

PERSONAL JOURNAL.

Elite Athletes' Therapies Go Mainstream

Longevity researchers look at cutting-edge treatments to improve health and wellness among the general population

BY JEN MURPHY

Infrared light waves. Electromagnetic fields. Extreme cold therapy. Treatments popular among elite athletes are now influencing the science of extending life and health.

In June, Mass General Brigham healthcare system opened a 20,000-square-foot laboratory and training facility in Foxborough, Mass., devoted to sports-performance research. It includes a cryostimulation chamber with temperatures as low as minus-220 degrees Fahrenheit and a device known as a photobiomodulation bed for light therapy.

"Medical experts are looking to training strategies of high-performance athletes to source ideas to improve healthspan," says Dr. Sawalla Guseh, a sports cardiologist at Mass General Brigham in Boston, referring to the number of years someone is healthy, without chronic and debilitating disease.

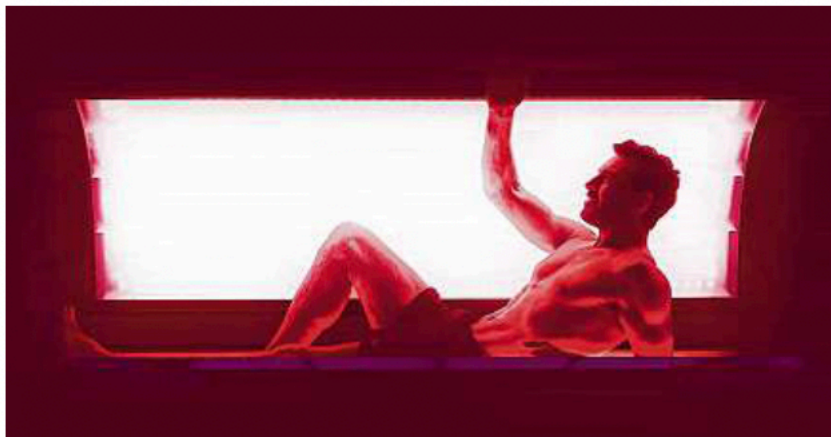
In athletes these treatments are often directed at performance enhancement and recovery. Some researchers believe that using them more frequently and in a prescribed, targeted way could have longer-lasting effects for a general population. While diet and exercise remain the most scientifically proven ways to achieve longevity, new therapies and devices are coming to wellness clinics and performance-focused membership clubs. Here's a look at some of the emerging treatments that promise to help turn back the clock, and what medical experts think about them.

Light therapy

Some liken it to photosynthesis in plants: Photobiomodulation uses specific wavelengths of red or near-infrared light in treatments for humans, aimed at promoting speedier healing and other benefits. Red light occupies the long end of the visible light spectrum with wavelengths between 630 and 700 nanometers. Near-infrared light lies on the invisible spectrum with wavelengths ranging from 800 to 2,500 nanometers.

The idea has been used in efforts to stimulate hair growth since the early 1960s. NASA started experimenting with it in the 1980s to prevent muscle atrophy in astronauts. Now longevity researchers are taking a look.

Studies suggest photobiomodulation could stimulate collagen growth, decrease inflammation and even improve cognitive function. Olympic athletes lie in Thor Photomedicine's NovoThor red-light therapy bed—which looks like a tanning bed and retails for \$130,000—for 15-minute sessions, hoping to boost performance and recovery. Also used by sports pros, Vielight's headband-and-nose-clip combination, at \$1,800-\$2,400, emits pulsed near-infrared light waves into the nostril toward the brain.



◀ A red-light therapy bed is used by Olympic athletes to boost sports performance and recovery.

More studies need to be done on the potential cognitive benefits of cold exposure, such as improved mood and attention, says Guseh of Mass General Brigham, but science backs physiological benefits. Cold is a stressor, he says. When the body is exposed to cold, blood pressure and heart rate rise, kicking into fight-or-flight mode. Exposing the body to frigid temperatures for short periods of time is like microdosing on stress, he says. "If you can adapt the way you handle stress you may be able to develop resiliency to defend against daily stressors that lead to disease."

Magnetic energy

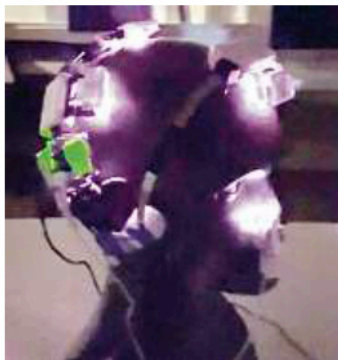
Much like the earth, our bodies are electromagnetic, and our brains use electromagnetic signals to communicate with the body. Electromagnetic fields from sources like electronics hit our bodies all day and, at high frequencies, can be damaging, says Arany of the University at Buffalo. In contrast, bursts of low-level electromagnetic radiation in a therapy known as pulsed electromagnetic field, or PEMF, trigger a biologic response that recharges cells when they start to lose energy from stress or fatigue, he says.

The idea is that low-frequency pulses pass through the skin and penetrate into cell membranes to induce genetic changes and even protein synthesis, Arany says. At around 5 to 30 hertz, the PEMF frequency mimics the body's natural bio-field. "Essentially it's forwarding our brain a message to kick-start the body's healing process," he says.

Most PEMF gadgets sold for home use, like mats and chairs, start at around \$1,000 and are marketed as ways to reduce inflammation or relieve pain, in conditions like arthritis. These devices have also become a staple at Upgrade Labs and Restore Hyper Wellness, two chains of centers in the U.S. that offer treatments aimed at enhancing performance. Magnecut Health says its Magnosphere Halo, a \$13,000 chair surrounded by large copper coils that create a uniform magnetic field around the body, can help reduce stress by resetting the nervous system.

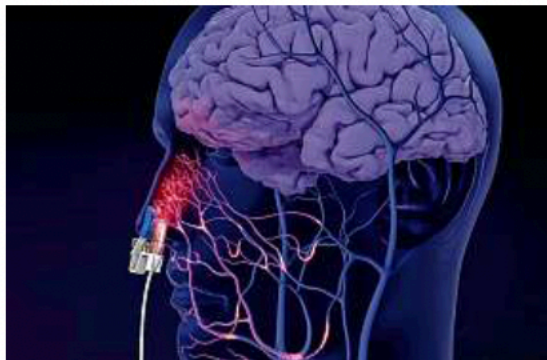
PEMF is approved by the Food and Drug Administration for conditions including bone healing, wound care, migraine headaches with aura and clinical depression, though it often isn't covered by health insurance. PEMF, combined with medication, can help alleviate effects of chronic arthritis, Parkinson's disease and other conditions, says Joseph Toy, clinical director of Cliniques Neuro-Vie Sante, a neurostimulation center in Montreal, where doctors can also prescribe the treatment.

He warns, however, that everyone reacts differently to PEMF. For the best results, it needs to be prescribed at a specific frequency and wavelength over a certain timeline.



▲ Sports pros use Vielight's Neuro device, shown emitting near-infrared light at the skull.

Photobiomodulation is believed to work through cell components known as mitochondria—our body's battery packs that give us energy, says Margaret Naeser, a research professor of neurology at Boston University School of Medicine who also works at the Boston VA Medical Center. When red or near-infrared light within a wavelength range of 600 to 1,200 nanometers is applied to tissue, it is absorbed by mitochondria, especially in damaged or compromised cells, where it triggers repair signals, she says. This appears to increase blood flow to the brain and



▲ A rendering illustrates how light is delivered through a nasal applicator on Vielight's devices.

help repair damaged cells.

Naeser was an author of a 2023 study published in the Journal of Alzheimer's Disease Reports that found photobiomodulation could be a management therapy for people suffering chronic traumatic encephalopathy, Alzheimer's and strokes.

Praveen Arany, an associate professor of oral biology at the University at Buffalo and an expert on therapeutic uses of lasers and light, says photobiomodulation clearly has benefits. But he questions speedy adoption in clinical and wellness realms. "How can you use the same light for any-

thing and everything from antiaging to improved brain function?" he says. In the future, he predicts, doctors will prescribe "photocuticals"—that is, light as a drug—in very specific doses, or wavelengths, and for very specific times of day to maximize benefits.

Thermal regulation

Athletes have helped popularize frigid baths and cryotherapy chambers, touting benefits ranging from better athletic performance to heightened focus.

After long studying heat loss in animals, Stanford University biologists H. Craig Heller and Dennis Grahn in the early 2000s developed cooling mittens to reduce muscle temperature in humans within seconds by drawing blood to a network of veins where it is rapidly cooled by water circulating in the glove's plastic lining. Their research showed that by precisely controlling core temperature, such mittens could significantly increase strength and endurance. The gloves were used by U.S. military forces in Iraq in 2003 and athletes at the 2004 Olympic Games in Athens.

Arteria Technology now sells the gloves known as CoolMitt at \$1,500, marketing them to athletes looking to boost performance as well as people who work in extreme heat.

◀ Cooling 'mittens' can reduce muscle temperature within seconds, improving endurance.

