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**\*\*UTHSCD researchers look at brain blood flow and mental illness.**

DALLAS--Researchers at The University of Texas Health Science Center at Dallas have found abnormal patterns of blood flow in certain brain regions of some patients with schizophrenia and depression.

The brain blood flow work is being done by Dr. Frederick Bonte, professor of Radiology, in collaboration with Dr. John Rush, Betty Jo Hay Professor of Psychiatry. Rush directs the school's Affective Disorders Unit, and Bonte heads up its Nuclear Medicine Center. Reports on this research have been made recently at meetings of the Society of Nuclear Medicine, the Society of Biological Psychiatry and the American College of Neuropsychopharmacology.

Over 150 patients with a variety of psychiatric illnesses have been studied in research that established definite aberrant patterns of brain blood flow in particular areas. Different patterns were associated with different illnesses in the findings.

More than 100 patients with manic depression, a condition in which patients often experience wide mood swings that may range from a deeply depressed state to one of extreme elation, and clinically depressed patients were studied. These psychiatric illnesses are classified by physicians as "affective", or mood, disorders. Over 50 subjects with schizophrenia were studied, as well as other patients with disorders such as phobias and multiple personalities. Comparative studies were done on approximately 100 normals.

Of the schizophrenia patients, researchers found that those with a paranoid condition showed the greatest aberration in blood flow. The test showed that over one-half of the paranoid schizophrenics exhibited a definite reduction in blood flow to both left and right frontal lobes while only one-fifth of the other schizophrenics registered low flow in these areas. Working on this project were Dr. Joachim Raese, assistant professor of Psychiatry; Dr. Roderick Gregory, assistant clinical professor of Psychiatry; and Dr. Ronald Paulman, clinical psychologist.

The frontal lobes, says Rush, are associated with abstraction and reasoning. "It is with the frontal lobe that we deal with logical sequencing, creativity and abstract ideas. These are areas we speak of as having a 'high cortical function.'

"For example, bill paying may be a problem. This activity requires a lot of steps. Persons with frontal lobe disease will get these steps out of order and get confused. Then they can't complete the task."

Patients with endogenous depression showed an overall reduction in blood flow in the right temporal parietal region, an area along the major temporal bone. Endogenous depression, Rush explains, may be thought of as "biological depression." "At least biological abnormalities are frequently found in that group. There may be external stressors, but when an endogenous depression gets started, it seems to have a life of its own." Because patients

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with endogenous depression tend to exhibit such symptoms as diminished capacity for pleasure, sex drive and appetite, as well as sleep problems, it is suspected that the condition is connected with the limbic system of the brain that controls emotion.

Subjects were either inpatients or outpatients from the Affective Disorders Unit. The patient population included both males and females from 18 to 70 years of age whose conditions were established on the appropriate psychiatric tests. Persons with a history of major medical illnesses were excluded. The studies looked at the brain blood flow before, and in some patients, after. Patients were drug-free and were age-matched to normal controls as closely as possible.

Making this look at the functional anatomy possible is the single photon dynamic computer assisted tomographic scanner in the Nuclear Medicine Center, a device that borrows the technology developed for the popular CAT scanner along with xenon, a radioactive gas that is inhaled as a tracer.

The scan measures the amount of blood in all parts of the brain and displays it in cross-section images on a television screen. The computer images are color-coded from no blood flow, which is indicated in dark blue, to a very high rate of flow, represented by white. This technology makes it possible to check function by representing a thick "slice" of the brain tissue, says Bonte.

The UTHSCD machine, purchased in 1981, was the second of its kind in use at that time, the first being developed in Copenhagen. Working with scientists on the original project was Dr. Ernest Stokley, associate professor of Radiology and second-in-command at the Nuclear Medicine Center. At that time Stokely, a biomedical engineer, was on a career development leave to work on the project.

Both Bonte and Rush are quick to point out that their findings are far from diagnostic. In fact, "indicator," they believe is too strong a word.

"These blood flow patterns cannot be used as an indicator of mental illness because many factors can change blood flow, and many diseases may have the same blood flow pattern. They are merely bringing us new clinical information that certain things aren't functioning normally," says Bonte. However, they view this information as an important new piece in understanding the neuroanatomy of psychiatric disorders.

"It's not just in your mind; it's in your brain," jokes Rush.

The researchers say that information from the tomographic scan-generated pictures could be used to tell a neuropathologist where to look in the brain. They can be used in mapping neurotransmitter capabilities and perhaps in the future give information that will help in selecting drugs and the sites where they could be given for particular disorders. Bonte likes to speak of the results of the study as adding "another frame of reference" to information about persons suffering from schizophrenia and depression. "It gives us a broad-brush look," says Rush about the team's continuing studies.

Also working on the mental illness project were Dr. Michael Schlessner, assistant professor of Psychiatry; Dr. Donna Giles, research assistant professor of Psychiatry; Dr. Carl Fulton, research assistant professor of Psychiatry; Dr. Michael Devous, assistant professor of Radiology; Stokely, Raese, Paulman and Gregory.

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