Biomedicine

Panel backs DDI despite uncertainties

In an unusual move, an advisory panel to the Food and Drug Administration has recommended approving the AIDS drug didanosine even though clinical trials to establish the treatment's efficacy are still in progress. The panel, which made its recommendation two weeks ago, advised FDA to allow sales of didanosine – also called DDI for its chemical name, dideoxyinosine – for adults and children with AIDS who cannot tolerate zidovudine (AZT), the only other approved AIDS drug.

The panel based its decision primarily on data from "expanded access" trials of DDI, begun in 1989 (SN: 10/7/89, p.231). Such trials allow researchers to collect some information on a drug's efficacy from seriously ill patients who receive the treatment outside statistically controlled trials. The advisory panel also considered data from two recent safety trials, one of which involved children (SN: 5/19/90, p.315; 1/26/91, p.55).

Unlike zidovudine, DDI does not cause anemia. However, it can cause pancreatitis, a potentially fatal swelling and inactivation of the pancreas. DDI's manufacturer, Bristol-Myers Squibb Co., reported last year that six of the roughly 9,000 patients participating in DDI clinical trials or expanded access programs had died of pancreatitis (SN: 3/17/90, p.165).

DDI's dangerous side effect, coupled with the paucity of efficacy data, prompted concern among some members of the FDA advisory panel. Although University of Chicago statistician Paul Meier voted to recommend approval, he cautioned that the panel might be "ratcheting down" the usual standards for drug approval in order to speed a new AIDS treatment to market. One of the nine panelists voted against DDI approval.

Although FDA usually follows the recommendations of its advisory committees, the agency has not announced when it will make a final decision on DDI.

Experts urge funding for artificial heart

A panel of health-care experts last week advised the National Heart, Lung, and Blood Institute (NHLBI) to continue funding research on two types of artificial hearts. These battery-powered devices, designed to assist or replace a failing human heart, might help an estimated 70,000 U.S. patients annually who would otherwise die of heart failure, the 16-member panel concludes.

The panel's report culminates a year-long investigation commissioned by NHLBI as a guide for making funding decisions on the "total artificial heart" (TAH), an experimental device intended as a replacement for the human heart.

In 1988, NHLBI officials suspended funding for TAH research and decided to concentrate instead on the "ventricular assist device" (VAD), a mechanical pump that helps the heart's lower chambers function despite damage from a heart attack or other ailment. While the new report notes the importance of VAD research and development, it also endorses the TAH approach, pointing out that many people, especially those with severe heart failure, need more pumping assistance than the VAD can provide.

Although artificial hearts will not replace heart transplants in the near future, the panel notes that many people die while waiting for a donor heart to become available, and that artificial hearts may provide such patients with a reasonable alternative that might extend their lives.

Barriers to a cost-effective artificial heart remain formidable, however. For example, scientists must find a way to prevent clots that form when blood comes in contact with the synthetic material – a serious problem that can lead to a stroke. In addition, the panel expresses concern about access to this expensive technology, noting that at least 30 million people in the United States lack adequate health insurance.

Chemistry

Gallium stabilizes new superconductor

By adding gallium to an yttrium copper oxide compound, scientists have created a new – and possibly tougher – family of superconductors. Researchers from Northwestern University in Evanston, Ill., and Argonne (Ill.) National Laboratory used high pressures to make the new material, which conducts electricity with no resistance at temperatures up to 73 kelvins.

This material seems more stable than other high-temperature superconductors, which lose oxygen when heated in air, says Northwestern chemist Kenneth Poeppelmeier. He described the work last week at an international conference on superconductivty in Kanazawa, Japan.

Superconductors made with copper and oxygen generally fall into one of three families, depending on whether they contain yttrium and barium, lanthanum and barium, or bismuth and thallium. The Illinois researchers have now created a fourth type by adding gallium and by replacing almost one-third of the yttrium with calcium. They subjected the resulting mixture to very high pressures of oxygen to make it into a superconducting solid. Like other superconductors, this one conducts electrons along planes formed by copper and oxygen atoms, Poeppelmeier says.

Polymer shifts light in two directions

To help light fulfill its potential in telecommunications and computing, researchers must first learn how to process it cheaply and efficiently. Recently, chemists have begun searching for plastics that could replace costly inorganic materials, such as lithium niobate crystals, in optical switches, light modulators and other devices that control the flow of light (SN: 5/25/91, p.335).

Now, three Israeli chemists have discovered that by using uneven electric fields, they can transform a cheap organic polymer so that it alters light passing through it lengthwise and sideways. Garry Berkovic of the Weizmann Institute of Science in Rehovot described the technique last week at a conference of the Society of Photooptical International Engineering, held in San Diego.

Chemists usually impart these properties to plastics by melting a polymer film with dye mixed in, then applying an electric field across the thick liquid as it cools. The field seems to cause the charged dye molecules to align, so the resulting film alters light traveling along one dimension.

The Israeli researchers set up electrodes along the film so that they could vary the electric field across and along the length of the film. They say the technique works with many polymer-dye combinations.

The luck of the four-leaf zeolite

Zeolite crystals delight chemists with their unusual – and very functional – internal structures. Most of these labyrinthine molecules include aluminum or silicon atoms arranged in rings that link to form channels and cages within the crystal. By making different kinds of zeolites, chemists have produced molecular sieves essential for refining petroleum and for separating out vapors and other products small enough to fit through the zeolite's tiny openings.

French and Swiss scientists have now expanded zeolites' potential with a new version whose pores and channels dwarf those of other zeolites. Made from gallium and phosphate, this zeolite has pores consisting of 20 atoms that link to form an opening shaped like a four-leaf clover. The new compound "provides new possibilities for shape-selective sorption," the group reports in the July 25 NATURE.

The researchers, led by Henri Kessler of the National Superior School of Chemistry in Mulhouse, France, call their creation "cloverite."