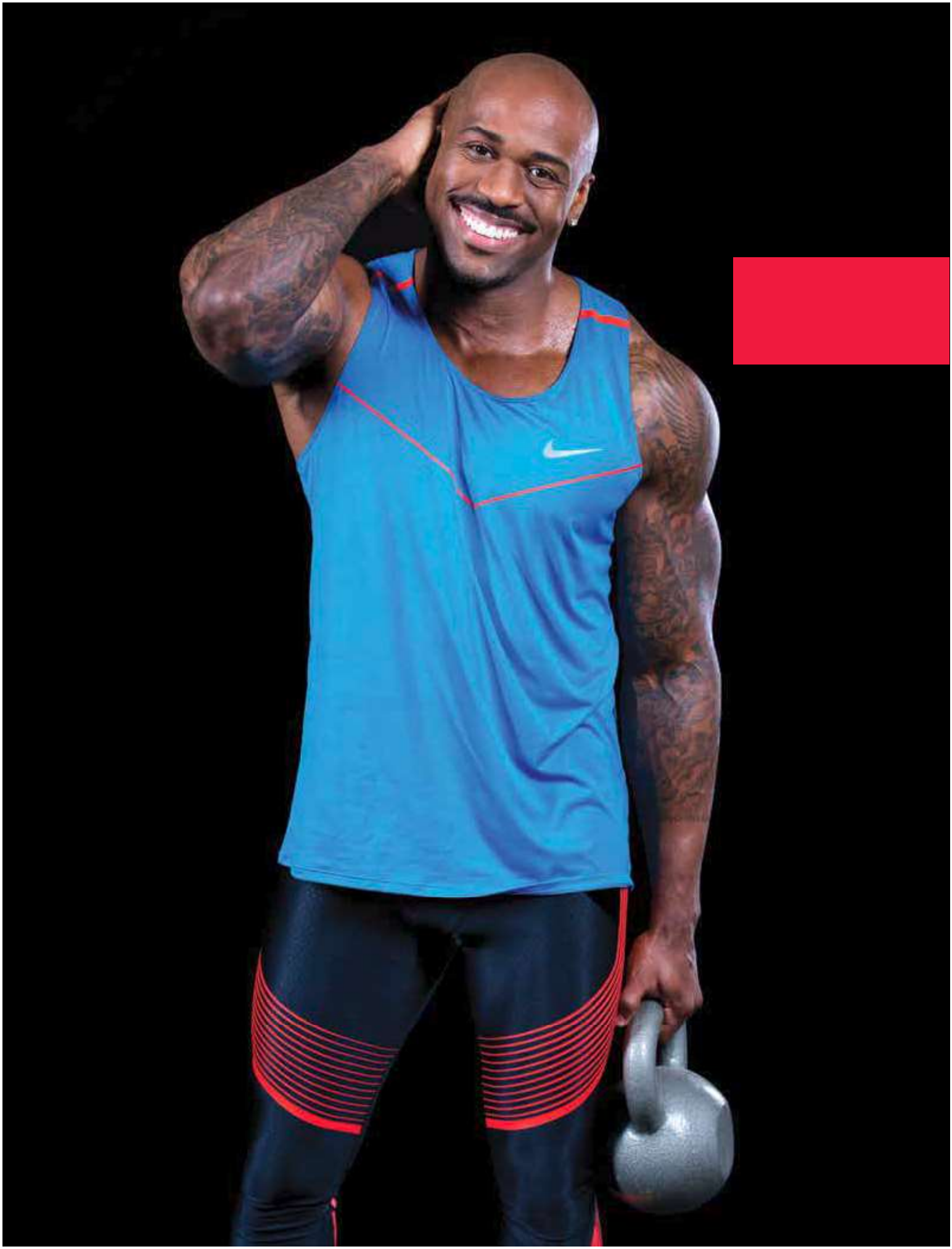


BRAINS, BRAWN, & ANTIOXIDANTS

A rebellion rises. A rebellion against the sedentary lifestyle that grips so many Americans and puts their hearts at risk. We're armed to the teeth with pedometers and race our friends to that legendary ten-thousandth step, scour diet books religiously, and cheer on contestants who fight for their hearts on reality TV shows like *The Biggest Loser*. But the war is far from won.

Dolvett's Quince-essential Heart-Health Habits

The number-one killer refuses to be dethroned. In a world of super-sized appetites for French-fried "vegetables," heart attacks occur every 40 seconds in the US. There's no doubt that diet and exercise will ward off most of the risk, but what if there is more to coronary excellence? "Is it just the way we eat? Is it just exercise? Is it just movement?" asked Dolvett Quince, celebrity trainer on *The Biggest Loser*. "It's those things, and it has to be something else." Even as a renowned, gym-hardened trainer at the pinnacle of health, Quince isn't obsessed by ab-counts, bench press scores, and outside physique. He believes there is more than meets the eye in the quest for a healthy heart.

"When people think of me or other trainers in my field, it's always about: 'How great are your abs?' 'How much do you bench, dude?' or 'What's your score?' It's always an exterior conversation. The dialogue really isn't about the inside. And if it is, it's probably about eating kale or quinoa, not taking supplements that you

BY MICHAEL A. MILLER

don't necessarily get from food. So I think people need to start making a conscious effort on realizing the organs you can't see are the things you should take care of the most, for example, your heart, your liver, your pancreas," he said.

And right now, Quince is giddy about one heart-helper in particular—a little-known antioxidant called Ergothioneine (EGT). "When I heard that ergothioneine helped reduce [oxidative stress], I was like, well, this could be exactly what people are missing to ensure that they have a healthy heart," he said.

OXIDATIVE ONSLAUGHT

But first, a primer on oxidation: Reactive oxygen species (ROS) are highly damaging oxygen molecules derived from general aerobic activity and produced continuously in a number of normal enzymatic reactions. Many ROS are also free radicals—atoms or molecules with unpaired electrons that are looking for a mate. This instability sends free radicals on a frantic quest to steal electrons from unsuspecting molecules, including proteins, lipids, and nucleic acids. When a free radical robs a molecule of its electron, that cell sustains damage and becomes a free radical itself. Thus, a chain reaction of electron swapping and cellular damage ensues.

Oxidative stress is an imbalance between oxidative free radicals and antioxidant forces. It has long been recognized as a contributing factor to the rise of many cardiovascular diseases. The bloodstream is the highway for pumping oxygen throughout the body, and is therefore especially susceptible to oxidative stress from ROS derived from environmental sources, as well as ROS produced by white blood cells and other metabolic waste in the blood stream.

Oxidized LDL cholesterol (oxLDL) wreaks havoc on the cellular integrity of the cardiovascular system, damaging lipids and proteins of endothelial cells, vascular smooth muscle cells, blood cells, and others. Cells damaged by oxLDL release inflammatory substances and are trapped within the arterial wall's subendothelium where they multiply, leading to atherosclerotic plaque. "It is the rupture of atherosclerotic plaque within the arterial wall that ultimately causes heart attacks and strokes," said Janet Lee, PhD, president of Subito Science, LLC. That's a lot of carnage caused simply by breathing.

ANTIOXIDANT ARTILLERY

The beauty of antioxidants is that they typically donate an electron to hungry free radicals, thereby neutralizing them and halting the chain reaction of electron thievery. You've almost certainly heard of cornerstone antioxidants like vitamins A, C, and E, and maybe even endogenous warriors against oxidation like Coenzyme Q_{10} (CoQ_{10}), glutathione, and superoxide dismutase (SOD). The one you may not have heard of is EGT. That's not because it's new. In fact, EGT is among the oldest—it's merely new to research, and this one may be the best yet for your heart. "A lot of people didn't even know they have [oxidative stress]. They don't know they have an imbalance in their antioxidants...that their blood stream could be oxidized," said Quince.

Ergothioneine is crucial in preventing events that create atherosclerotic plaque. It prevents the damage caused to endothelial cells by oxLDL, reducing the risk of atherosclerotic plaque and cardiovascular disease. Ergothioneine can be found in white blood cells, reducing pro-inflammatory, oxLDL-induced adhesion molecule expression, like a white knight against

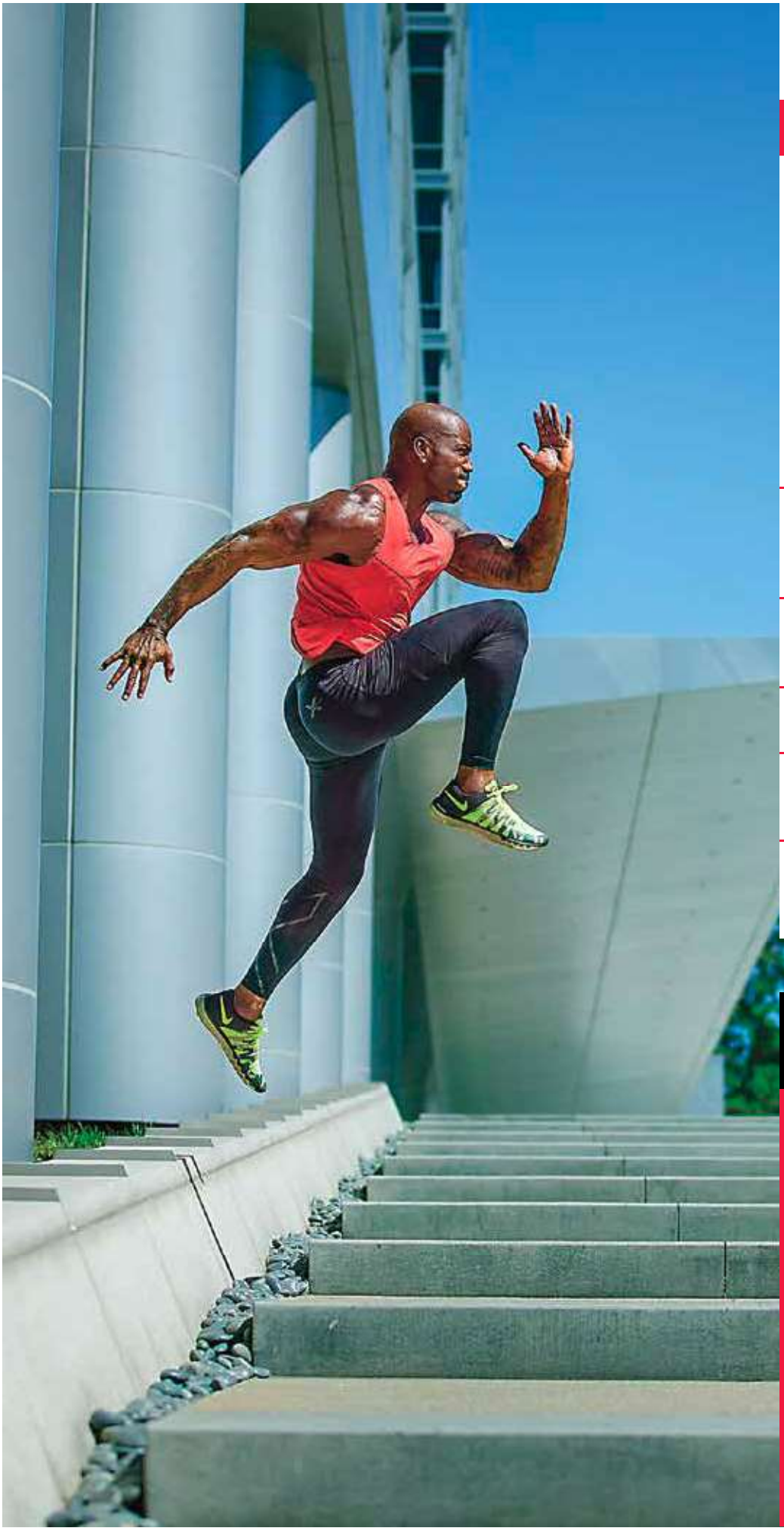
Confuse your Metabolism

Recent research has come to light revealing a heavy truth about most diets. The body will likely fight to gain the weight back that you fought so hard to lose. A study following 16 *The Biggest Loser* contestants concluded that "Metabolic adaptation persists over time and is likely a proportional, but incomplete, response to contemporaneous efforts to reduce body weight." Essentially, dieting fools your body into believing it's starving, which throws your metabolism into a snail-paced survival mode. But that doesn't help anyone who wants to keep the weight off. Quince has a plan for that—cheating on your diet.

Quit blinking and rubbing your eyes, you read it right. Quince discovered that two cheat days per week help trick your metabolism into a calorie-blazing pace. "Your body will respond better if you confuse it. If you speed up your metabolism. Eat clean for three days, then have a cheat day. That spike says to your body, wait a second. This has been new to me for the last three days. What am I doing here? That body confusion actually keeps you more balanced than if you were to prod yourself either way," coached Quince.

However, your cheating must have its bounds. You won't be staring at a single alfalfa sprout on your plate, but you can't have pizza for breakfast, cake for lunch, and donuts for dinner, either. Cheating within reason is the key to a speedy metabolism. "That word cheat sounds so degrading, but it just means if you want to have a glass of wine, then have a glass of wine. If you want to eat a slice of carrot cake, then do that, but if you do that every single day, then you'll hurt," said Quince.

This also crosses over into the exercise realm. Quince believes that allowing yourself to become used to a particular type of exercise lulls the body into complacency. At some point you stop using new muscles, and your body starts anticipating the routine. "If I'm just a yoga person, my body is strong, but I may not be developing dense muscle because I'm not lifting weights, and that could lead to osteoporosis and other issues. If I'm just doing weights, I should include Pilates or cycling or swimming, even, just to add some diversity," said Quince. So switch it up. Keep it fun. Play hard, cheat responsibly, and confuse your body to function at your best.



The 10 and 10

Confusing to the body and healthy for the heart is Quince's 10 and 10 workout. A 10 and 10 has you switching between 10 minutes of cardio and 10 minutes of lifting weights while increasing the difficulty for each segment. "Cardio is great for the heart but lifting weights is as well, so going back and forth within your hour is efficient because you're maximizing your time," said Quince. For example, Quince suggests:

- **10 minutes of cardio.** Walk an incline at a low speed, just to open your muscles up and get the blood flowing.
- **10 minutes of lifting weights.** Stick to just one body part, maybe two, such as your back and shoulders.
- **10 minutes of cardio.** Ramp it up and go for a jog this time.
- **10 minutes of lifting weights.** Target a completely different body part and amplify the difficulty.
- Do **one more rotation** of each cardio and weight lifting at an increased difficulty to complete your hour.

The Man Behind the Muscles

Name:
Dolvett Quince

Hometown:
Stamford, Connecticut

Favorite fiber:
Baobab

Favorite "cheat" food:
Carrot cake

Favorite antioxidant:
Ergothioneine

Favorite exercise:
Anything that works the lower half, like burpees

oxidation. Ergothioneine also prevents oxidation of fibrinogen, an important protein required for blood clotting and preventing hardening and rupture of the arterial walls, according to Dr. Lee. What's equally interesting is how EGT accesses key cardiovascular cells.

HIGHWAY TO HEALTH

Ergothioneine plays its grand role in the heart's rebellion against free radicals via a carrier protein called Organic Cation Transporter Novel Type-1 (OCTN-1) and its matching gene. Research shows cells are encoded with OCTN-1 specifically for EGT uptake, but not just any cells—only those that are highly susceptible to oxidative stress. Chief among these cells are endothelial cells, red and white blood cells, and epithelial cells, positioning it to champion the cardiovascular system.

Unique in its characteristics, EGT is shown to protect both proteins and lipids from oxidation as well as inflammation. "Unlike other water-soluble antioxidants, the presence of the OCTN-1 transporter in the lipid membrane enables EGT to concentrate at the face of the membrane where it may prevent oxidation of lipids as well as proteins," said Dr. Lee.

In contrast to fat-soluble antioxidants, which congregate in a cell's outer lipid membrane, EGT's water solubility would typically bar it from entering a cell to do its job. But transporter OCTN-1 acts like a backstage pass to a cell's vulnerable-to-oxidation, aqueous interior. Once inside, EGT is actively stored and partially regenerates itself for more potent and longer-lasting protection, according to Dr. Lee. In one study, EGT in human brain microvascular endothelial cells had a synergistic effect on other antioxidants, actually increasing the expression of glutathione reductase, catalase, and SOD, while reducing the expression of NOX-1, a major source of oxygen-derived free radicals in the vascular wall.

However, what the OCTN-1 transporter gives, it can take away. Research shows that when OCTN-1 is incapacitated, not only are the antioxidant abilities of EGT abolished, but proteins, lipids, and DNA are exposed to enhanced oxidative damage. In one study, silencing OCTN-1 reduced EGT uptake by 74.3 percent in human brain microvascular endothelial cells.

MITOCHONDRIAL MISCHIEF

Ergothioneine is also there to help a mitochondrion in need. The mitochondrial theory of aging suggests that these organelles are responsible for the oxidative degradation of our bodies through their production of free radicals. But mitochondria lack histones and efficient repair mechanisms to protect them from oxidative stress. "In the process, mitochondrial DNA itself is targeted by ROS leading to DNA nicks, breaks, and mutations," according to *Cell Death and Differentiation*. Protecting mitochondria is crucial for preserving cellular vitality and function in the cardiovascular system. Fortunately, the OCTN-1 transporter is expressed abundantly in mitochondria.

HOW DO I GET SOME?

Ergothionine is not manufactured by the body and must be obtained from dietary sources, but evolution has favored this heart-helping antioxidant for ages. Ergothioneine and its transporter have been discovered in humans, plants, and animals as ancient as the prehistoric horseshoe crab, and its OCTN-1 transporter remains intact in human DNA today. The perseverance of its specialized transporter suggests EGT is a relevant and powerful nutrient for human health. One study suggests that "EGT appears to be an important physiologic cytoprotectant which probably merits designation as a vitamin." There's just one problem.

Ergothioneine is an uncommon and inconsistent dietary constituent. While trace amounts are found in various foods, mushrooms are the only somewhat reliable source of the amino acid. Unfortunately, growing conditions and other minor factors can influence the amount of EGT at harvest. Adding to that, EGT has no Recommended Daily Value and is not tracked on dietary labels of food products, so it is difficult to monitor intake without a dietary supplement. But, due to its complex chemical behavior, EGT has presented engineering challenges to its production as a supplement—until now.

A way to bring EGT into your diet via a supplement, called MironovaEGT+, has been discovered by Mironova Labs. The supplement allows for standardized intake values of this crucial antioxidant at a time when the war on heart disease is all too real for Americans. The company studied its safety as a weapon against oxLDL and endothelial dysfunction—testing a 50,000-mg dose (10,000 times the available 5-mg supplement) showed no adverse effects. The highest available dose is 5 mg, according to Mironova Labs, consistent with the amount shown to have an antioxidant effect. A serving of mushrooms typically yields 2-5 mg of EGT, depending on the aforementioned growing conditions.

The EGT supplement is not meant to be an all-powerful Excalibur to vanquish

Breathe Easy

Oxygen causes oxidation, breathing is consumption of oxygen, and you breathe harder when your body is working hard...so isn't exercise actually bad for your heart? Doctor Lee puts the kibosh on that silly rumor, so go ahead and take a deep breath of relief. Although oxidation does put the whammy on our hearts and our bodies, it's actually involved in many beneficial processes, too. "Exercise promotes healthy oxidation of tissues by upregulating mechanisms that protect from stress. Ironically, by leading to increased protection, exercise actually promotes the antioxidant side of the balance," said Dr. Lee. It's the chronic oxidative stress you want to prevent with determined antioxidants like EGT.

Mironova EGT+
To order Mironova EGT+ or to learn more about EGT, visit mironova.com.

evil, however. "EGT intake is just one part of the equation," said Jan Trampota, CEO of Mironova Labs. "Consumers need to balance their diets, and…regular exercise is the other critically important factor that is essential in maintaining heart health and preventing cardiovascular disease."

Call EGT Excalibur's protective guard, if you will, while exercise is the legendary sword's braided grip and a proper diet is its exacting blade: Together they enable proper wielding of Excalibur in valiant vascular defense. We spoke to Quince on the importance of this trifecta for heart health.

NATURAL SOLUTIONS: *What are the risks of heart disease and diabetes, and how do you best protect your contestants on* The Biggest Loser*?*

DOLVETT QUINCE: Big heart disease risks involve [getting] little to no exercise, and [making] food choices that are high-cholesterol and fried, as well as sugary, high-glucose drinks, et cetera, where you constantly feed bad things into your system. When you do that, and you send that in the pipeline, your blood and your heart will function at a low level. This happens with smokers, excessive drinkers, and people who make bad decisions with their food. The way to eliminate those things or slow down the process of aging, so to speak, and speed up your youthfulness and your energy, is to take EGT and to be aware of and change the way you eat to complement the EGT. Spend time exercising, turn the TV off, move with your family, lead a workout with your family, go outside and enjoy nature and be active. You do that recipe, and you will see that you function at a very high level and you'll be there for your family for years to come.

NS: *Are there any other ways antioxidants are important in regards to fitness and physique?*

Q: Yeah, I think EGT helps me function at the highest quality that I can. So when it comes to exercise and fitness, I would hate to put all this work in and then have clogged arteries, god forbid, a heart attack, or a stroke. People will think, "Wow, he seems so fit, how did he get a heart attack?" No one is exempt. No one. Everyone can potentially get a heart attack or a stroke. You definitely have to pay attention to the inside, not just in things you see in the mirror, but make a conscious effort to take care of the inside as well.

NS: *How would you describe a heart-healthy diet?*

Q: A heart-healthy diet is simply eating well. Increasing your fiber intake, eating plenty of green, lean protein, drinking plenty of liquids, having things in your body that are from the earth, that are natural and aren't chemical-based. Taking the right supplements like EGT helps. I believe in that combination of good eating and supplement intake.

NS: *Do you take other supplements besides antioxidants?*

Q: Every day. Every day. Every day. I take my vitamin A, B_{12}, C, and D. In terms of antioxidants, EGT is my number one. I'm really into maca right now—maca is huge for me. I like high-fiber things. There is another product out there that I put in my orange juice in the morning, called baobab, which is from a fruit tree in Africa, very high in fiber.

NS: *How is exercise important?*

Q: Exercise is key. You've got to have movement in there, not just eating well, but also you want to remove those cobwebs, strengthen your bones, develop the body just to feel strong and solid. You know, like I know, after a few weeks of training or even a few days of training, you feel good. You feel accomplished and strong, and it's that feeling that helps you perform at your best.

NS: *What's your perspective on attitude towards exercise?*

Q: Your attitude determines your altitude. It determines how high you can go. As it pertains to exercise, I've had my days that I've gotten out of bed like I really don't feel like it today, but I go anyway. I approach life like that. There's days that I don't want to go to work, but I purposely put myself in a scenario that I think I don't want—just to get something out of it. Because if I always lead with my wants and don't wants, I'll kind of lose something in the middle, and that is, when I go work out, and I go take care of myself mentally, it clears up all the junk and smoke. You're just best version of yourself, and I think we all should do ourselves justice by telling our minds to get out of our bodies' way and just keep moving, then one day it'll connect. It always does.