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Mind Over Muscle

Harness the power of your brain to get strong and lean

Earlier this year, scientists in South Africa discovered something peculiar about fatigue: It doesn't begin in the muscles. Indeed, that burning you feel in your quads near the end of a 10K or in your pecs during a final bench press originates farther north, say the scientists, whose finish-line biopsies of exhausted marathoners showed plenty of glycogen (the body's main fuel) and ATP (a chemical that stores energy) in the runners' muscles. Their conclusion: Fatigue sets in not when muscles run out of gas, but when the brain tells them to conserve energy.

"This is likely a survival mechanism," says Timothy Noakes, MD, the study's lead author and a professor of exercise and sports science at the University of Cape Town. Early man was an endurance athlete, after all, and his body needed a reserve of go-juice in case a saber-toothed tiger attacked or a woolly mammoth got ornery. Sure, the stakes are lower today, but our innate energy reserves remain, and if you can tap into them, you'll gain an edge in everything from pickup games to cardio sessions. Here's how.

Program your pace. A recent study in the *British Journal of Sports Medicine* found that the brain has a governor that regulates pace based on distance and expected effort. "That's why unfamiliar routes seem harder," says Alan St. Clair Gibson, PhD, chair of sports sciences at Northumbria University, in England. "If your brain doesn't know how much energy you'll need for a workout, it errs on the side of caution." Use interval training (e.g., alternating between two minutes of hard running and two minutes of jogging) to overcome

this brain block. Just 20 minutes a week can teach your brain that running faster won't harm your body.

Sweat with a smile. Projecting a positive attitude can restructure your brain to enter a state of bliss while exercising, allowing you to work out harder, says Chris Bergland, Triple Ironman champion and author of *The Athlete's Way*. Researchers at Wake Forest University agree, noting that feelings of pain result from both immediate *and* expected experiences. Fight fatigue with affirmations. "Repeating 'I'm strong and swift' will rewire your brain to believe it," says Bergland.

Zen out. That burning sensation in your muscles is due to the buildup of lactic acid. "And tense muscles accumulate it faster than relaxed ones," says Dan Czech, PhD, graduate director of Georgia Southern University's sports psychology program. When you run, are you moving your legs freely or pushing them? If it's the latter, imagine the tension draining from your muscles and your legs moving with ease. "After a few minutes, you'll feel more energized," says Czech.

Envision success. "Physiologically, the brain doesn't distinguish between imagined and real experiences," says Steven Rosenberg, PhD, team psychotherapist for the Philadelphia Flyers. Taking five minutes to visualize running seven miles with energy to spare, therefore, will reinforce the same neural patterns as actually doing so, giving you a mental leg up before you hit the road. "Alternatively," says Rosenberg, "if you're trying to squeeze out a few more curls, picture the action—arms extending, weight lowering, biceps contracting, weight rising—and then do it." STEVE MAZZUCCHI