Behavior

Childhood clues to schizophrenia

Schizophrenia, a severe mental disorder that afflicts about 1 in 100 people, usually emerges in late adolescence or young adulthood. Its symptoms run a frightening gamut that includes hearing the taunts of imaginary voices, becoming convinced that others control one's thoughts, losing the will to work or maintain relations with loved ones, and laughing or crying uncontrollably at inappropriate times.

In rare cases, children exhibit clear signs of schizophrenia. Two preliminary investigations of such youngsters, both published in the January AMERICAN JOURNAL OF PSYCHIATRY, suggest that childhood schizophrenia bears similarities to the adult version, but it stems from a more severe brain disruption. Moreover, continued research into the biological changes underlying childhood schizophrenia may help to identify subtler disturbances at work in adult victims of the disorder.

The first study, directed by Javad Alaghband-Rad, a psychiatrist at the National Institute of Mental Health (NIMH) in Bethesda, Md., finds that some of the most severe and intractable symptoms of schizophrenia—such as a deadening sense of apathy and social withdrawal—appear in the youngsters displaying the smallest brains, as measured by a brain-scanning device. A couple of prior studies uncovered the same pattern in adults with schizophrenia, "but our data show a more striking relationship," according to the researchers.

Small brain size may create a vulnerability to a number of mental disorders, which then combine with disturbances of brain development specific to schizophrenia, they propose. The study consisted of 29 volunteers age 10 to 19, all of whom had been diagnosed with schizophrenia before age 12.

In a second investigation by the same group, directed by NIMH psychiatrist Leslie K. Jacobsen, treatment with antipsychotic medications produced comparable improvement in 18 teenagers whose schizophrenia began in childhood and in 16 adults whose schizophrenia first appeared later in life. The course of treatment with each of the two drugs—haloperidol and clozapine—lasted for 6 weeks.

Brain chemistry remained largely unchanged for both the teens and adults after treatment. So the mechanism for the drugs' action remains unclear. —*B.B.*

Birth of the light

The brain's circadian pacemaker, which regulates daily biological rhythms, responds sensitively to light almost immediately after birth, at least in baboons, a new investigation finds. This result raises the possibility that the bright artificial lighting typical of hospital nurseries sometimes wreaks havoc with the biological rhythms of human babies, according to neurobiologist Scott A. Rivkees of Yale University School of Medicine and his colleagues.

Baboons display strong daily rhythms in their behavior and hormonal secretions, making them a good model for human circadian activity, the researchers state in the Jan. 7 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

Rivkees' group placed five newborn baboons in incubators and maintained them on regular 12-hour cycles of light and darkness for 2 days. Three animals who were then exposed to 45 minutes of bright light at night exhibited increased activity in the suprachiasmatic nucleus, a brain structure that generates circadian rhythms; they also displayed elevated concentrations of a protein manufactured by the suprachiasmatic nucleus.

Another four newborn baboons experienced either alternating light and dark periods or total darkness for several days after birth. During that time, the infants developed different cycles of activity and rest. Exposure to constant dim light then yielded large shifts in activity-rest cycles, indicating a resetting of the infants' biological clocks. —*B.B.*

Chemistry

Old cholesterol paints picture of diet

A skeleton buried for hundreds of years still carries the legacy of a person's diet, giving new meaning to the adage "you are what you eat." Capitalizing on this wisdom, Richard P. Evershed and Andrew W. Stott, chemists at the University of Bristol in England, have developed a technique for analyzing cholesterol from bones and teeth found in archaeological digs. These traces can tell what individuals ate and even how their diets changed with the seasons.

Their findings appear in the Dec. 15 ANALYTICAL CHEMISTRY.

The researchers tested their method on skeletons recovered during archaeological work at a cemetery in Barton-on-Humber, a community on the coast of England. The dates of the graves range from the 9th to the 18th century. Evershed and Stott took bone samples from 50 skeletons, crushed them into a powder, chemically extracted the cholesterol, and determined its ratio of carbon-13 and carbon-12 isotopes.

From those ratios, the researchers could tell that most of the people ate seafood rather than land animals—not surprising for residents of a coastal community. Seafood generally has more carbon-13 than meat does.

Dietary information from cholesterol complements that provided by other molecules, such as collagen, says Evershed. Collagen takes years to build up in bone, whereas cholesterol turnover occurs every few months. It could therefore provide "a closer snapshot of diet" than collagen, enabling researchers to correlate food preferences with the time of year when a person died. Also, collagen reveals primarily the amino acids ingested, whereas cholesterol reflects a broader food intake, including carbohydrates. "We're seeing a different part of the diet with cholesterol," Evershed says.

Examining cholesterol rather than collagen has two clear advantages. Evershed and Stott have demonstrated that cholesterol comes from bone, not from contamination by soil-borne bacteria. Furthermore, less material is needed to do a cholesterol analysis; only about 50 billionths of a gram gives reliable carbon isotope ratios. —*C.W.*

Bacterial factories for smell receptors

Scientists think that an animal's complex sense of smell is based on the activities of thousands of individual receptors, each responsible for detecting a particular odor and relaying that information to a specific area of the brain. Studies of genes that code for these receptors have boosted this theory.

Yet despite "a lot of very compelling inferential evidence, there has not been a demonstration that one of these molecules actually is an odor receptor," says Glenn R. Prestwich of the University of Utah in Salt Lake City (SN: 8/4/90, p. 79). Now, he and his colleagues at Stockholm University and the University of Hohenheim in Stuttgart, Germany, report in the Dec. 17 BIOCHEMISTRY that they've found a smell receptor that matches a specific odor.

The researchers inserted a gene from rats into bacteria that have the potential to produce the rat receptor in abundance. The receptor interfered with the bacteria's growth, however, so Prestwich and his colleagues had to create a slightly modified form of the receptor that the bacteria could synthesize in large quantities without ill effect.

Then, by methodically testing various smells, the researchers found two molecules, called lilial and lyral, that bound well to the receptor. Prestwich describes each of the compounds as having "sort of a floral odor."

The next step will be to determine which part of the receptor the odor molecules bind to, a search made easier now that bacteria can make as much receptor as the researchers need. The technique should also enable scientists to make a class of similar receptors in large amounts. —*C.W.*