

Wray Herbert reports from the Adolf Meyer neuroscience seminar at the Johns Hopkins Medical Institutions in Baltimore, Md.

Senility: Sitting on a time bomb

Alzheimer's disease — a degenerative brain disorder that causes senility — has been known to run in families, but researchers have remained uncertain about how, indeed if, Alzheimer's is transmitted from generation to generation. Population studies are difficult because the signs of the disease typically don't appear until people reach 80 years of age; as a result many people presumably destined for senility die before the disorder ever unfolds. Two Johns Hopkins psychiatrists have now completed an analysis of family histories of patients with Alzheimer's disease. Their results suggest that the disease is heritable and that the genetic makeup for Alzheimer's is much more prevalent in the population than ever realized: Siblings and children of an Alzheimer victim have a 50-50 chance of becoming senile, too — if they live into their nineties — while other 90-year-olds, according to the scientists, have only a one-in-ten chance of becoming senile. The research indicates, furthermore, that the most reliable indicator of familial Alzheimer's disease is a breakdown in linguistic ability — presumably related to an inherited brain defect.

John C. S. Breitner and Marshal F. Folstein examined the living relatives and the family histories — taken from a healthy relative — of 54 Alzheimer patients, some of whom had developed language deficits and some of whom had not. They found that the patients with language disorders were much more likely to have living senile relatives: 11 percent (compared with 1 percent) of their relatives over 65 years of age were already showing signs of senility. But the more striking finding came when Breitner and Folstein compared the projected prevalence rate for the two groups: The relatives of the language-disordered patients had an overall lifetime risk for dementia of over 50 percent; the senile patients without language deficits showed no more family risk than did elderly, but non-demented, controls. Linguistic breakdown, Breitner concludes, is a marker for a highly heritable brand of senility. "We're seeing the tip of the iceberg," he says. "As the population ages and more and more people survive into their eighties, we're going to see a higher prevalence rate for dementia. We're sitting on a time bomb."

Curbing sexual appetite

Deviant sexual behaviors such as pedophilia and exhibitionism may result from abnormal hormonal activity in the brain, according to two Johns Hopkins scientists who report that they have successfully treated sex offenders with a "sexual appetite depressant." Fred S. Berlin and John Money say that they have identified a cluster of biological abnormalities in the sex offenders who have for more than a decade been referred to their clinic — findings, they say, that call into question the idea that early life experiences alone lead to deviancy in adulthood. Although they have no theory about just how the brain abnormalities trigger unconventional sexual behavior, they say that their 20 subjects have unusual brain scans (showing cortical atrophy), unusual electrical activity and significantly elevated levels of testosterone (a male sex hormone) and pituitary hormones. In addition, Berlin says, the majority of his patients have now been successfully treated with a drug, called Depo Provera, that lowers the level of testosterone in the blood. Unlike castration — another treatment used on sex offenders — Depo Provera lowers testosterone by acting directly on the brain, where it also mimics testosterone, preventing an elevation of pituitary hormones. The effect on behavior, Berlin says, is to depress what seems to be an overwhelming sexual appetite in these exclusively male patients. The drug does not make the men impotent, but with diminished sexual drive the men report being able to make deliberate choices about sex; although their sexual preoccupations do not change, 17 of the 20 patients have foregone illegal sexual behaviors, in one case for 15 years.

NASA seeks 'fresh' space station ideas

The potential for scientific research aboard a manned U.S. space station is being studied by a number of advisory groups both inside and outside the National Aeronautics and Space Administration, and is at least a factor in NASA-funded space-station design studies underway. Now the agency has instituted a small program to find out whether promising ideas may also exist among researchers who are less-established members of the space science community.

Using funds from NASA's Office of Space Flight (so that they do not come out of the impoverished budget for research and data-analysis), the Office of Space Science and Applications is preparing to consider unsolicited proposals "outlining ideas for the possible utilization of a space station." NASA hopes that contributions will be forthcoming "from the individuals who have not had the opportunity to effectively develop and present their ideas through the traditional advisory channels." The plan is to fund perhaps 10 to 20 of the ideas, at about \$16,000 each, for study during the first half of 1983. NASA would like to hear from postdoctoral researchers, scientists newly employed by industry, and those working for government agencies (including parts of NASA) whose usual activities may have no connection with space stations at all. "NASA's traditional constituency of science, applications and technology experts have been and will continue to be consulted," says Burton Edelson, associate administrator for Space Science and Applications. The point here is to see if people outside the usual space-program "loop" have something to add as well.

Interested researchers should send 1-to-2-page outlines of their proposals (together with curriculum vitae) to Dr. Stephen S. Holt, Code MFA-13, NASA Headquarters, Washington, D.C. 20546. The selections are expected to be made by late December or early January, for funding through the end of June.

Europa: Signs of a plasma torus?

One of the dramatic features of Io, innermost of Jupiter's four major moons, is the vast doughnut, or torus, of electromagnetic plasma along the satellite's orbit. Now two California researchers have reported what they call the "first evidence" of a plasma torus associated with Europa, the next moon out.

Nothing in the data from the two Voyager spacecraft that flew through the Jovian system in 1979 has yet been interpreted as evidence for a European torus, according to Devri S. Intriligator and W.D. Miller of the Carmel Research Center in Santa Monica; indeed, they note in the Oct. 1 *JOURNAL OF GEOPHYSICAL RESEARCH*, one research group has recently concluded that Europa cannot be a significant plasma source in the Jovian magnetosphere. Intriligator and Miller, however, draw their evidence from the 1973 flyby by Pioneer 10, the first spacecraft ever to visit the giant planet.

The plasma from Io extends well beyond Europa, but the scientists report that one of Pioneer 10's instruments showed an increase in the plasma density at Europa's orbit, as though Europa itself was making a contribution. If so, they propose, and if such a plasma had little turbulence and were flowing out relatively slowly, it ought to accumulate in a continuous, tight spiral, whose coils would be penetrated successively by a passing spacecraft. The Pioneer 10 data seem to represent just such a progression, the authors maintain, as though the plasma streams from Europa present an obstacle to those coming outward from Io, which bunch up as they decelerate.

The net speed of the outflowing plasma is calculated to be about 0.37 kilometers per second from the Pioneer 10 data, but an analysis by the same researchers of Voyager 2's measurements from six years later suggests a nearly three-fold increase in speed, consistent with other signs that the Jovian magnetosphere had changed between flybys.