

'Buckyballs' to treat multiple sclerosis

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This is Dr. Michael Gozin from Tel Aviv University. Credit: AFTAU

If you're of a certain age, you'll remember Buckminster Fuller's distinctive "geodesic domes" - soccer-ball-shaped structures that the late futurist envisioned as ideal human domiciles. Tel Aviv University chemists remember them too - and are now putting them to use in the treatment of multiple sclerosis (MS).

In partnership with a group of Prof. Howard Weiner from Brigham and Women's Hospital at Harvard Medical School, Dr. Michael Gozin from TAU's School of Chemistry is attempting to create the next generation [MS](#) drug based on a delivery platform of "[buckyballs](#)," small soccer-ball-

shaped molecules sometimes called fullerenes. Made from pure carbon, the buckyballs can function as invigorating antioxidants to keep neurons in the brain alive and kicking.

There is currently no cure for MS, which slowly paralyzes and then kills.

Buckyballs and related carbon nanotubes have enormous potential to be used in sensors and electronic applications allowing scientists to manufacture much more smaller and faster processors. These carbon-based materials have a huge range of possibilities in [nanotechnology applications](#) as well.

Until now, buckyball-derived therapeutics have not been used in medicine. But the TAU and Harvard teams believe that they may resolve issues related to this nanomaterial development, and are seeking to commercialize their patented invention. If successful, the TAU-Harvard collaboration could provide new hope to millions of MS sufferers, and would make Bucky himself proud.

The TAU team is the first in the world to have synthesized a brain-targeted antioxidant to treat affected neurons in the brain. Pre-clinical trials, the researchers report, proved successful in animal models. They are also attempting to apply the same technology to the treatment of Alzheimers disease, but a reliable and effective treatment for MS is their primary goal.

MS is an autoimmune disease that robs people of the ability to control their motor movements. No one knows exactly how many people are afflicted with MS. According to the National Institute of Neurological Disorders and Stroke, it is estimated that there are currently more than 350,000 people in the United States, who have been diagnosed with MS, where approximately 200 new cases are diagnosed each week. Current state-of-the-art therapies like the Israeli-invented Copaxone clearly help,

but may not be enough, says Dr. Gozin, whose wide-ranging research has included work on classified projects for the U.S. Department of Defense.

"[Multiple sclerosis](#) is a very serious clinical condition," says Dr. Gozin. "I had a dream, an idea for a new kind of drug." He took this idea to MS expert Prof. Howard Weiner at Harvard University, and the two began a collaboration.

"I wanted to target with antioxidants specific receptors in the brain, which are involved in the disease progress, to stall the deterioration of motor function in MS sufferers," Dr. Gozin says. The US-Israeli researchers started from the belief that buckyballs, and brain-targeted moieties attached to them, may be able to achieve success in treating MS.

"We've created a molecule based on the C60 fullerene, a soccer-ball-shape, with great biomedical potential," says Dr. Gozin. The Tel Aviv University team, including graduate student Amnon Bar-Shir, was the first to synthesize and patent this application, which is "programmed" to target specific receptors in the brain. "We are presently working on the next generation of this type of molecules, containing less exotic and more natural building blocks," Dr. Gozin reports.

Source: Tel Aviv University ([news](#) : [web](#))

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