HEPATITIS

Reversing the plasma rules

Plasma is the cell-free, liquid part of blood. Whole plasma has had a controversial history since its introduction in World War II when it was used to revive and sustain the badly wounded. Subsequently hundreds of thousands of surplus units were distributed and used throughout the United States.

Pooling is the mixing together of large quantities of plasma from the blood of many individuals; it is widely practiced both for economy and because it is thought such mixing will neutralize dangerous antibodies. Pooling has been done commercially since the early 1950's, and large quantities have also been produced by local hospital and other blood banks.

There are estimates that more than 300,000 units of pooled plasma are administered in the U.S. each year, primarily in the treatment of the severely burned or the severely injured. It is sometimes given as a nutritional supplement and in the treatment of coagulation and immune deficiencies, but there is little hard evidence to support its value in such uses.

Long ago it was shown that the use of plasma from large pools carried an unacceptable risk of transmitting hepatitis, presumably because of the presence of an unidentified virus. A major program of research failed to provide a practical solution until a report in the late 1940's suggested that the prolonged storage of whole, pooled plasma at room temperature killed the virus.

Now, however, a National Research Council subcommittee, which has been studying reports of hepatitis transmission via pooled blood plasma over more than 20 years, has reversed a 1958 guideline. That assumed plasma's comparative safety if it is treated with ultraviolet radiation following storage in the liquid state for six months at 30-32 degrees C.

The NRC committee on plasma and plasma substitutes now decrees that the use of such plasma must be discouraged and even discontinued because of strong new evidence from a three-year study by Los Angeles researchers.

The March-April issue of the journal TRANSFUSION, published April 5, carries the committee's 1,600-word recommendation and the California research report by Dr. Allan G. Redeker and Carl E. Hopkins, with Barbara Jackson and Patricia Peck.

Dr. Redeker's study has cast serious doubts on the earlier assumptions, the NRC warns. His team used methods not available to earlier researchers, and since the study was controlled, in contrast to earlier ones, the committee says it is soundly based and carefully conducted.

"Because of the sizable resources, effort and time required for such studies," the committee emphasizes, "the possibility that Redeker's work will be repeated in other laboratories appears slight. Even if other studies were initiated now, years would pass before requisite data would be forthcoming. In the interim, Redeker's data appear convincing: combined treatment with ultraviolet irradiation and storage at 30-32 degrees C. for six months under closely controlled commercial supervision does not eliminate the risk of hepatitis."

Twelve of the 120 patients studied by Redeker's team at Los Angeles County Hospital contracted acute hepatitis after being given pooled whole plasma, whereas not a single case of hepatitis was noted among 46 patients receiving the control solution, which was five percent serum albumin.

MEMORY

Chemical transfer again

Several years ago a group of researchers performed now-classic experiments with planarians (SN: 3/19/66 p. 186). They taught one group of those flatworms to nagivate a simple maze. The worms then were chopped up and fed to untrained worms. The researchers claimed the naive planarians showed some degree of the learned behavior after their meal, indicating that memory of how to react to the maze was stored chemically in the first worms' bodies.

The hypothesis was that the worms synthesized a particular form of ribonucleic acid (RNA) whose molecular structure served as a codified memory of the maze and how to respond to it. Intense interest in the planarians' erudite diet faded after other workers were unable to reproduce the results (SN: 1/7/67 p. 9).

The chemical transfer work went on, however, with experiments using extracts of the brains of rats trained to run a maze. It was claimed that mice injected with these extracts received some degree of maze learning.

Scientists who believe that memory is primarily a function of the neural pathways in the brain, thus requiring an intact brain, scorned the chemical-memory theorists.

Since then the battle has raged back and forth. Some criticism of the memory-transfer work, much of which was done by Prof. Georges Ungar of Baylor University College of Medicine in Houston, was that Ungar and others had failed to perform experiments in biochemistry, concentrating instead on behavioral methods of proving their point. Prof. Ungar said only that he believes the active ingredient of the brain extract to be a polypeptide. All proteins are polypeptides, as are all amino acid chains.

Now Prof. Ungar and some coworkers at Baylor have published another paper, in the March 30 NATURE. Introducing the paper, they refer to earlier criticism:

"In most of these (earlier) experiments, transfer of information was suggested by varying degrees of statistical probability and it was challenged by negative results obtained in other laboratories.

"The experiments reported here are easily and rapidly reproduceable and yield unequivocal results which clearly demonstrate the possibility of a purely chemical transfer of some types of acquired information."

In the new experiments rats were trained away from their natural preference for dark spots. Both trained and untrained rat brain extract was then administered to naive mice. Recipients of trained extract show a much-decreased preference for dark places lasting about four days; then they return to normal. Recipients of untrained extract show no change. The observers involved were unaware of which mice had received trained and which untrained extract. No biochemical studies were done other than a determination of the effectiveness of various fractions of brain extract and methods for obtaining them.

"It's depressing," says one of the scientists who leans away from the chemical theory. "I thought it had all died down for good."

Those who weren't convinced before show few signs as yet of being convinced now. Dr. Harry Cohen of the Albert Einstein College of Medicine in New York, who with co-worker Dr. Samuel H. Barondes has studied the memory phenomenon, says supporting biochemical experiments still are needed. "These have not been done," he said, "and they are relatively simple." He says other control experiments, concerning for instance the transport of the extract to the recipient's brain, also are needed.

Dr. Cohen notes that more than a year ago one group of workers attempted to trace a radioisotopically labeled extract through the recipient's body and found that the material had a great deal of difficulty reaching the brain.

What remains to be seen is whether anyone will do Ungar's "easily reproduceable" experiment and get positive results, and whether anyone will be able to work out a more chemical basis for the chemical memory theory.