ADVANCES

Dispatches from the frontiers of science, technology and medicine

Neurons derived from a patient with schizophrenia.

NEUROSCIENCE

Mental Illness in a Dish

A new technique offers scientists an unprecedented window into complex psychiatric disorders

No organ in the human body is as resistant to study as the brain. Whereas researchers can examine living cells from the liver, lung and heart, taking a biopsy of the brain is, for many reasons, more problematic.

The inability to watch living human brain cells in action has hampered scientists in their efforts to understand psychiatric disorders. But researchers have identified a promising new approach that may revolutionize the study and treatment of conditions such as schizophrenia, autism and bipolar disorder. A team led by researchers at the Salk Institute for Biological Studies in La Jolla, Calif., took skin cells from a patient with schizophrenia, turned them into adult stem cells and then grew those stem cells into neurons. The resulting tangle of brain cells gave neuroscientists their first real-time glimpse of human schizophrenia at the cellular level. Another team, from Stanford University, converted human skin cells directly into neurons without first stopping at the stem cell stage, potentially making the process more efficient. The groups published their results recently in *Nature* (*Scientific American* is part of Nature Publishing Group).

Scientists have used the disease-in-a-dish strategy to gain insight into sickle-cell anemia and heart arrhythmias. But the Salk team, led by neuroscientist Fred H. Gage, is the first to apply the approach to a genetically complex neuropsychiatric disorder. The group found that neurons derived from patients with schizophrenia formed fewer connections with one another than those derived from healthy patients; they also linked the deficit to the altered expression of nearly 600 genes, four times as many as had been previously implicated. The approach may eventually improve therapy, allowing psychiatrists to screen a variety of drugs to find the one that would be most effective for each patient, Gage says.

Whereas the research is still preliminary, many neuroscientists are excited by it. "This study opens up a whole new area of work," says Daniel Weinberger, director of the Genes, Cognition and Psychosis Program at the National Institute of Mental Health. It is unclear what answers the stem cells approach can provide, but by making the inaccessible accessible, it opens up questions that until now could not have been asked. —*Tim Requarth*

"MODELING SCHIZOPHRENIA USING HUMAN INDUCED PLURIPOTENT STEM CELLS," BY KRISTEN J. BRENNAND ET AL., IN *NATURE*, VOL. 473; MAY 12, 2011

FURTHER READINGS AND CITATIONS ScientificAmerican.com/aug2011/advances