BIOMEDICINE

Interferon and liposomes team up

Liposomes, a promising vehicle for delivering drugs to patients, may also prove practical for giving the antiviral agent interferon. Paul Anderson, Jan Vilcek and Gerald Weissmann of New York University School of Medicine reported at the recent first annual Congress on Interferon Research in Washington that they have managed to entrap one of the three major forms of interferon — leukocyte interferon — in liposomes.

Lipsomes are tiny packages of lipids. An increasing number of studies suggest that liposomes might be a better way to administer drugs because the liposomes keep entrapped drugs from being degraded, are better able to slip into target cells than are drugs alone and can be targeted to desired sites of action.

Interferon: How it works

While hundreds of scientists are trying to make the protein interferon in batches big enough for treating many patients and are exploring interferon's antiviral and anticancer potential, others are probing the mechanisms by which interferon works as a drug. One of the more interesting insights into interferon's antiviral action was reported in the Oct. 2 NATURE and also at the first annual Congress on Interferon Research in November by Radha K. Maheshwari and Robert M. Friedman of the National Institutes of Health; Dipak K. Banerjee and Charles J. Waechter of the University of Maryland School of Medicine, and Kenneth Olden of Howard University Cancer Research Center.

They have found that interferon-treated cells produce viral particles with low infectivity, and that this low infectivity seems to be related to the reduced amount of glycoproteins and membrane proteins incorporated into viral particles and is not related to inhibition of virus production.

'Jawboning' and blood changes

When jaws and bites are out of whack, they often lead to blood circulation problems in other parts of the body, such as cold hands, numb feet or headaches. In 1978 Stephen D. Smith of the Temporomandibular Orthopedics Clinic in Philadelphia reported that, based on the subjective comments of his patients, reposturing jaws and bites out of joint seemed to improve circulation in other areas of their bodies. And now Smith reports in the August and October issues of OSTEOPATHIC MEDICINE that he has objectively shown, with a blood measurement instrument called a vascular analyzer, that such reposturing indeed improves blood circulation to other parts of the body.

The vascular analyzer uses ultrasound to measure large blood vessel flow and a light sensor to measure blood flow to the fingers and toes.

Cancer patients sought for studies

Young patients with acute leukemia, neuroblastoma, rhabdomyosarcoma, Ewing's sarcoma, osteogenic sarcoma and non-Hodgkin's malignant lymphoma (especially Burkitt's lymphoma) are being sought by the National Cancer Institute for clinical trials evaluating new types of therapy. Patients may be admitted with any stage of disease except in the cases of neuroblastoma and rhabdomyosarcoma, which are restricted to extensive disease. The only cost to patients will be for the first trip to NCI. Other travel, evaluation, treatment, hospital and ambulatory care will be free.

Interested patients or physicians should contact: Attending Physician, Pediatric Oncology Branch, NCI, Building 10, Room 3B-12, National Institutes of Health, Bethesda, Md. 20205, Phone: (301) 496-4256.

PHYSICAL SCIENCES

The spin of the gluon

Spin is an important characteristic of subatomic particles. It is concerned with spatial and temporal relations, especially which of the different geometrical classes of force field a given particle relates to.

For gluons this field relation is especially important. They are supposed to be the most fundamental glue, the material embodiment of the force that holds together quarks to build neutrons and protons, which then build atoms, etc. The amount of gluon spin says basic things about that force. The unified field theory that describes all this predicts one unit of gluon spin, which means the force field has what is called a vector character. Another suggestion is zero spin or a so-called scalar field.

A report in the November CERN COURIER indicates that, as usual nowadays in particle physics, unified field theory wins again. Observations at the DESY laboratory in Hamburg give results best conforming to a spin 1 or vector gluon.

A magnet that persists

A superconducting magnet at the CERN laboratory in Geneva has been running — that is, maintaining its magnetic field — since May without the input of any electric current, the November CERN COURIER reports. Such a magnet is called "persistent" to distinguish itself from the conventional "permanent" magnets made of magnetized minerals.

The persistent magnet has a coil of superconducting metal. Electric currents in the coil set up a magnetic field that threads the coil. Any change in the magnetic field induces new currents in the coil, currents that tend to restore the magnetic field to its previous condition. In an ordinary conductor such induced currents would quickly die away due to the resistance of the coil. The superconducting state is resistanceless, so the induced currents persist.

With the induced supercurrents and the magnetic field acting reciprocally, the system can maintain itself without outside power connections. With no more than some topping off of refrigerant to keep the temperature at 4K, the persistent magnet has been maintaining fields of more than 4.5 tesla with no external power supply. CERN COURIER says this illustrates "Nature's opposition to change."

Mass of the gas in the blast in Cas

The supernova remnant Cassiopeia A was discovered by radio astronomers early in the history of their work. Taking the somewhat naive assumption that the gas in Cas A had been expanding steadily at the observed velocity and had not encountered any serious deceleration due to interstellar matter, astronomers could calculate that the stellar explosion that started the gas occurred about 300 years ago. It seemed strange that no sixteenth century astronomer had recorded the appearance of that supernova.

This year W. Ashworth reported that apparently John Flamsteed had seen the Cas A supernova in 1680 (SN: 1/26/80, p. 56). The appearance was only sixth magnitude instead of the second magnitude that would be expected for Cas A being a Type II supernova, but everything else fits. If 1680 is accepted as the date, then the gas has in fact undergone almost no deceleration. As Kenneth Brecher and I. Wasserman of Boston University point out in THE ASTROPHYSICAL JOURNAL (Vol. 240, p. L105), that makes it relatively easy to calculate the mass of the gas thrown off in the blast. They come to an amount approximately or possibly greater than 10 to 12 times the mass of the sun. "This is the first dynamical determination of the mass ejected in a supernova explosion," they write.