BIOMEDICINE

Cancer vaccines in the works

One of the many fronts in the war against cancer has been the push to develop vaccines to combat one or more varieties of the disease. At a recent science writers seminar sponsored by the American Cancer Society in Daytona Beach, Fla., researchers discussed the latest cancer vaccine developments.

Thomas H.M. Stewart of the University of Ottawa described "favorable results" from a human study begun in 1973 using vaccines against four types of lung cancer. The vaccines, developed by Ariel Hollinshead of George Washington University in Washington, D.C., were made by isolating and purifying the antigens present on the surfaces of tumor cells of the different types of lung cancer. Out of 52 patients, all of whom had lung cancer surgery and some of whom also had conventional drug therapy, 28 patients were randomly given the appropriate vaccine. The vaccine was administered once a month for three months following surgery. In the four years after surgery — the years of highest risk of recurrence — 17 percent of the immunized patients died of cancer, compared with 51 percent of the nonimmunized patients.

Despite the encouraging results, Frank Rauscher of the cancer society cautioned against "overexpectancy"; the technique now faces extensive testing. A separate trial of the vaccine at Roswell Park Memorial Institute in Buffalo, N.Y., replicated the results, Hollinshead told SCIENCE NEWS, and a test involving 300 patients at centers in Canada, Chicago, Ill., and Pittsburgh, Pa., was begun last June. In addition, she said, the Soviet Union is beginning a trial using the vaccines and French researchers have just decided to test them. According to Hollinshead, the vaccines seem most useful following surgery for early stages of only certain types of lung cancer. She said that the possibility of using the vaccine for lung cancer prevention in high-risk individuals is being studied.

In a medical killing-of-two-birds-with-one-stone, Baruch Blumberg of the Institute for Cancer Research in Philadelphia described a vaccine against hepatitis B virus (HBV) that may also be effective against liver cancer. Blumberg's vaccine is made by separating the whole HBV particle from the blood of carriers. The treatment is based on the substantial evidence for a relationship between chronic HBV infections and post-hepatic liver cancer.

Patentable microorganisms

The right of a geneticist or microbiologist to patent "inventions" — so-called man-made microorganisms — was recently reaffirmed by the U.S. Court of Patent Appeals. Two years ago, the court decided in favor of the Upjohn Co., whose researchers had purified a bacterium that produces the antibiotic lincomycin, and thereby established that the fact a microorganism is alive is irrelevant to its patentability (SN: 10/15/77, p. 247). Last summer, the court was instructed by the Supreme Court to reconsider that decision. This time around, the appeals court included a separate case involving General Electric Co.'s invention by recombinant techniques of an oil-eating bacterium. The appeals court ruled that the bacteria in question were "products of a microbiologist," and that in both cases they met the patentability requirement of "any new and useful process, machine, manufacture, or composition of matter." "[T]he fact that microorganisms are alive is a distinction without legal significance," said the opinion, written by Judge Giles S. Rich, and "they should be treated ... no differently from chemical compounds" when they are considered for patents. An attorney with the Department of Health, Education and Welfare's patent office said the decision "will be an aid" to HEW grantees involved in recombinant DNA research who wish to interest commercial firms in funding their work.

PHYSICAL SCIENCES

In the matter of antimatter

There is a rule in physics that says there should be as much antimatter in existence as there is matter. The rule comes from the physics of subatomic particles, where it is obeyed in a most orderly way. To all appearances the macrocosm does not obey it, and this has led to cosmological questions.

Now comes Steven Weinberg of Harvard University to suggest a particle physics way to break the rule. In particle physics one way to state the rule is "conservation of baryons" because the class of baryons includes protons and neutrons, the main structural elements in gross matter. It states that processes that produce baryons should produce equal amounts of baryons and antibaryons, processes that change baryons should preserve the net number. In the March 26 PHYSICAL REVIEW LETTERS Weinberg suggests that the present nonobservation of processes that violate baryon conservation is because the particle that serves as intermediary or trigger in nonconserving process, the X boson, is too heavy to be made at current energies. Existence of the X boson is predicted in the "grand unified field theories" on which Weinberg works. Since the history of the universe is a story of higher energy states, Weinberg proposes there was a time in the past when X bosons existed in large numbers, did their baryon-nonconserving thing and then disappeared, leaving an excess of baryons over antibaryons as a legacy for us.

Deuterium opens the universe

Another cosmological conundrum concerns deuterium. According to the big bang theory deuterium would have been made shortly after the creation. If the universe was very dense, all or nearly all this deuterium would have been processed into helium within a very few minutes.

If there is primordial deuterium left, it means that the universe is not so dense, and that means, according to the usual interpretation, that the universe is open and will expand forever. In the March 1 ASTROPHYSICAL JOURNAL Arno Penzias of Bell Laboratories at Holmdel, N.J., reports observations of primordial deuterium that supports the open universe.

Convincing people that deuterium is primeval is hard. Closed universe proponents suggest other origins, especially unusual processes in stars. But star-produced things tend to be concentrated in the centers of galaxies. Jeremiah Ostriker and Beatrice Tinsley had suggested, therefore, that if there were more deuterium near the edges of galaxies, that would be evidence it was primordial. With a radiotelescope, Penzias studied deuterium-bearing chemical compounds in different parts of the galaxy and found up to 10 times as much at the edge as near the center.

Son of quark

It is usually said that a quark is a kind of elemental building block out of which particles such as protons and neutrons are built. But given enough energy, the part is momentarily greater than the whole, and a single quark can produce the particles of which it is usually only a part.

This is what happens to the quarks inside a proton when that proton is struck and smashed by a very high energy electron. Averaged over many such events, the "fragmentation" products of a quark should show the electric charge of their parent, and since quark charges are fractional and distinctive, this could be a way of identifying varieties of quark. It works for the common *u* quarks in protons, report a large group from Cornell University and the DESY laboratory in Hamburg (R. Erickson et al.) in the March 26 PHYSICAL REVIEW LETTERS, and it may work for exotic varieties.