several thymus hormones that can signal immune system cells. These factors, when injected into mice whose thymuses were surgically removed, stimulate immunity. Jean-François Bach and colleagues in Paris are studying the nine-amino acid circulating thymic factor, whose sequence they have determined. Chemical synthesis yields a compound as active as the natural product, and synthesis of more than 20 has helped locate the site of biological activity on one part (the carboxy terminal end) of the molecule.

Bach reports that he and co-workers have demonstrated that the factor is present in the normal thymus, but is absent from blood of animals lacking a thymus. The factor is also seen in human blood, but not in blood from patients with certain immune diseases, such as lupus and congenital immunodeficiency.

It is difficult to predict the action of treatments using this thymic factor, Bach says. The factor induces T lymphocytes, but those cells have diverse functions. Some stimulate the B cells to make antibodies, while others repress antibody formation.

Clinical trials have already begun on crude extracts containing several thymus hormones, and Bach reports that pharmocological and toxicological studies of the pure, synthesized circulating factor are in progress. He predicts that the first clinical trials of the pure factor will begin in a few months.

The expectation that thymic factors will play a role in the treatment not only of obvious deficiencies but of autoimmune disease as well is a "new and important concept," according to Bach. A condition where the immune system is overactive, attacking even cells of the body, may be caused by deficiencies of the T cells that repress antibody production. Thus, in some situations, restoring a deficiency should help restrain an immune system active beyond its normal control. □

Shuttle aimed for 9/28/79

Friday, Sept. 28, 1979, is the new official target date on which the National Aeronautics and Space Administration hopes to send the space shuttle into orbit for the first time. The date, announced to a House subcommittee this week by NASA associate administrator John Yardley, represents a six-month delay from earlier plans, due primarily to problems in tests with the shuttle's engines. Recent tests have been more successful, but about two-thirds of the required test-firing time has yet to be accumulated, and the target date could slip still further. As now set, however, it may still be in time to let astronauts from the second or third flight raise the orbit of the slowly descending Skylab, which has been maintaining its low-atmospheric-drag orientation of late in response to ground commands. □

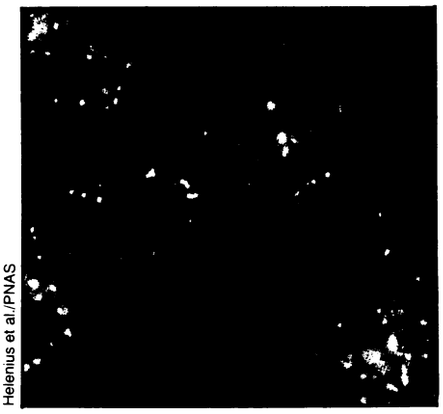
Histocompatibility antigens as double agents

Fascinating proteins called histocompatibility antigens are sprinkled over all human cells (except red blood cells). Each person has four varieties of these proteins — two inherited from each parent. Thus, each person's histocompatibility antigens are as individual as eye color or nose shape — which is why the antigens play a major role in organ transplant rejection. In other words, if an organ is transplanted into a patient, and antigens on the organ do not match those on the patient's cells, the patient's immune system views the transplanted organ as a foreign object and attempts to destroy it.

Now, histocompatibility antigens have been found to do something even more intriguing — they serve as handles for viruses to hook onto when they infect cells, according to Ari Helenius of the European Molecular Biology Laboratory in Heidelberg, Germany, and his colleagues in the August PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. Such a finding is ironical, to say the least, because while the antigens are helping keep certain alien objects, such as transplanted organs, out of the body, they are allowing other foreign objects — viruses — in. What's more, the discovery that histocompatibility antigens serve as a cell entry point for viruses provides the first characterization ever of an animal virus cell receptor (SN: 2/19/77, p. 120).

The research narrative that unfolds in PNAS includes as its principal characters histocompatibility antigens from both humans and mice and the Semliki Forest virus, a simple virus capable of infecting many different kinds of vertebrate cells. First, protein spikes from Semliki Forest viruses were shown to bind to the cells of interest (see illustration), suggesting that the spikes were attaching to certain receptors on the cells' membranes. Then, strong evidence was obtained suggesting that histocompatibility antigens on the cells were receptors for the virus. For instance, histocompatibility antigens taken from the cells were found to interact in solution with Semliki Forest viruses. Complexes between the viral protein spikes and histocompatibility antigens were isolated from cell surfaces. When coupled to an insoluble matrix, the viral protein spikes selectively bound to histocompatibility antigens in solution, although they had the option of binding to other cellular proteins as well. And so on.

Thus, histocompatibility antigens appear to be handles by which Semliki Forest viruses attach to host cells, the researchers conclude. But does a virus grab only a few antigens on a cell at first, then recruit more, since they're mobile? Or does it attach to only a few antigens? And once a virus hooks up with histocompatibility antigens, how does it slip into the cell? Finally, why are Semliki Forest viruses able to use histocompatibility antigens as ports of entry into host cells? Do the antigens have some special reason to accommodate them? Or have the viruses evolved some trick of exploiting the antigens? The latter hypothesis seems more likely, because histocompatibility antigens from different vertebrates are strikingly similar chemically, and the virus can infect cells from all of them. In other words, the virus has probably evolved some means of recognizing certain chemical sequences in many different histocompatibility antigens and thus latches onto these sequences. □



Helenius et al./PNAS

Viral protein spikes attached to cell surfaces, probably to cell receptors.

The 'schizophrenics' who aren't

Diagnosing schizophrenia is somewhat akin to investigating the properties of antimatter: Theoretically, the phenomenon exists and has a tremendous impact on its environment — but no one is quite sure of its exact nature. The immediate consequences of such vagueness in psychiatry — unlike physics — go far beyond theory. A person who is not schizophrenic, but who is diagnosed as such — and vice-versa — may receive inappropriate treatment, including administration of drugs, that could carry adverse effects for many years, or permanently.

Estimates abound on the "widespread" nature of psychiatric misdiagnosis (SN: 7/9/78, p. 28). Now, a comprehensive documentation of substantial overdiagnosis of schizophrenia in state hospitals has been reported in the August AMERICAN JOURNAL OF PSYCHIATRY.

Psychiatrists Michael Alan Taylor and Richard Abrams of the University of Health Sciences at the Chicago Medical School report a "five-fold overdiagnosis of schizophrenia" at a university psychiatric inpatient unit in a suburban-rural area in New

York State. In this study — and in several others performed in St. Louis and elsewhere, which were cited in the report — the researchers applied what they felt were more specific and appropriate criteria to schizophrenia. The criteria — along the lines of the "narrow," European view of schizophrenia — are "more rigorous and restrictive" than those found in DSM II, the current diagnostic bible used by the American Psychiatric Association, Taylor told SCIENCE NEWS. The criteria used in DSM II are "totally unreliable," he says. And the definition of schizophrenia found in DSM III — expected to be adopted next year — is an improvement, but still contains "inaccuracies," he says.

Taylor and Abrams developed research criteria from their own and other studies performed over the last six years. Their criteria for schizophrenia include:

- At least one of the following: Formal thought disorder (private words, stock words, non sequiturs, tangentiality and others); at least one "first rank" symptom (including hearing continuous voices, believing you are under alien control or thinking your thoughts are broadcast aloud from your head); emotional blunting (an inappropriate indifference for loved ones, lack of emotional responsivity and loss of social graces).
- Clear consciousness.
- No diagnosable affective disorder (such as depression or mania).
- No diagnosable brain disease or past use of hallucinogens or other drugs that might cause schizophrenia-like symptoms.

Taylor and Abrams, chairman and vice chairman, respectively, of the psychiatry department, evaluated 620 consecutive admissions (representing 425 individual patients) over a 22-month period ending in May 1976. Under their criteria, just 6.7 percent of the patients were diagnosed as schizophrenics; 34.4 percent had an affective disorder; 45.4 percent suffered from brain disease, alcoholism, drug abuse, personality disorder, neurosis, stress reaction or "no illness"; 13.6 percent were termed undiagnosed.

This and other research studies cited by the Chicago team contrast sharply with the accepted 24 to 40 percent national range of schizophrenia prevalence on admission (according to the National Institute of Mental Health). In addition, other studies using similar narrow criteria yield comparable results in schizophrenia prevalence in the general population and within families, Taylor and Abrams note.

The psychiatrists are quick to acknowledge that the discrepancies are a product of their change in diagnostic criteria rather than the actual prevalence of schizophrenia. But Taylor says there is "no question that almost any research criteria are better" than those found in DSM II and III. "Using these validated criteria we ... showed that many people labeled schizophrenic by nonresearch criteria had diagnosable affective disorder," say the researchers. They add that the results suggest "that the low figures recently reported [in their study] are an accurate reflection of the true prevalence of the condition.

"The diagnosis of schizophrenia is not merely a matter of style or personal preference," they say. "Patients who receive a diagnosis of schizophrenia when in fact they have another condition may be subjected erroneously and unnecessarily to chronic administration of neuroleptic drugs, with their high risk of permanent neurologic damage in the form of tardive dyskinesia (SN: 2/11/78, p. 85). Patients with bipolar affective disorder [manic depressive problems] who receive an incorrect diagnosis of schizophrenia may be deprived of appropriate treatment with lithium ion, the only available preventive agent for this form of illness.

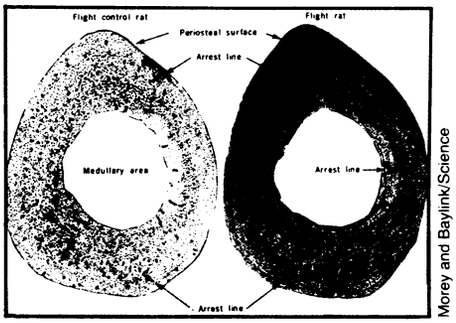
"The correct diagnosis of schizophrenia is also critical for research on the nature of the condition," say Abrams and Taylor. "It is generally acknowledged that many years of schizophrenia research have yielded virtually no hard data on the etiology of this condition. We believe this is due to a five-fold overdiagnosis of schizophrenia in the hospitals and clinics where the research was conducted."

At the same time, research in the biomedical field continues the search for physical markers of schizophrenia. In one of the latest findings — reported at the American Chemical Society meeting in Miami Beach — Rajendra Varma of Warren State Hospital in Pennsylvania reports that schizophrenics have significantly less glycosaminoglycan (GAGS) in their urine than "normal" persons with no schizophrenia diagnosis. GAGS is one of the mucoproteins that form a component of the brain-blood barrier and the neural receptor sites in the brain; GAGS is also distributed throughout the human body. The researchers suggest that an abnormally low amount of the substance found in the urine may indicate a chemical imbalance in the brain. □

APS remains tax exempt

The American Physical Society, publisher of PHYSICS TODAY and 39 scholarly journals, survived a challenge to its tax-exempt status. Last December, the Manhattan District Office of the Internal Revenue Service ruled that the APS was not strictly a scientific and educational organization because it also carried on professional service activities. The latter, reasoned IRS, should shift the organization into a "business league" and a different tax category (SN: 8/12/78, p. 103). But the APS protested, explaining that the activities IRS had questioned were also educational and scientific. IRS's regional office agreed; on September 8 it issued a report reversing the earlier ruling. □

Space flight: Rats feel it in their bones



Morey and Baylink/Science

Arrest of bone growth in space rats is indicated by longer arrest lines (right) than in rats left on the ground (left).

A 19-day space flight aboard Soviet biological satellite Cosmos 782 appears to have stopped bone growth temporarily in rats. The growth stoppage could be due to weightlessness and related changes in activity patterns, acting either directly or through changes in blood flow, nerve transmission or hormone levels. About three days after the flight, new bone again began to form.

Interest has focused on bone reaction to space flight since loss of bone mass during flight was detected among monkeys and astronauts. Metabolic studies showed an increased loss of calcium in the astronauts' urine (indicating breakdown of bone), similar to that observed during prolonged bed rest. However, in rats, which had not yet reached maximum size, no significant resorption of bone was observed. Instead, new bone simply was not built up.

Emily R. Morey of NASA Ames Research Center and David J. Baylink of the University of Washington compared bone growth in the space rats to that in ground control groups. One control group was placed in an identical spacecraft (on the ground) five days after the Cosmos 782 launch and exposed to acceleration, noise, shock and vibrations mimicking the experiences of rats aboard the craft in space.

The bone formation rate of the flight group was about 53 percent that of the controls, Morey and Baylink report in the Sept. 22 SCIENCE. The researchers believe that bone formation stopped completely at some time, because long arrest lines were evident in cross sections of the rat tibia (shin bone). Arrest lines, which occur when bone growth stops and then begins again, were longer in the flight group.

More recently, another group of rats went into space aboard the Cosmos 936 biological satellite. Preliminary analysis of their bones gives results almost identical to the earlier data. On the next biological satellite Morey and colleagues plan to send up rats that will mate during the flight and thus provide the first data on embryonic and early postnatal bone formation under space flight conditions. □