Biomedicine

Progress against throat warts


Mounts/PNAS

Throat warts — papillomas of the larynx — are no small problem for the seven million Americans who have them. They can block the airway and become life-threatening, are resistant to treatment, tend to recur and are even contagious among family members. Now two advances have been made against them.

The first comes from Phoebe Mounts of the Johns Hopkins University School of Hygiene and Public Health in Baltimore and colleagues. They used immunological-chemical techniques to study viral genetic material and viral antigenic material present in the warts, and as they report in the September PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, the material comes from papillomaviruses closely related to those that cause genital warts. (The arrow in the photo points to one of the cells in wart tissue that was found by immunological-chemical techniques to contain papillomavirus antigen.) Thus these viruses appear to be the ones that cause the warts.

The second report comes from Herbert H. Dedo and colleagues at the University of California at San Francisco. As they write in the September ANNALS OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY, a laser provides "a clear advance" over surgery in removal of throat warts. They used laser treatments on 109 patients who had had an average of 10 throat warts each removed surgically without eradicating the disease. The patients underwent an average of five laser treatments each to remove their warts and were followed up for six years. At that time, 45 of them (41 percent) were free of their warts. What's more, there were no deaths from laser treatment; the death rate is seven percent with surgery.

Wonder drug for acne

It looks as if severe acne may finally be conquered, thanks to an oral vitamin A derivative that goes by three names — 13-*cis*-retinoic acid, isotretinoin or Accutane (its trade name).

First the drug was successful in clinical trials (SN: 2/24/79, p. 118; 5/22/82, p. 346). In May, it was approved by the Food and Drug Administration for marketing as a prescription drug. This month it becomes commercially available to patients, its manufacturer, Hoffmann-LaRoche, reports. And according to the Sept. 3 MEDICAL LETTER ON DRUGS AND THERAPEUTICS, which assesses scientific data on new drugs, 13-*cis*-retinoic acid "may be the most effective treatment ever offered for acne. It can completely clear severe nodulocystic lesions, leading to prolonged remissions that often persist for years after treatment is stopped."

Computers tackle gum disease

During the past several years conventional X-ray diagnosis has undergone a technical improvement called digital subtraction radiography. Digital computers are coupled to X-ray sensors to enhance the quality of X-ray imaging, thus bringing out information in the images that would otherwise not be available. Digital radiography's most extensive use so far has been in the diagnosis of heart disease (SN: 6/12/82, p. 395).

Now digital radiography also looks promising in the early detection of gum disease, according to a report in the August NIDR RESEARCH NEWS. R.L. Webber and his team at the National Institute of Dental Research in Bethesda, Md., had 10 dentists look for signs of gum disease in conventional radiographs and in digital radiographs that had been taken of newly diseased gums. In every instance the dentists were better able to detect disease in the digital images.

Space Sciences

OTS-2: Solar sailing on the job

The idea of solar sailing — guiding and propelling a space vehicle with the physical pressure of sunlight — was first proposed more than half a century ago. Though light-pressure has not yet been used to provide a spacecraft with actual motive power, it did help control the Mariner 10 Mercury probe's orientation in space after the craft's attitude-control system malfunctioned in 1974. The problem was threatening to use up the gas in Mariner's steering jets, until engineers worked out a way of aiming its solar panels so that the light-pressure against them would stabilize an unwanted oscillation of its roll-axis.

The engineers' solution, which helped Mariner 10 complete all three of its planned encounters with Mercury, was an emergency measure, inspired by necessity. A similar technique is now being used as a regular part of the operation of a European earth-orbiting satellite called OTS-2 — not because there was any malfunction, but because the technique, originally included merely for study purposes, has worked out so well.

"The idea behind this experiment," says U. Renner of the European Space Technology Center in the Netherlands, "was to verify the general feasibility of solar sailing on a satellite that was not specifically designed for it [equipped, in other words, with an independently controllable solar sail] and to investigate its potential performance." The satellite, scheduled for a variety of communications tests, was launched for the European Space Agency by NASA on May 11, 1978. Its first solar-sailing test, evaluating the controllability provided by the light-pressure on its solar panels, was conducted about six months later for a six-day period. On Oct. 2 of last year, it began a long-term trial.

"After almost one year of successful operation," writes Renner in the August ESA BULLETIN, "solar sailing is no longer regarded as an experiment for OTS, but is being continued as the 'normal' mode of attitude control."

Experience has shown that the "disturbance torques" produced by the light-pressure are "very predictable" from one 24-hour period to the next, and smoothly sinusoidal over a year-long cycle. (OTS-2 orbits about 35,800 km above the earth — a "geostationary" altitude, at which it stays over a fixed longitude — so it is in sunlight most of the time.) This allows a similarly smooth, regular cycle of corrective maneuvers to be used to maintain the satellite's orientation, meaning that fewer and more regular firings of the attitude-control jets will do the job.

There are several advantages to using the solar-sailing technique, Renner notes. Simplified hardware can be used on the spacecraft, which means less weight and fewer pieces of equipment to malfunction. Also, he says, "a significant power saving" can result from the limited and regular use of the reaction-control system, "which has to be activated only for station-keeping maneuvers, typically once every six weeks." In addition, the satellite can be aimed more precisely, and simplified operations procedures can be used by flight-controllers on the ground.

A different approach to solar sailing as an attitude-control technique was tried this year on India's U.S.-built INSAT 1 communications satellite, launched April 10. INSAT actually carried a separate solar sail — an 11-foot-long, tapered cylinder made of aluminized Kapton — designed to compensate for the light-pressure against the satellite's solar panels. Unfortunately, the extendable boom on which the sail was mounted failed to deploy, so it never had a chance to prove itself. Other problems resulted in the loss of INSAT's entire supply of steering gas, and Indian space officials reported that it creased operating on Sept. 6. Engineers are still investigating the possible causes of INSAT 1's difficulties, which terminated what was to have been India's first operational communications satellite. (The U.S. Mariner 4 Mars flyby craft, launched in 1964, carried similar vanes at the ends of its solar panels. Adjustment problems rendered them useless, but did not affect the mission itself.)