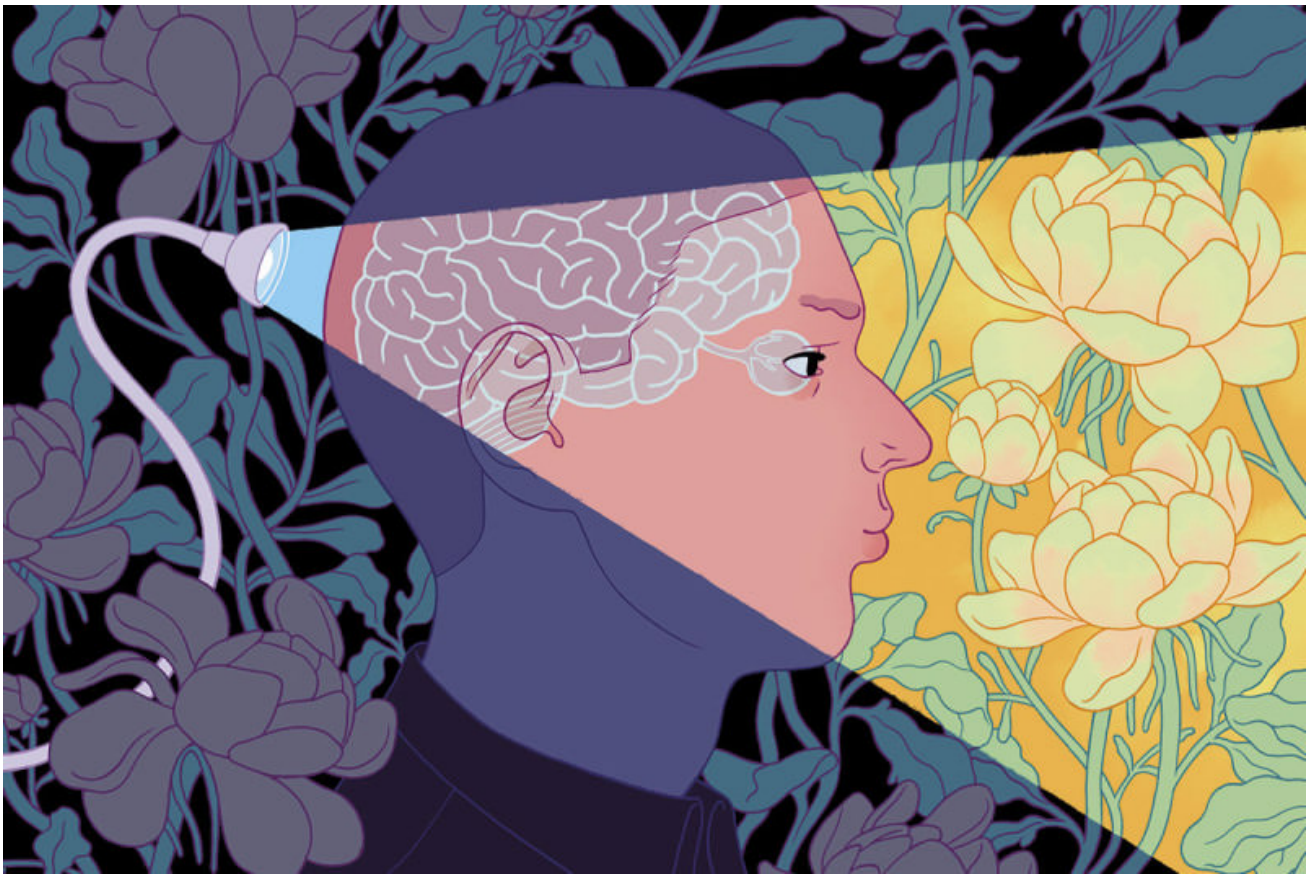
FEATURE 22 June 2016

Fixed by light: Flick a switch to banish pain and blindness

Parkinson's, blindness, chronic pain and more could all be cured using optogenetics – a revolutionary therapy that has just begun its first trial in humans



Scientific world is alight
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By **Teal Burrell**

ED BOYDEN was a graduate student at Stanford University when he sparked a revolution. It was August 2004, 1 o'clock in the morning, and he was still in the lab, peering down a microscope at a single nerve cell. Curious to see how it would react, he flashed a blue light at it. Instantly, it fired. It was a defining moment, the birth of a technique that would revolutionise the study of brains and behaviour.

You may have heard of optogenetics. It's a procedure that makes neurons sensitive to light, enabling researchers to turn them on or off at the flick of a switch. Karl Deisseroth, who pioneered optogenetics with Boyden, gave an early demonstration of its power when he flashed a blue light on a mouse's brain – the right motor cortex to be precise – and found that the animal ran in circles, anticlockwise. When he turned off the light, it stopped.

Fast forward to February this year, and the revolution is upon us. In the first trial of its kind, doctors injected DNA from light-sensitive algae into a blind woman's eye in an attempt to restore her vision. This is the first time optogenetics has been tried in humans. It surely won't be the last. There are already other medical applications in the pipeline, including plans to alleviate chronic pain, nurse diseased brains back to health, and possibly even treat cancer – all at the flick of a switch. Boyden and Deisseroth's discovery is set to come out of the lab and into our lives.

Even without these developments, optogenetics has set