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Israeli researchers find new way of diagnosing schizophrenia

Test works by examining nerve cells from the nose that are part of the system responsible for our sense of smell.

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Researchers from Tel Aviv University have developed a way to diagnose schizophrenia by examining nerve cells from the nose.

Schizophrenia, the leading reason for admission to psychiatric hospitals, is currently diagnosed subjectively, using clinical observation and medical questionnaires that evaluate the patient's functioning. The medical community has long sought a biological marker that would offer a more accurate diagnosis.

The Israeli researchers said they have found a quick way to arrive at an early diagnosis by examining nerve cells from the nose that are part of the system responsible for our sense of smell.

"The olfactory system consists of nerve cells that are located in the inside top of the nose, which are the only nerve cells that can be removed from a healthy person without killing him," explained Dr. Noam Shomron, director of the Functional Genomics Laboratory at Tel Aviv University's Faculty of Medicine, who led the research team. "We believe these cells are a window to understanding the activity of nerve cells in the brain."

The study included 25 schizophrenics hospitalized at Johns Hopkins University Medical Center in Baltimore, which was a partner in the study, plus 25 healthy subjects. The nerve cells were swabbed from the subjects' noses under local anesthesia. The researchers then screened the 2,000 genetic controls contained within these cells, using a method called high-output genetic mapping.

Genetic controls, called MicroRNAs, are the small molecules in the cell responsible for the cell's epigenetics, or genetic expression. Previous studies have found that these genetic controls play an important role in the development of various diseases, including diabetes and cancer.

The TAU study identified three specific genetic controls that were faulty in the schizophrenia patients. Two of these "turned on" genes that are meant to remain "turned off." The third and most significant control, named MicroRNA 382, led to the shutting down of genes that remain "on" in healthy people, and that previous research had already shown to be connected to schizophrenia. According to Shomron, these three controls constitute "the epigenetic signature of schizophrenics."

The signature of schizophrenia

Shomron was assisted in the research by doctoral student Eyal Mor and Prof. Ruth Navon of TAU's Faculty of Medicine, along with Prof. Akira Sawa, a professor of psychiatry and behavioral sciences at Johns Hopkins. The findings were recently published in the journal "Neurobiology of Disease" and will be presented on Tuesday at the 14th International Congress on Schizophrenic Research in Orlando.

Schizophrenia is a psychiatric disturbance that manifests itself in a number of ways, including hallucinations, delusions, speech disorders and cognitive disruption. In Western countries, the disease affects an estimated one percent of the adult population. A May 2007 study conducted in Israel among candidates for military service found that 0.2% were schizophrenic.

Until now, biological signs of schizophrenia could only be found in nerve cells in the brain that couldn't be examined in live patients, but only during autopsies. The new research paves the way for a medical test that provides objective evidence of the condition. The researchers have already started searching for a company to produce a test based on their discovery.

"Next it is important to determine whether the detected change in the controls occurs before the symptoms of schizophrenia appear, or only after the development of the disease," Shomron said. "If it turns out the change appears in the early stages, even before the onset of the disease, this would allow early therapeutic intervention that could delay the onset of symptoms and prevent a great deal of suffering to the patient and his family."