

Swimming on Empty

Masters swimmers prone to low blood sugar in the pool can find the sweet spot for their training



After 1,000 easy yards, tell-tale lights—like paparazzi flashbulbs—begin swarming my visual field. I’m overcome with light-headedness, physical exhaustion, and shakiness. Hunger pangs overwhelm me; I fantasize about cramming candy bars down my throat with a feeding stick.

Diagnosis: hypoglycemia of exercise, AKA low blood sugar. The first time I suffered an episode of this was 15 years ago. I feared it prefigured diabetes or something similarly dreadful. Fortunately, this wasn’t the case—I’d simply failed to eat enough before swim practice.

“In otherwise healthy athletes, hypoglycemia during training is not that rare,” explains Pittsburgh-based sports dietitian Leslie Bonci, whose clients include the WNBA, the Kansas City Chiefs, and Olympic gold medalist Garrett Weber-Gale. “If it were indeed a dire sign, it would happen much more regularly, not just during exercise.”

RUNNING LOW

Almost any athlete can hit the wall when skeletal muscles demand more glucose than the body can supply. For a significant subset of athletes, however, the problem is frustratingly common. A 1999 study in the *International Journal of Sports Medicine* suggests that 30 percent of nondiabetic athletes appear

extremely sensitive to reactive hypoglycemia, which can strike seemingly at random during easy warm-ups and extreme race conditions alike.

“Why it’s a big issue for some athletes and a nonissue for others,” Bonci says, “is one of the next frontiers in sports medicine. But we’re not there yet.”

Researchers studying muscle and metabolism in the M-3 Research Unit at Maastricht University in the Netherlands report that hypoglycemia can be triggered not just by inadequate pre-exercise feeding, but also by the types and amount of food an athlete eats beforehand, when food is consumed, the timing of training sessions, previous hypoglycemic episodes, hydration status, anxiety and stress, and variable sensitivity to hormones such as insulin and glucagon—the yin and yang of blood sugar regulation.

Some athletes might even be victims of their superior conditioning. Just as a sedentary lifestyle ups the risk of insulin resistance, which increases blood sugar levels, endurance training can boost insulin sensitivity, which can cause blood sugar to fall below normal.

OH, SUGAR, SUGAR

Despite its vilification these days, glucose is far from the poison some purists would have us believe. Our brains run almost entirely on glucose, consuming nearly 60 percent of the body’s supply while at rest. The brain can’t store sugar so it takes what it needs from the bloodstream whenever it needs it. Note to desk jockeys: If the work’s cognitively demanding, you’re probably draining your tank faster than you think.

By contrast, our skeletal muscles and livers can store sugar as glycogen and release it as needed. Muscles hog their stores for themselves; the liver shares its supply with the whole body.

“When we start working out, we tap our muscle glycogen stores first,” Bonci says. When these stores run low, the liver can help by releasing some of its supply into the bloodstream, but this mechanism takes 15 minutes to kick in.

Moreover, liver glycogen stores aren’t unlimited. The brain always gets first dibs, followed by other vital organs, and finally our muscles—assuming there’s anything left. “And if you’ve gone a long time without eating, you can burn through liver glycogen quickly even at rest,” Bonci says.

As the glycogen larder empties, blood glucose levels can fall under 70 milligrams per deciliter. Some symptoms such as scotoma, or spots in your vision, result from insufficient glucose to the retina. Others such as polyphagia, or ravenous hunger, likely involve emergency cries from the hypothalamus. “Like Audrey in, ‘Little Shop of Horrors’ your brain is screaming, ‘Feed me! Feed ME!’” Bonci says.

GETTING BACK IN THE SWIM

The good news is that even extreme episodes can be reversed quickly via 15 grams of easily absorbed carbohydrates. Bonci says, “Swimmers prone to hypoglycemia should make sure to bring an emergency fuel kit to practice—a sports drink, honey packet, GU or similar gels, even raisins. Bars don’t work as well—it takes too long to digest them. You want something that’s immediately available.”

Don’t expect instantaneous relief, but you’ll likely feel better after 10 to 15 minutes. If so, is it safe to resume practice? “Everybody has the best sense of their own body,” says Bonci. Some opt for caution by packing it in for the day. Others, however, get back in the pool and see how they feel.

Surprisingly, the latter appears safe—at least for lab rats. In rodents with experimentally induced hypoglycemia, intravenous infusion of blood sugar produces near immediate recovery, allowing them to resume running on a wheel without further fatigue or other ill effect.

TOPPING OFF THE TANK

The best way to avoid exercise-induced hypoglycemia is to prevent it from happening in the first place. For some, this can be as simple as eating a balanced diet and never skipping meals before practice. But for others, says Bonci, a winning strategy can prove trickier.

“Because so many different underlying metabolic issues can play a part, there’s no one-size-fits-all prevention strategy. Some athletes do all the right things and still experience hypoglycemia. If this describes you, you’ll need to do some detective work to really fine tune what will work best for you.”

To this end, Bonci and other experts recommend trying the following:

- **Make peace with carbs.** “Diets that advocate protein to the exclusion of all else, or severely curtail carbohydrates, are never recommended for athletes,” Bonci says. It’s not just complex carbs we need, either. It’s true that muscle can also burn fat for fuel, especially during longer, endurance exercise. But sugar—whether in the form of sucrose, lactose, maltose, fructose, etc.—remains the preferred energy source for bursts of moderate to intense activity. Artificial sugar, by contrast, doesn’t cut it. “Some people are so sugar-phobic they look for an alternative to the real thing,” Bonci says. “Don’t fool yourself into thinking artificial sugar will help. Zero calories equals zero fuel. It’s not rocket science: You can’t exercise well on empty.”
- **Avoid exercising in a fasted state.** Many swimmers have to get up so early for predawn practice that it’s tempting to skip breakfast altogether. For others who swim after work, it can be six hours or longer since lunch. “I understand that most people don’t want to exercise on a full stomach,” Bonci says. “And the truth is you don’t need to eat a lot.” But the longer you go between meals, the more depleted your glycogen stores become.
- **Carb up on deck.** Some hypoglycemia-prone athletes find it helpful to consume something sweet 5 to 10 minutes directly before initiating exercise. “I’m not talking about a half-gallon of chocolate milk or a scone the size of your

head,” Bonci says, adding that a modest snack won’t cause an insulin spike and sugar-plummeting backlash. “It just doesn’t happen because the counteracting effect of physical activity blunts that response.”

- **Slurp between sets.** For long or intense training sessions and endurance races, sipping a sports drink can help keep blood glucose steady.
- **Replenish afterwards.** As long as you’re planning to eat a balanced meal within an hour of your workout, you don’t need to take any unusual steps to refuel sooner, Bonci says. But if you know you won’t be eating for several hours, packing a post-practice snack will kick-start the restoration of glycogen stores and muscle protein synthesis during the time your body is most receptive to it. One easy way to cover these bases is to drink a 10-ounce bottle of chocolate milk right after practice.
- **Take it easy on caffeine and alcohol.** Too much coffee seems to trigger hypoglycemia in some athletes; excess alcohol consumption, especially on an empty stomach, impairs the liver’s ability to store glycogen, setting you up for problems the next day.
- **Avoid extreme training conditions.** High altitude and unusually hot or cold environments can significantly up your odds of hypoglycemia. Ditto for late-night workouts, which seem more problematic than training during the morning or afternoon, possibly because of circadian fluctuations in the hormone cortisol. Few of us swim at midnight, but if you cross multiple time zones for a competition, keep in mind your body might still feel like it’s midnight.
- **One episode begets another.** One hypoglycemic event makes another more likely over the next 24 to 48 hours, so be especially vigilant about nutrition during this window of vulnerability. When in doubt, give yourself time to recover and avoid overtraining. With exercise and food alike, it pays to remember: The sweet spot always falls between not enough and too much.—JIM THORNTON



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