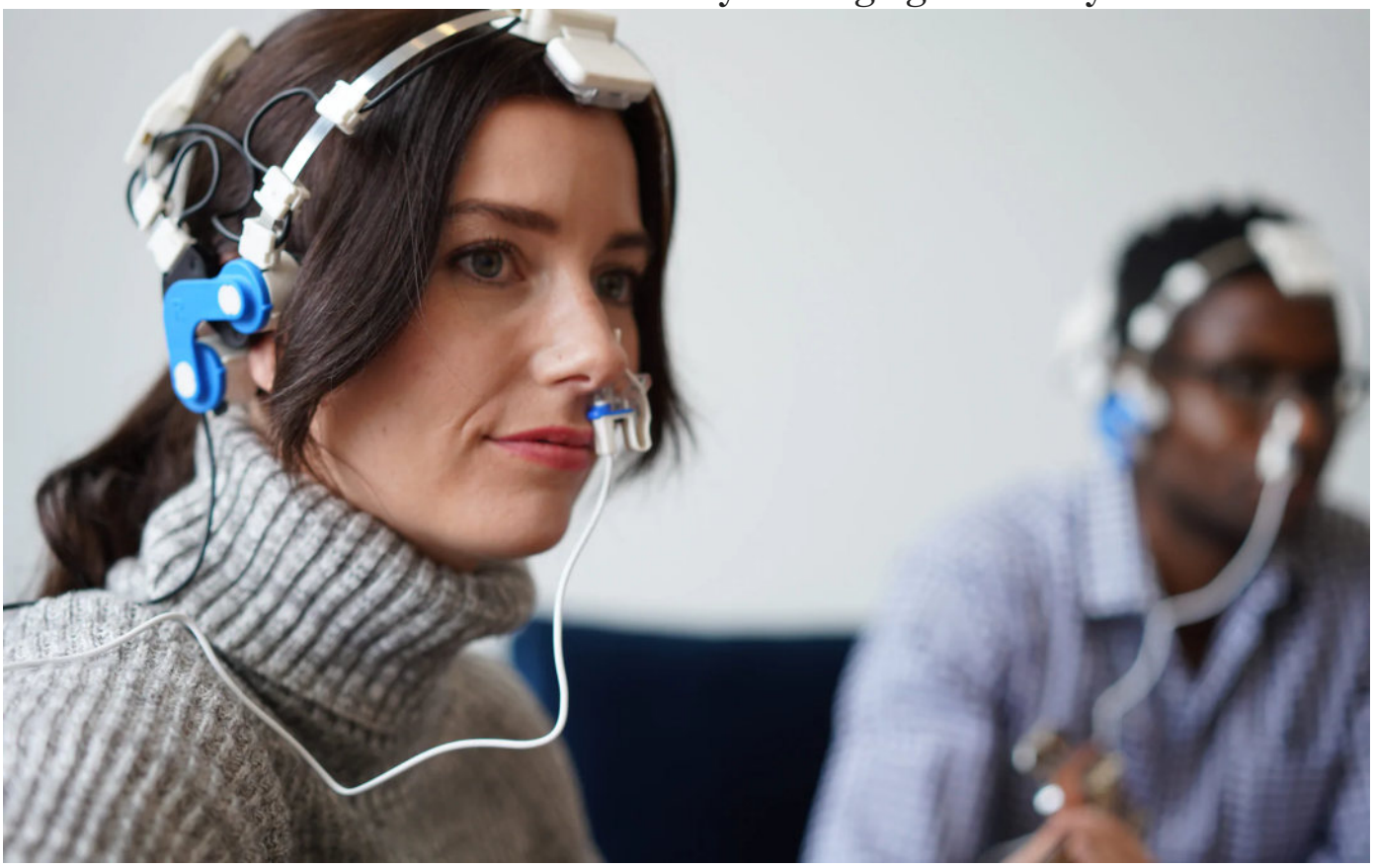
How Alzheimer's disease could be cured by shining light directly into the brain



The light is directed at specific areas of the brain known to be damaged in Alzherimer's CREDIT: VIELIGHT

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By **Sarah Knapton**, SCIENCE EDITOR

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Alzheimer's disease could be reversed by shining light directly into the brain through the nose and skull, scientists believe.

The first major trial to see if light therapy could be beneficial for dementia has just begun following astonishing early results which have seen people regain their memory, reading and writing skills, and orientation.

If successful it would be the first treatment to actually reverse the disease. So far, even the most hopeful drugs, such as Biogen's aducanumab, have only managed to slow the onset of dementia, and many scientists had givenup hope of reversing brain damage once it had already happened.

The device works using LEDs to shine near-infrared light directly into the brain CREDIT: VIELIGHT

But a device called the Neuro RX Gamma headset developed by Canadian-based biotech company Vielight maybe about to succeed where other drugs have failed.

The device works through a process called 'photobiomodulation', where pulses of near-infrared light are directed to parts of the brain known to be damaged or harmed in dementia.

Dr Lew Lim, CEO of Vielight, the inventor of the device said: "Photobiomodulation introduces the therapeutic effect of light into our brain.

"It triggers the body to restore its natural balance or homeostasis. When we do that, we call upon the body's innate ability to heal.

"We have a much bigger ambition than the drug trials. Drug developers are mainly either seeking to slow the mental decline in diagnosed cases, or seeking to prevent the onset of Alzheimer's disease by intervening at pre-symptomatic stage.

"Based on early data, we are confident of seeing some measure of recovery in the symptoms not just a slowdown in the rate of decline, even in moderate to severe cases."

What are the early signs of dementia?

According to the Alzheimer's Society, 850,000 people in the UK have dementia, with one in six aged over 80. There is no cure, but early diagnosis can help ease the symptoms, which include behavioral changes and memory loss.

The symptoms of Alzheimer's can be divided into three main stages. It can take years to progress from mild to serious, and each person will develop them at a different rate.

According to the NHS, the most common early symptom is memory lapses, which may include:

- Forgetting recent conversations, events or whereabouts of household items
- Forgetting place or object names
- Regular repetition or asking the same question several times
- Poor judgement and finding it tough to make decisions
- Becoming less flexible or resistant to trying new things
- There may also be mood changes, increased anxiety or confusion. As the disease develops from the early stage, memory deteriorates further, with names of loved ones harder to recall. Even recognising friends and family can become difficult.

For more details, go to alzheimers.org.uk

Around 850,000 people in Britain have Alzheimer's but there are still no drugs available which can reverse the symptoms.

The device works by firing 40 Hz gamma waves directly into the skull using LEDs mounted on a headset. A separate nasal clip also channels light directly up the nose to the hippocampus, the part of the brain which is responsible for memory, and one of the first areas to deteriorate in Alzheimer's disease.

The light boosts the mitochondria - the cells batteries - which produce fuel for the cells and improves their function and communication.

So instead of using medication to clear out the plaques and tangles of protein which cause Alzheimer's, the device stimulates the brain itself to activate immune cells known as microglia, which sweep away the disease.

The new trial led by the University of Toronto will involve 228 people enrolled at eight sites in Canada and the US, half of whom will receive a 20 minute daily session at home, six days a week for a total of 12 weeks. The rest will receive a placebo.

In an initial safety trial involving five patients with mild to moderately severe dementia, all showed significant improvement after 12 weeks, with increased function, better sleep, fewer angry outbursts, less anxiety, and wandering.

Scans showed visible improvements in connectivity between brain regions and and an increase in blood flow. Once the therapy was stopped, the patients began to once again decline.

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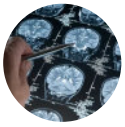
Alzheimer's disease 'will become manageable like HIV' 	Concussion in 20s 'could raise dementia risk by 60 per cent' 

A separate study of one man in 2017 showed his long term memory doubled and short term memory improve three fold in just three weeks. His writing ability and motor skills also went from zero to seven out of 10 in a fortnight. And his mood, critical thinking and conversational skills also increased from one point on day one, to seven points at day 21.

Real-time scans at the time of treatment showed a big boost to brain power.

Speaking about the results at the time, Dr Reza Zomorrodi, who conducted the trials at the University of Toronto, said "It was a very big surprise to see how the light could change the EEG and brain signals, the language of the cells inside the brain.

"It is an accurate and immediate effect. We believe it is interacting with the mitochondria activity and boosting the energy of the brain to create more frequency and a more organised and coordinated network."

The first discovery of light therapy was published in 1967 and many countries now prescribe it for wound healing, pain reduction, skin treatment, sinus problems and hair growth.

Dr Lim believes that a lack of light caused my modern indoor lifestyles may be partially driving the increase in Alzheimer's disease, and thinks the device could restore natural levels of brightness.

All the countries with the worst prevalence in dementia, such as Finland, Iceland and Sweden are found in the northern hemisphere.

While most people believe cells are fuelled by oxygen, water and food, light is also an important source of energy for cells and aids in the production of

Dr Lim said: "People in the north should get more sunlight which helps to synthesize vitamin D, especially those with darker skin.

"When they do not get enough sun, they risk having insufficient levels of vitamin D. Vitamin D helps to prevent Alzheimer's disease."

"In the north there is not enough sun for you. What we are doing here is lighting up the brain, inviting light into the brain. It's a similar effect as sunlight but it's more targeted."

Scientists have also now started clinical trials to see if the Neuro RX Gamma device can also be used for Parkinson's Disease (PD) after several patients including former Australian politician Max Burr reported incredible results from 'home-made'light therapy.

Burr recovered his sense of smell, was able to write again and was able to resume public speaking after light therapy. He was also able to climb the stairs and now regularly plays bowls and practices tai chi.

Although scientists fear the results may be a placebo effect they believe there is now enough evidence to show there is a mechanism behind the therapy to begin trials. A small safety trial on eight volunteers at the University of Arizona has shown improvements in symptoms.

And trials are also ongoing at Boston University for using the device for Traumatic Brain Injury (TBI)and post-concussion syndrome.

The results from the latest Alzheimer's trial are expected within three years and if successful, the device could become the first treatment to reverse dementia.

Liz Burnett, whose father 88-year-old father Rudy began using the device eight years ago, had seen at dramatic improvement.

"It seemed to slow the progression of Alzheimers," she said. "He also remembered more. His immune system improved as he didn't get the flu anymore.

"All his siblings passed away around 83. He is still around at 88. He is the longest living family member so far.

"I use the device myself and I sleep better, feel better."