

[PIANO PLAYING]

ERIC J. NESTLER: It's impossible to overstate the impact that depression has on humanity.

JAMES MURROUGH: Of course, we think of the brain as being important in depression or a psychotic source. It turns out it's a whole body disorder.

ERIC J. NESTLER: One of the challenges in understanding what is causing an individual's depression is that it could be caused by very different things. The challenge we have at Mount Sinai is to understand those differences so we can design personalized treatments.

HELEN S. MAYBERG: I study depression through the lens of neurology, and the way I've done that is to basically use imaging as a way to really look at what's wrong in the brain when people are depressed. Cells communicate with each other in organized ways, and those are the fundamental building blocks of brain circuits. When we look at brain scans we can literally see the imbalance in the brain.

Think about an orchestra where they're not quite playing together. In essence you are finding where in the orchestra someone's out of tune. So what we can do now is insert a device, like a pacemaker, that rebalances the malfunctioning circuits.

JAMES MURROUGH: For some patients with depression, there are signs their immune system is in overdrive. So really looking at the immune system is a first step towards trying to differentiate subtypes of depressed patients in order to get them better faster. So drug development for depression has been a major challenge in the field. Essentially the medicines we have to treat depression are the same ones we had 40, 50 years ago-- the medicines that were first discovered by accident.

ERIC J. NESTLER: Our scientists have shown that a single dose of ketamine, developed in large part here at Mount Sinai, has led some people who've been desperately depressed for years to be cured. By working on different receptors than traditional antidepressants, it lifts that depression within a day.

HELEN S. MAYBERG: When you're in the right place and you hit the current the right way, the patients will describe it as though it lifts off of them and immediately is associated by feeling connected to us in the room to feeling like doing something.

ERIC J. NESTLER: Our goal, simply put, is to conquer depression by understanding its biology and developing treatments that reverse it. The FDA's recent approval of ketamine represents a major success. And in five years, we expect to have a range of new treatments available targeting people with different forms of depression that work effectively specifically for them.

HELEN S. MAYBERG: If you've been sick five years being disabled, staying home, being in bed-- pretty much not working-- what would you do if you suddenly could?

[MUSIC PLAYING]