medical sciences

ENDOCRINOLOGY

Blood hormone isolated

The existence of erythropoietin, the hormone that stimulates formation of red blood cells, has been known for some time. In order for researchers to study and eventually synthesize it, the hormone must be in a pure state, but it is present in such minute traces that it has never been isolated.

Dr. Eugene Goldwasser of the University of Chicago and Charles Kung, senior scientist at the Atomic Energy Commission's Argonne Cancer Research Hospital, succeeded in separating the hormone from the blood of anemic sheep. Anemic sheep produce about 100 times more of the material than healthy sheep, but for some reason are unable to utilize it. Anemic humans also produce much erythropoietin, but excrete it in urine.

The achievement may eventually be of great benefit to kidney disease patients, since they do not produce the hormone and suffer severe anemia. The frequent transfusions these patients now require increase the risk of hepatitis. Unfortunately, Dr. Goldwasser estimates that cost of treatment, initially at least, would be very high, since the blood from 150 sheep produces only 200 millionths of a gram of erythropoietin.

VIROLOGY

Search for leukemia virus

More than 85 viruses are known to cause cancers in animals, but there is as yet no conclusive evidence of virus causes for leukemia or other human cancers. If scientists want to learn whether a certain virus causes cancer in an animal, they simply infect the animal with the virus and await results. This method obviously can't be used in research on human beings. Other, less direct methods are needed.

Scientists at the New York State Department of Health's cancer research center in Buffalo have found what they believe is a promising new approach in the search for a human leukemia virus.

Drs. Richard Steves, Audrey Fjelde and Edwin A. Mirand found that when human leukemic tissue and a mouse leukemia virus are administered to mice, the animals rapidly develop more numerous signs of leukemia than when the mouse virus is administered alone or with healthy human tissue.

Since earlier studies have shown this type of "helper" activity only when known animal leukemia viruses were added to the mouse virus, the scientists suggest that the human leukemic tissue may contain leukemia virus.

NUTRITION

Vitamin A deficiency and light

The folklore that eating certain vegetables helps you see at night is well-supported by scientific evidence. A deficiency of vitamin A results in a decline in rhodopsin, the photosensitive pigment in retinal rods that is important to night vision.

But this effect depends on one other factor. Dr. W. K. Noell, Dr. M. C. Delmelle and Renate Albrecht of the Neurosensory Laboratory of the State University of New York at Buffalo have found that the effects of vitamin A deficiency are critically dependent on exposure to light.

Rats fed a diet deficient in vitamin A and kept continuously in darkness maintained virtually normal rhodopsin content and normal electric potential in the retina after stimulation by light even after 23 weeks. Rats kept on a day-night 12-hour cycle of dim illumination and darkness, however, lost rhodopsin continuously, the researchers report in the April 2 SCIENCE.

The increase of rhodopsin in control animals kept in darkness suggests, the scientists say, that light environment plays a role not only in visual deficiency but also in the normal biology of visual cells.

CANCER

Antibiotic may inhibit growth

For some years it has been known that many cancer viruses have RNA instead of DNA as their genetic molecules. According to a recent theory, an enzyme present in the cancer virus translates RNA into DNA, which carries the information required to transform a normal cell into a cancer cell. Such an enzyme was discovered last spring.

Rifampicin, an antibiotic developed for use against tuberculosis, was found to operate by inhibiting an enzyme. Dr. Melvin Calvin, Nobel laureate at the University of California at Berkeley's Lawrence Radiation Laboratory reasoned that rifampicin might also inhibit the enzyme involved in virus-induced cancers.

Dr. Calvin, LRL colleague Dr. Urs R. Joss and Dr. Adeline J. Hackett and Robert B. Owens of the University's School of Public Health tested the effects of rifampicin and three of its derivatives on a strain of mouse cancer virus. On April 3, at an American Cancer Society seminar for science writers in Phoenix, they reported that a rifampicin derivative called DMB is a potent inhibitor of cancer growth. When DMB was administered to an infected culture, formation of piles of cancer cells (foci) was eliminated, virus replication was reduced 100-fold and cell proliferation declined two-thirds.

NUTRITION

Malnutrition and brain damage

Evidence has been mounting that malnutrition early in life causes chemical changes in the brain, impairing its development and interfering with learning ability and behavior. But studies to date have not revealed whether these chemical changes reflect disturbances in the neurons themselves or in other brain cells.

Dr. Richard J. Wurtman and William J. Shoemaker of the Massachusetts Institute of Technology analyzed substances found exclusively in brain neurons. They report in the March 12 SCIENCE that brains of rats undernourished from midgestation to weaning contained 25 percent less norepinephrine than those of animals adequately nourished. Norepinephrine is a neurotransmitter, a substance responsible for carrying a signal across the gap between two neurons. Neurons that use norepinephrine as a neurotransmitter have a role in the control of mood, learning, blood pressure, heart rate, blood sugar and glandular function. Another neurotransmitter, dopamine, was also deficient.