MANIC-DEPRESSIVE

Genetic link in mental illness

Depressive illness is the most widespread mental disorder—two or three persons out of every hundred in the world live in its gloomy shadow for so long or so deeply that they can be classified as mentally ill.

They are marked by bouts with fatigue, thoughts of death or a black future, loss of interest in their daily lives, inactivity, inability to concentrate.

The causes of the malady are not known for sure. Neither are the causes of schizophrenia, the other major category of mental illness, that afflicts one percent of the world's people.

For both conditions, there is some evidence of inheritance. But while research on schizophrenia remains confusing and contradictory, some cases of depressive illness now look like a condition passed on to the patients by their mothers.

Investigators at Washington University School of Medicine in St. Louis have found strong evidence that at least one mood disorder, in which hyper-excitability or mania and depression both occur, is linked to the female sex chromosome, and may be caused by one or perhaps two defective genes.

Many doctors treating the conditions note that mood and energy levels seem to run in families. Some families are consistently elevated; others consistently low; both have occasional cycles in the other direction.

"If one family member is depressed, you often find depression a common pattern in the family," says Dr. Nathan Kline, of Rockland State Hospital in New York.

Moreover, drugs readily affect mood level, indicating that levels of depression and excitability are rooted in the individual's inherited biochemical makeup.

Until now, physicians have been unable to separate the various forms of depressive illness in any meaningful way. To explain this failure, some authorities have theorized that all people fall at some place on a kind of sadness-happiness scale, which is determined by many genes.

While the majority of people fall in the middle of the curve, with moderate cycles of elevated and depressed moods, depressives and manic-depressives would swing out at the extreme ends.

The St. Louis evidence attacks this theory on several grounds. It points to a single gene for manic-depressive illness: one that is defective.

The investigators first isolated manic depressives from a group of 426 depressed patients. If the patient had a parent or child who was also sick, he was placed in one group; if not, he went into a second. About one sixth, 59 patients, came from families with two generations involved.

Fremont Davis

Depression: some may be inherited.

Mania was common in this group but almost non-existent in the other much larger group of depressed patients whose parents or children were not sick. This suggests that manic-depressive illness is passed from one generation to another and occurs in 0.5 percent of the population.

Probing further, the researchers found that an ill father almost never had an ill son. Only one sick father-son pair turned up. But mothers passed the illness to both sons and daughters. More than twice as many mothers as fathers were ill. The evidence favors a X (female) linked gene of the dominant type. ◇

ASTROPHYSICS

Distance to pulsar measured

The first direct measurement of the distance to one of the 12 pulsars, pulsing radio sources that puzzle astronomers, has been made by four British scientists.

They find it is at least 30 times more distant than had been postulated when discovery of the first four of the objects was announced (SN: 3/16/68, p. 255). The pulsar CP 0328 radiates from more than 13,692 light years from earth, their observations show.

The new measurement sets only a lower limit on the distance. When combined with the sub-pulse structure reported by Drs. Frank Drake and Harold D. Craft, Jr. (SN: 10/12/68, p. 363), however, the new distance raises more problems for theoreticians, who are already having difficulties explaining the energy source of pulsars, as well as the regularity of their outbursts, which come about once every second.

One result of establishing a minimum distance is that it can be used to set an upper limit to the average density of electrons along the line of sight to the pulsar. This is no more than one electron in each 6,000 cubic centimeters, a factor of 17 less than used in previous estimates of the distance of pulsars.

This finding, in turn, implies that the distances to all pulsars have been badly understated, since they had been estimated from the old electron density figure. Compared with the thickness of the Milky Way galaxy, the pulsars' distances are large, and they could well be outside the main body of the galactic disk, which is some 10,000 light years deep and some 100,000 light years across.

The distance to CP 0328 was found by what is now called the classical 21 centimeter technique, although it is less than 20 years old. The British scientists tuned in on the 21 centimeter radio radiation from the pulsar, then measured the absorption caused by neutral hydrogen in the line of sight.

The frequency of this absorption indicates the velocity of the hydrogen. This indicates its distance, since the whirling spiral arms of the galaxy move at different speeds depending on how far out they are.

The British astronomers found that radio waves from CP 0328 clearly show both the spiral arm of the Milky Way in which the sun is located and the Perseus arm, as well as a suggestion of absorption from the third, or outer, arm. There is no evidence for a cut-off in the absorption at any frequency, as would be expected if the pulsar were within either the local or Perseus arms of the galaxy.

The source, therefore, has to be at least 13,692 light years away. If the possible absorption in the outer arm is correct, then it would be more than 19,560 light years away.

The measurement of the distance to pulsar CP 0328 was made by Dr. J. E. B. Ponsonby and co-workers of the University of Manchester's Jodrell Bank facility.

Their report appears in the Oct. 12 NATURE.

The discovery was something of a triumph for Drs. H. J. Habing and S. R. Pottasch of the University of Gröningen's Kapteyn Astronomical Laboratory, who had previously suggested, in the Sept. 14 NATURE, that pulsars, instead of being at distances of 300 light years or less, could well be at least 10 times farther away. This suggestion was based on estimates of how many electrons are spawned by low energy cosmic rays in the solar vicinity. Drs. Habing and Pottasch at that time urged observations of the 21 centimeter neutral hydrogen lines to measure pulsar distances.