efficiently, and the brain can't live without the nutrients put there by the liver and intestines." This chain of events is true of any human being, but if you're an athlete, your organs are under even greater pressure to do their expected jobs.

While you have 78 organs in your body, five are critical for basic survival — the brain, heart, liver, kidneys and lungs. Keeping these organs healthy and happy translates to peak performance in all aspects of your full and active life.





HAVE A HAPPY HEART

At rest, your heart pumps about 60 times per minute (more during exercise), delivering oxygen-rich blood to all your tissues and returning used, deoxygenated blood to the lungs for gas exchange. “The heart is beating nonstop to carry out its duties with an average of 100,000 beats per day,” says Rachel Eva Dew, Ph.D., DNM. It also helps maintain your internal temperature, protects you from infection, removes wastes and balances your fluids.

At its foundation, the heart is a muscle made up of cardiac tissue. “And like any muscle, it can be trained to become fitter and more efficient with regular exercise,” says Jennifer Haythe, M.D., associate professor of medicine at Columbia University and co-director of the Columbia Women’s Heart Center in New York City. “In fact, the reason why high-level athletes have such a low resting heart rate is because their hearts are in such good shape, and each beat is very effective.”

However, too much of a good thing can mean bad news. “Chronic forms of extreme exercise can lead to heart damage,” warns Haythe, referring to the obsessive exercise habits of eating-disordered people. “The goal for all exercise enthusiasts should be finding a healthy, balanced exercise routine that optimizes health instead of depleting it.”

Proper nutrition also goes a long way toward having a happy heart. “Foods that are especially heart-healthy include oatmeal, berries, flaxseed, lentils and even dark chocolate in moderation,” Haythe says.

If your urine isn’t colorless or light yellow, you aren’t drinking enough water.



BE KIND TO YOUR KIDNEYS

Your kidneys are located on either side of your spine just below your rib cage and serve as your filtration system. They each have one “intake” pipe where blood enters the kidney for filtering and two “outflow” pipes: One sends clean blood back into circulation, and the other sends urine to the bladder.

Exercise helps improve kidney health by reducing blood pressure, ejecting toxins, increasing muscle function and lowering cholesterol. Adequate fluid intake is of the utmost importance for healthy kidneys, especially during exercise, and dehydration and electrolyte depletion can lead to cramps, headaches, dizziness and even kidney stones.

“When you become dehydrated or if your body has an excess of sugar or toxins, it places additional pressure on the kidneys and can impact the entire urinary tract system,” Dew says. “Additionally, it may inhibit the ability of your kidneys to release hormones that help regulate blood pressure and play a key role in the endocrine system.”

What makes your kidneys happy? “Water, water, water!” Dew says. Fresh parsley, cranberry juice, ginger and dandelion tea are also things your kidneys crave, she adds.



LOVE YOUR LUNGS

Your lungs are located on either side of your chest cavity, and in concert with your diaphragm, they draw air into the body, transmit oxygen to the bloodstream, then remove and release the resultant carbon dioxide.

Of course, the lungs only actually work if you’re breathing, hence the reason your coaches are constantly reminding you to do so. “Breathing is usually automatic,” says Munzer Sundos, Ph.D. “As sensory organs in the brain monitor the blood, an increased concentration of carbon dioxide sends a message to breathe more deeply and more frequently. In contrast, when carbon dioxide in the blood is low, the brain reduces the frequency and depth of breaths. But people can also [consciously] control their breathing, taking shallow or deep breaths when they desire.” You also may forget to breathe during moments of intense concentration or effort, which could lead to lightheadedness or muscular weakness.

Whether you’re breathing on autopilot or are having a focused moment of Zen, there’s very little you can do about the quality of the air you’re taking in. “Our bodies were not designed to endure the many toxic elements in our environment,” says Mark Drucker, M.D., a specialist in preventative medicine and healthy aging in Southern California. “This makes it very difficult to get enough antioxidants from food alone.” Drucker recommends that athletes supplement with a multitude of nutrients such as multi-minerals, vitamins C and E, electrolytes and B-complex vitamins. Drinking low-sugar vegetable juice made from celery, kale, chard and apples and eating herbs and spices high in antioxidants such as onions, garlic, cinnamon, oregano, turmeric and ginger are also on his to-do list for athletes.



LONG LIVE YOUR LIVER

As your largest internal organ, the liver keeps busy by performing more than 500 essential functions, including producing bile to break down fats, carrying away wastes and storing carbohydrates in the form of glycogen — the latter of which is especially important to athletes. “Glycogen can be converted to glucose during times of both fasting and exercise,” explains Christine Bishara, M.D., a wellness and weight-loss expert who is board-certified in internal medicine in New York City.

Another important function of the liver is the production of glutathione, a potent antioxidant that helps neutralize harmful elements. “Glutathione ... helps improve the function of other antioxidants, such as vitamin C, and decreases the load of oxidative damage caused by free radicals,” Bishara says.

In addition to proper rest, hydration and nutrition, the liver needs adequate dietary fat (e.g., fatty acids) to stay healthy. “The liver of an extreme athlete requires lots of healthy fats and oils, such as coconut, olive and avocado oil, raw nuts and seeds (and their oils and butters), eggs, fatty fish, organic grass-fed meats and even butter,” Drucker says. “In contrast, fats that have been heated and processed [such as canola or vegetable oil] become useless and damaging. Much like putting diesel fuel in a gasoline engine, they ‘gum up’ your engine and will be stored in your liver, causing fatty liver [disease].”



BOOST YOUR BRAIN

"Your brain is an impossibly fast computer with near-infinite storage that keeps everything working together," Heilbron says. "It coordinates complex movements like walking, chewing and playing the piano, processes your senses and houses your personality." Your brain also happens to be the only organ that requires actual sleep — not just simple rest — in order to function properly.

"As the National Institutes of Health's division of Neurological Disorders and Stroke so succinctly puts it: 'The biological purpose of sleep remains a mystery,'" Heilbron says. "We do know that ... our brains stay remarkably active while we sleep and that sleep may be important for brain-cell (neuron) intercommunication. There may also be a 'housekeeping role' where certain unnecessary byproducts or toxins that build up while you're awake get flushed out."

Chronic lack of sleep is associated with an increased risk of hypertension, heart disease, diabetes, depression and obesity. Fortunately, exercise is beneficial for maintaining and even improving brain health: It increases heart rate, which in turn delivers more oxygen, nutrients and hormones to the brain; it improves mood and reduces stress and anxiety; and, according to Heilbron, some studies suggest that the areas of the brain that control thinking and memory have greater volume in those who exercise.

Your brain likes you to eat berries and sip some caffeinated coffee and tea to improve mental function, and wants some walnuts for memory maintenance. "There does seem to be evidence that green, leafy vegetables with their beta carotene, folate, lutein and the like may help slow cognitive decline," Heilbron says. "Also, omega-3 fatty acids as seen in certain fish ... may lower the levels of certain chemicals in your blood that could be related to Alzheimer's."

According to the National Kidney Foundation, saunas, hot yoga and heavy exercise may lead to kidney stones. Why? More sweating means less urine production, allowing minerals to settle and bond in the kidneys and urinary tract, forming stones.

THE RUNNERS-UP

Obviously, you won't fare too well if you're missing any of your organ systems, but these two are of particular importance to athletes.

► **GUT CHECK** The gut — aka intestines or bowel — extends from the stomach to the anus and does everything from digesting food to producing hormones to regulating water balance. The gut is also home to trillions of microorganisms that affect your overall health, and it's important to maintain a balance between the harmful and the beneficial bacteria that reside within. "If there is an abundance of harmful bacteria in the gut, our bodies will not be able to produce important chemicals and neurotransmitters in adequate doses," Dr. Christine Bishara says. This can interfere with the feedback loop that signals our brain that we are full, for example, and also can lead to deficiencies in serotonin and dopamine, chemicals that regulate mood and exercise capacity.

Eating a diverse diet that supports your gut microbiome is essential, and experts recommend fresh fruits and vegetables, which contain plenty of fiber (prebiotics) to feed those good bacteria. It's also important to eat foods that contain tryptophan and tyrosine, the precursors to serotonin and dopamine, respectively. Tryptophan-rich foods include walnuts, salmon, pineapple, edamame and turkey, and foods replete with tyrosine include black beans, kidney beans, eggs and hard cheeses.

Exercise in the form of frequent, intense workouts also can keep your digestive system in the pink. "The GI tract plays a critical role in delivering fluids and carbohydrates to the immediate areas [of need] for maximum performance," says Harvey Allen Jr., M.D., gastroenterologist and medical director of Mohawk Valley Endoscopy Center in Utica, New York.

► **SKIN-SATIONAL** Hey, your epidermis is showing! And thank goodness because your skin — the largest human organ — covers every square inch of your body, holding everything together in a nice, neat package. "The normal function of the skin is to maintain hydration and ... to keep allergens and pollutants out," explains Jeffery Fromowitz, M.D., a dermatologist in Boca Raton, Florida. "When there are breaks in its barrier function such as a cut or a skin condition like psoriasis, we can develop allergies, itches or rashes."

Your skin takes one heck of a beating on a daily basis, especially during workouts. Friction-prone areas can chafe and sweating can cause acne, but the pluses of exercise outweigh the negatives when it comes to the health of your skin. "When blood flow is higher to the skin, it helps carry away oxidative molecules such as free radicals, helping [prevent] aging," says Anthony Youn, M.D., FACS, plastic surgeon and skin-care specialist in Michigan. "We are also now learning about the benefits of exercise on autophagy and cellular renewal. Putting our bodies under short-term stress, as with exercise, is great for these age-reducing processes." ❧