

A novel treatment for rheumatoid arthritis

Liposomes — membrane packages filled with water — have been explored as a vehicle for enzyme replacement therapy. The approach consists of incorporating normal enzymes that a patient lacks into liposomes, then injecting the enzyme-laden liposomes into the patient. Enzyme-deficient cells in the patient then digest the liposome-camouflaged enzymes without realizing that they are foreign (SN: 3/29/75, p. 211). Now liposomes look promising in the treatment of rheumatoid arthritis.

Cortisone is a common treatment for rheumatoid arthritis, yet doses large enough to counter joint inflammation can also trigger serious side effects. J. T. Dingle of Strangeways Research Laboratory in Cambridge, England, and his colleagues hypothesized that giving rheumatoid patients shots of cortisone entrapped in liposomes might be a way of targeting lots of cortisone to inflamed joints and not to other areas of patients' bodies. They tested this hypothesis in rabbits, and as they report in the Jan. 26 *NATURE*, the novel treatment looks encouraging. An injection of liposome-entrapped cortisone has much more anti-inflammatory activity than an equivalent dose of the drug not entrapped in liposomes.

Bran wins as colon cancer preventive

Lack of fiber in the diet has been linked with cancer of the colon. But what kinds of fibers make for the most robust and speediest bowel movements and, hence, the best colon cancer preventives? And do we all need the same amounts of fiber in order to stave off colon cancer? Answers to these two questions (and more regarding fibers and cancer of the colon) appear in the Jan. 7 *LANCET*.

J. H. Cummings of the Medical Research Council Dunn Nutrition Unit in Cambridge, England, and his team added bran, cabbage, carrots, apples and guar gum to the diets of 19 healthy volunteers. Bran produced the most robust bowel movements by far, followed by guar, with carrots, cabbages and apples producing comparably lesser benefits. Thus, cereals appear to be much more effective than vegetables and fruits as colon cancer defenses.

When the volunteers ate a diet with the same fiber intake, they were found to produce markedly different amounts of bowel movements (anywhere from 65 to 194 grams, or 2 to 7 ounces daily). This suggests that those persons who produce fewer bowel movements probably need to consume more fiber to combat colon cancer than do those individuals who produce ample bowel movements.

Still another interesting finding to emerge from the study is that those fibers that produce the best bowel movements are especially rich in chemicals that retain water well.

Can traffic pollution do bikers in?

Anyone who has ever biked to work in the city can't help wondering whether the exercise benefits of cycling aren't offset by exposure to toxic fumes. The answer apparently is no, according to a study released by the U.S. Department of Transportation.

Ten healthy subjects either biking or driving a car through the streets of Washington under varying air conditions were studied for short-term health changes. Neither drivers nor bikers encountered any major health problems such as cardiovascular symptoms. However, the bikers did experience more fatigue, sore throat and eye irritation than the drivers did.

The study recommends that another study now be conducted to examine the long-term health risks of biking in traffic and that the study be conducted on smokers and persons with respiratory ailments.

Subatomic particles in the mass

One of the most tantalizing questions in particle physics concerns the masses of the various particles, specifically the mass spectrum of the particles or how the number of particles in a given range of mass varies with the amount of mass.

There are a number of theoretical hypotheses for extrapolating the spectrum of known particles to higher masses than experiment has investigated. One such hypothesis concerning the class of hadrons, which includes the overwhelming majority of known particles, is the bootstrap hypothesis, so called because it proceeds by adding the known particles to each other to generate new ones. Adding together the properties of two or more known particles yields a number of combinations (with a mass more or less equal to the sum of the masses), each of which is a possible unknown particle. In this hypothesis the number of possible particles rises very fast with increasing mass. As Norman K. Glendenning and Yasha Karant of the Lawrence Berkeley Laboratory point out in the Feb. 6 *PHYSICAL REVIEW LETTERS*, there are 10,000 possible particles in a range of only 100 million electron-volts or so around the mass level of 2.5 billion electron-volts.

To seek evidence for the existence of each such possibility individually is a hopeless task. At one particle a day it would take a hundred years to confirm the bootstrap hypothesis for just that short mass range. However, Glendenning and Karant propose that there is an easier way to gain knowledge, if not of individual particles, at least of the over-all shape of the mass spectrum. It can be done through high-energy collisions of atomic nuclei, they say.

Such collisions produce what is called a nuclear fireball, a short-lived, hot blob of nuclear matter. The fireball is hadronic matter in a very pristine form. As it cools, it gives off all kinds of hadrons. Glendenning and Karant propose that the properties of the fireball, particularly its temperature, will depend on the number and mass distribution of hadrons that can exist. They calculate that there will be sufficient difference in the fireball's properties, depending on whether the bootstrap or a rival estimate of the hadron mass spectrum is correct, that the various hypotheses can be tested in such an experiment.

A galaxy around BL Lacertae

One of the important astrophysical questions about quasars is their relationship, if any, to galaxies. A number of astronomers have suggested that quasars and the centers of galaxies may be essentially the same kind of object — quasars being perhaps galactic centers at an earlier stage of evolution. To support this hypothesis it would be nice to find a galaxy surrounding a quasar. Though some observers have claimed instances of this kind, none is generally accepted.

Meanwhile, something about the possible linkage between galactic centers and quasars can be found, many astronomers believe, by studying the so-called BL Lacertae objects. These objects, named for the first of them to be found, BL Lacertae, have resemblances to quasars, but appear to be more diffused in space and are also highly variable in their energy output.

In the Jan. 15 *ASTROPHYSICAL JOURNAL LETTERS*, Joseph S. Miller, Howard B. French and Steven A. Hawley of the Lick Observatory report definite evidence that BL Lacertae itself is surrounded by a galaxy. The spectrum of the light from the area around the object shows features characteristic of a normal elliptical galaxy, they say. The finding strengthens the notion of a general relationship among galaxies, quasars and BL Lac objects, and raises interesting questions about how a normal galaxy can contain a center that varies its energy output from time to time by a factor of 10.