

PET projects with psychiatric drugs

Positron emission tomography (PET) scanning, which provides color-coded pictures of brain activity, is showing promise as a technique to investigate the action of drugs used to treat mental disorders, said psychiatrist Monte S. Buchsbaum at an Alcohol, Drug Abuse and Mental Health Administration press seminar last week in Washington, D.C.

Buchsbaum, of the University of California at Irvine, and his colleagues use PET scans to track glucose metabolism in the brain. They recently found that giving an anti-anxiety drug to a small group of subjects with persistent anxiety "turned down" metabolism in the visual centers at the rear of the brain.

This did not occur when an inactive substance was substituted for the drug. Further use of PET, he suggests, may help to put in focus the role of vision in anxiety.

In a preliminary study with depressed patients, says Buchsbaum, activity in part of the frontal lobes of the brain was "turned up" after the use of antidepressant drugs. Since this region is involved in planning behavior, he notes, antidepressants may have a stronger effect on the ability to concentrate and organize thoughts than on depressed mood.

Furthermore, reports Buchsbaum, PET scans of nine schizophrenic patients given antipsychotic drugs show metabolism enhanced in the basal ganglia, an area deep in the brain also linked to Parkinson's disease.

Although studies of drug activity in the brain are just beginning, Buchsbaum says PET may eventually help clinicians to monitor the effectiveness of drug treatment and identify which patients will respond to which drugs. Still, there are drawbacks to the technique: A single PET scan session costs \$5,000 and the entire process takes about 8 hours to complete.

Two faces of epilepsy

As far back as 1817, physicians reported isolated cases of dual personalities in individuals undergoing periodic epileptic seizures. There have been a couple of recent reports of an unexpectedly high rate of multiple-personality disorders among patients at a seizure clinic in Boston, but for the most part, this condition is thought to arise from psychological conflict and trauma, such as that produced by child abuse.

Seizures, however, are more commonly implicated in cases of multiple personality than is often assumed, say neurologist D. Frank Benson of the University of California at Los Angeles and his co-workers. In the May *ARCHIVES OF NEUROLOGY*, they describe two epileptic patients displaying "Jekyll-Hyde" personality transformations.

The two young women, ages 22 and 19, were normally pleasant and close to family members. But one became belligerent, irritable, hostile and, at times, violent, if her seizures were eliminated for more than several weeks by anticonvulsant medication. The other underwent similar changes that lasted from a few hours to several days before a seizure occurred. In each instance, the "abnormal" personality denied the other personality's existence as well as any connection to other family members, who were considered imposters. In the "normal" state, the women expressed some knowledge of the other personality, but this knowledge was learned from family members rather than being truly remembered, say the researchers. Personality consistently shifted back to normal, they say, with the onset of a major seizure.

While these cases point to a link between epilepsy and some cases of dual personality, the underlying causes of the disorder are unknown. The limbic system of the brain, integral in the regulation of memory and emotion, may be chemically altered by the electrical buildup to a seizure, suggest the researchers. But most epileptics, they add, do not have dual-personality problems, even if their seizures involve the limbic system.

The causes of drought . . .

Scientists trying to understand what makes the land go dry in the African Sahel, a band of land stretching across the continent south of the Sahara, have been studying a variety of subjects ranging from agricultural practices to atmospheric weather patterns. Researchers have suggested that Sahelian droughts are linked to changes in the sea-surface temperatures (SSTs) in the tropical Atlantic Ocean (SN: 5/4/85, p. 282).

Now a group of scientists at the Meteorological Office in Bracknell, England, concludes in the April 17 *NATURE* that Sahelian rainfall patterns are related to SSTs on much larger — nearly global — scales. Working with an improved SST data set, C.K. Folland, T.N. Palmer and D.E. Parker found, for example, that the driest years and epochs in the Sahel tend to occur when both the Southern Hemisphere and the North Indian Ocean are warm. Similarly, they found, the wettest times in the Sahel are associated with cold temperatures in these areas. The influence of global SST patterns is supported by numerical experiments using a computer model of atmospheric circulation.

In another *NATURE* paper, soon to be published, Palmer uses this model to explore further the individual roles that SSTs in specific areas play in the development of drought. He concludes that while the Atlantic Ocean strongly affects the amount of rainfall over the western Sahel, SSTs in the Pacific also play an important part, and that the worldwide pattern of SSTs exerts a stronger influence on rainfall than do SSTs in any of the ocean regions alone. In the April 17 paper, Palmer and his co-workers say they don't discount the role of soil moisture and other changes in the Sahelian land surface in affecting rainfall, but they "do suggest that the worldwide SST anomalies may have a more fundamental influence on Sahel rainfall."

. . . and the dust drought causes

The large-scale winds that help to bring drought to Africa also take some of Africa away. Soil dust is swept from the parched land and is carried across the Atlantic to places such as Barbados, where Joseph M. Prospero and his co-workers have been monitoring the dust concentrations since 1965 (SN: 12/15/84, p. 376). In the April 24 *NATURE*, Prospero and Ruby T. Nees of the University of Miami (Fla.) present their most recent data to support the idea that this dust is a sensitive indicator of short-term meteorologic and climate change.

The researchers have noted in general a strong correlation between unusually high dust levels and periods of severe drought. For example, during the summers of 1983 and 1984, at a peak in the drought that began in the late 1960s, dust concentrations reached the highest levels on record, measuring four times that of predrought years. Prospero and Nees say the best correlations are between dust levels and rainfall averaged over the previous two to three years — an indication that soils became more vulnerable to erosion as drought conditions are prolonged. They also note that rainfall must not be the only factor influencing dust levels, since there are some years of normal rainfall and high dust concentrations.

Scientists continue to debate the specific causes of variations in dust levels. But what is clear from satellite imagery and other data is that dust outbreaks in West Africa have been particularly intense during the last few years. ". . . [T]o our knowledge," write the researchers, "the rate of transport of dust out of North Africa is unprecedented in recent times." Some studies have suggested that dust clouds block sunlight to a degree comparable to that envisioned for a "nuclear winter." Dust outbreaks in Africa and elsewhere, which are caused by changes in climate, are thought in turn to affect climate — perhaps, as some have suggested, perpetuating the droughts that caused them.