

Health Matters

AI to help spot early risk factors for Alzheimer's

UC San Francisco scientists have found a way to predict Alzheimer's Disease up to seven years before symptoms appear by analyzing patient records with machine learning.

"This is a first step towards using AI on routine clinical data, not only to identify risk as early as possible, but also to understand the biology behind it," said the study's lead author, Alice Tang, an MD/PhD student in the Sirota Lab at UCSF.

The risk of getting the disease increases with age, and women tend to live longer than men, but that does not fully explain why more women than men have it.



men and women. Erectile dysfunction and an enlarged prostate were also predictive for men. But for women, osteoporosis was a particularly important predictor.

Childhood appetite linked to later eating disorder

An enthusiastic response to food in early childhood may be linked to a higher likelihood of experiencing eating disorder symptoms in adolescence, according to a new study led by researchers at UCL and Erasmus University Rotterdam.

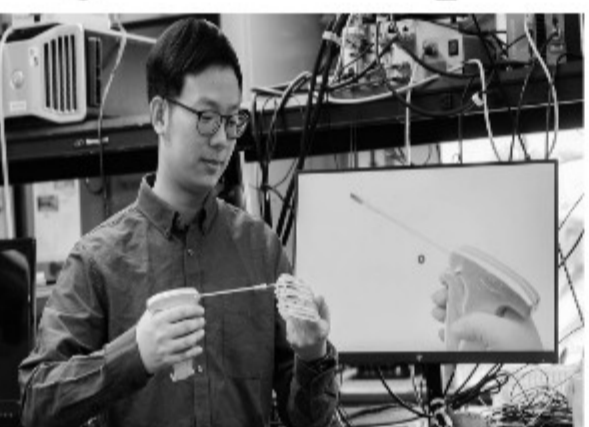


The study looked at survey data from 3,670 young people in the UK and the Netherlands to investigate how appetite traits in early childhood might relate to the likelihood of developing eating disorder symptoms up to 10 years later.

childhood was also linked with higher odds of engaging in compensatory behaviours, which are intended to avoid weight gain, such as skipping meals, fasting and excessive exercise.

Scientists invent ultra-thin, minimally-invasive pacemaker

Sometimes our bodies need a boost. Millions of Americans rely on pacemakers - small devices that regulate the electrical impulses of the heart in order to keep it beating smoothly.



technology similar to solar cells to stimulate the body. Photovoltaics are attractive for this purpose because they do not have moving parts or wires that can break down or become intrusive - especially useful in delicate tissues like the heart.

two layers of a silicon material known as P-type, which respond to light by creating electrical charge.

The result is a minuscule, flexible membrane, which can be inserted into the body via a tiny tube along with an optic fiber - a minimally invasive surgery.

older women, will get Alzheimer's. "It is the combination of diseases that allows our model to predict AD onset," said Tang, "Our finding that osteoporosis is one predictive factor for females highlights the biological interplay between bone health and dementia risk."

To understand the biology underlying the model's predictive power, the researchers turned to public molecular databases and a specialized tool developed at UCSF called SPOKE (Scalable Precision Medicine Oriented Knowledge Engine), which was developed in the lab of Sergio Baranzini, PhD, a professor of neurology and a member of the UCSF Weill Institute for Neurosciences.

SPOKE is essentially a database of databases that researchers can use to identify patterns and potential molecular targets for therapy.

The team also found that a slower pace of eating and feeling full more quickly (high sensitivity to satiety) in early childhood may be protective against developing some eating disorder symptoms later.

Co-lead author Dr Ivonne Derks (UCL Institute of Epidemiology & Health Care) said: "Although our study cannot prove causality, our findings suggest food cue responsiveness may be one predisposing risk factor for the onset of eating disorder symptoms in adolescence."

"However, high responsiveness to food is also a normal and very common behaviour

and should be seen as just one potential risk factor among many rather than something to cause parents worry." Higher food responsiveness was linked to a 16% to 47% increase in the odds of reporting eating disorder symptoms, including binge eating symptoms, uncontrolled eating, emotional eating, restrained eating and compensatory behaviours.

The 47% increase was found for binge eating symptoms (eating a very large amount of food and/or experiencing the feeling of loss of control over eating), meaning that adolescents whose parents rated them highest on food responsiveness were almost three times more likely to report binge eating symptoms compared to adolescents whose parents scored them lowest.

A 16% increase in odds was found for restrained eating, whereby a person restricts their intake of food to lose weight or avoid weight gain.

Just like food responsiveness, emotional overeating in early

In turn, some appetite traits seemed to be protective against developing eating disorder symptoms later. Higher satiety responsiveness - that is, feeling full more quickly after eating, and feeling full for longer - was linked to lower odds of uncontrolled eating (defined as the extent to which someone feels out of control and eats more than usual) and compensatory behaviours.

A slower pace of eating, meanwhile, was linked to lower odds of compensatory behaviours and restrained eating. The researchers also found that appetite traits such as food fussiness, emotional undereating (eating less due to low mood), and enjoyment of food in early childhood were not linked to later eating disorder symptoms in adolescence.

A team of researchers with the University of Chicago has developed a wireless device, powered by light, that can be implanted to regulate cardiovascular or neural activity in the body. The featherlight membranes, thinner than a human hair, can be inserted with minimally invasive surgery and contain no moving parts.

the cell no matter what part of the panel is struck," explained Li. "But for this application, you want to be able to shine a light at a very localized area and activate only that one area." For example, a common heart therapy is known as cardiac resynchronization therapy, where different parts of the heart are brought back into sync with precisely timed charges.

In current therapies, that's achieved with wires, which can have their own complications. Li and the team set out to create a photovoltaic material that would only activate exactly where the light struck.

The eventual design they settled on has

It weighs less than one fiftieth of a gram; significantly less than current state-of-the-art pacemakers, which weigh at least five grams. "The more lightweight a device is, the more comfortable it typically is for patients," said Li.

Red light can reduce blood glucose levels

The researchers found that 670 nanometres (nm) of red light stimulated energy production within mitochondria, the tiny powerhouses within cells, leading to increased consumption of glucose. In particular, it led to a 27.7% reduction in blood glucose levels following glucose intake, and it reduced maximum glucose spiking by 7.5%.

Mitochondria provide energy for vital cellular processes, using oxygen and glucose to produce the energy-rich nucleoside adenosine triphosphate (ATP). Previous research has established that long-wavelength light between approximately 650-900 nm (spanning the visible through to the near-infrared range) can increase mitochondrial production of ATP which reduces blood glucose and also improves health/lifespan in animals.

in a different part of the body. Likewise, 670 nm light shone selectively on the backs of mice in previous studies has been shown to result in improvements in ATP that improve symptoms in both a model of Parkinson's disease and a model of diabetic retinopathy.

the way mitochondria function and this impacts our bodies at a cellular and physiological level. Our study has shown that we can use a single, 15-minute exposure to red light to reduce blood sugar levels after eating.

Professor Jeffery said: "Sunlight has a balance between red and blue, but we now live in a world where blue light is dominant because although we do not see it, LED lights are dominant in blue and have almost no red in them. This reduces mitochondrial function and ATP production. Hence our internal environments are red-starved. Long-term exposure to blue light is potentially toxic without red. Blue light on its own impacts badly on physiology and can drive disrupted blood sugars that may in the long run contribute to diabetes and undermine health spans.

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