Virus implicated in some diabetes

Several viruses have been suspected of being involved in juvenile-onset diabetes, but the evidence has been indirect. Now, in the May 24 NEW ENGLAND JOURNAL OF MEDICINE, scientists report the first clear indictment of a virus in causing the disease.

The diabetes-causing virus was isolated from the pancreas of a 10-year-old boy who had rapidly developed symptoms of diabetes and died after a week's hospitalization. The isolated virus was grown in laboratory cultures of mouse, monkey and human cells and then injected into mice. In genetically susceptible animals, the virus caused symptoms of diabetes. In patient and mice, the virus damaged insulin-producing beta cells of the pancreas.

Previous evidence for viral involvement in juvenile-onset diabetes includes a seasonal variation in its diagnosis, initiation of diabetes symptoms in animals by viruses and epidemiological observations. Investigators have reported that diabetes may follow many years after intrauterine exposure to rubella, months to years after mumps infection (SN: 2/4/78, p. 69) and weeks after infection with a virus called Coxsackievirus B4. The virus that Ji-Won Yoon and colleagues at the National Institutes of Health and National Naval Medical Center just isolated from the 10-year-old child is closely related to Coxsackievirus B4.

While the newly detected virus meets classical criteria for a disease agent, the scientists are not suggesting that it is the sole, or even a common, cause of juvenile-onset diabetes. Almost half the population has at one time or another been exposed to Coxsackievirus B4, while less than 1 in 1,000 individuals suffer from juvenile diabetes.

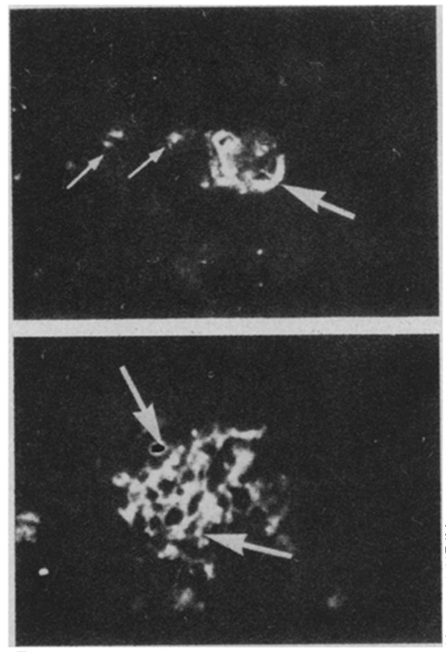
Genetics and immunity are two other influences that clearly play roles in the disease. "A genetically mediated defect in immunological response appears to be the major cause of diabetes," says Allan L. Drash of Children's Hospital of Pittsburgh in an editorial accompanying the research report.

Among humans, certain genetic characteristics of the immune system occur with increased frequency in patients with juvenile-onset diabetes. In addition, Yoon found that the virus isolated from the child caused diabetes among mice of one genetic type, but not among mice of several other strains. The researchers suggest that some mice and some people have on their beta cells receptors that allow those viruses to invade.

Evidence has also accumulated recently for juvenile-onset diabetes being an autoimmune disease. Antibodies to pancreas cells have been detected in the blood of patients (SN: 9/9/78, p. 182). "Autoimmunity, either alone or together with viral insult, is probably a more common mechanism," Drash says.

Juvenile diabetes may not be a single disease, but several diseases with different causes. Yoon and colleagues say the virus-initiated case they analyzed may be a rare exception or it may be a common situation. They point out that variants of the virus might produce a spectrum of disease ranging from a common subclinical infection with minimal damage to beta cells and no overt diabetes to an unusual case of severe damage and obvious diabetes. The relative importance of the viruses can now be examined by using antibodies to detect infection in patients with the disease and in a control group.

If the virus turns out to be a significant disease agent, some diabetes prevention may perhaps be provided by immunization with viral vaccines. The researchers suspect, however, that a variety of environmental factors, including viruses and chemicals, trigger diabetes in genetically predisposed persons. □



Yoon et al./NEJM

Fluorescent antibody lights up regions containing virus in brainstem of patient after autopsy (top) and in pancreas of a susceptible, infected mouse (bottom).

SS433: Gather ye data while ye may

The discovery of a celestial object that does unheard-of things tends to provoke astronomers all over the world to take a look at it and to see what they can find out for themselves and possibly add to the excitement. The object catalogued as SS433 does some of the most unheard-of things yet. It has spectral lines that move around the spectrum with time. They shift from the red end toward the blue and back with a period of about 160 days. If one accepts the model proposed by Bruce Margon of the University of California at Los Angeles (SN: 4/28/79, p. 277) these strange spectral changes represent a rotating neutron star spewing out two oppositely directed streams of ionized gas that move at a quarter the speed of light.

The periodicity that Margon reports gives other observers something specific to look for. They can also look for other data that Margon's model suggests should be there. Or they can look for contradictions if that suits them. They report their preliminary findings to each other by telephone, private telex messages and, most particularly, the postcard circulars issued for the International Astronomical Union by Brian G. Marsden of the Harvard-Smithsonian Center for Astrophysics.

The first thing to do is look at the record. Astronomy deals with the history of objects as well as their present state. Some of the astronomers who had originally alerted the world to the oddity of SS433, P.G. Martin of the University of Cambridge and P.G. Murdin and D.H. Clark of the Royal Greenwich Observatory, have reanalyzed the observations that they did with the Anglo-Australian Telescope in the summer of 1978 and report that evidence of the 160-day variability is there.

E. W. Gottlieb and William Liller of the Harvard-Smithsonian Center for Astrophysics studied the images of SS433 on plates in the Harvard archival collection. One can't find spectral lines this way, but it is possible to deduce color. They find that the object's blue magnitude tends to be periodic with a period about 161 days. That behavior goes back to 1929. Before that there was little evidence of periodicity. There is no explanation for the change.

Another thing to do is look for variations in nonvisible ranges of the spectrum or at other periods. I. S. Glass and B. S. Carter of the South African Astronomical Observatory report both an excess (that means more than you would expect to see from an ordinary star) and variability in the infrared. E. F. Milone and T. A. Clark of the University of Calgary found an infrared variability with a timescale of days using the 150-cm telescope on Mt. Lemmon in Arizona. On a nearby peak, Mt. Hopkins, J. McGraw, S. Starrfield, Roger Angel and N. Carleton used the newly dedicated Multiple Mirror Telescope to look for very short period variations. In period ranges between two seconds and 10 minutes they found none. They also found no evidence for the accretion disk of infalling matter that is expected to surround a neutron star if the neutron star is a member of a close binary system.

These are all rather raw reports. Reconciliations, revisions, and evaluations will all be done in future papers. □