Diuretic Slows Cystic Fibrosis Damage

An aerosol form of a diuretic drug slackened the pace of lung damage in 14 young adults with cystic fibrosis, scientists report. Their pilot study raises hopes for an improved treatment for adults suffering from this as-yet-incurable disease. It also suggests that physicians may one day treat children with the inherited disorder before serious lung-tissue destruction occurs.

"This is the first time a drug has been developed to treat the primary cystic fibrosis defect," says Robert J. Beall, executive vice president of the Cystic Fibrosis Foundation in Bethesda, Md. Standard treatment today consists of antibiotics to combat lung infections and physical therapy to clear thick secretions from the airways, but physicians have had no way to thin the abnormal mucus that characterizes the disease.

Previous research had identified the defective gene causing cystic fibrosis, inherited by one in every 2,500 U.S. infants (SN: 9/2/89, p.149). This genetic flaw causes epithelial cells lining the lung's airways to absorb excessive amounts of salt and water, leaving airway secretions thicker than usual. People with cystic fibrosis can't clear away the sticky mucus, which hosts repeated infections that destroy more healthy lung tissue, eventually resulting in death.

Michael R. Knowles and Richard C. Boucher of the University of North Carolina at Chapel Hill and their co-workers now report early evidence that the diuretic amiloride blocks absorption of salt and water at the epithelial cells, thinning the mucus and improving the patient's ability to cough up secretions. They present their findings in the April 26 NEW ENGLAND JOURNAL OF MEDICINE.

The team studied cystic fibrosis patients aged 18 to 34, giving them antibiotics at the study's start to clear any festering lung infections. Seven of the 14 volunteers inhaled a spray form of amiloride four times daily for six months, while the other half received a placebo spray. After six months, the team gave all patients another round of antibiotics and then switched each person to the opposite treatment.

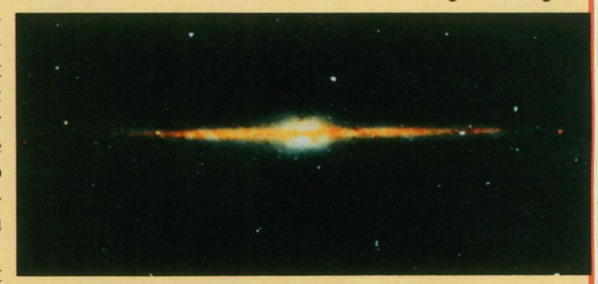
Sputum samples showed that mucus was more fluid during amiloride therapy than during placebo treatment, the researchers report. Moreover, in analyzing a year's worth of data, they discovered that when patients got amiloride, the average loss of lung function from mucus buildup dropped by about 50 percent, with no adverse side effects. "We slowed the normal disease-induced loss of lung function," Boucher told SCIENCE NEWS.

Amiloride doesn't heal damaged lung tissue, but it does appear to protect remaining lung tissue from infection by thinning sticky secretions that can become breeding grounds for infectious microbes, Knowles says. The study suggests amiloride may keep adults with cystic fibrosis infection-free for long periods, thus preventing frequent trips to the hospital, Boucher says. The researchers hope such treatment may prolong the lives of people with cystic fibrosis, but further study must demonstrate that benefit, Knowles adds.

The preliminary report hints that physicians might one day prevent permanent lung-tissue damage before it occurs by giving amiloride early in life, says Susan P. Banks-Schlegel of the National Heart, Lung, and Blood Institute in Bethesda, Md. But she cautions that further research is needed to establish the drug's safety and efficacy, especially in treating children. Adds Knowles, "We don't want doctors and parents running out and using this drug willy-nilly in children before the appropriate safety studies have been done."

Physicians currently prescribe amiloride pills — which do not work in cystic fibrosis — to treat adults with high blood pressure. But the FDA will require additional tests before approving the aerosol version as a treatment for cystic fibrosis. Knowles says he is planning a second amiloride study, this one to include some teenagers. — *K.A. Fackelmann*

Out-of-this-world view of the Milky Way



NASA/Goddard Space Flight Center

Measurements of infrared radiation detected by an instrument aboard the Cosmic Background Explorer (COBE) spacecraft have allowed researchers to construct a unique portrait of the inner portion of the Milky Way.

"We see for the first time a very clear picture of our galaxy, with its nuclear bulge of stars," says Michael G. Hauser of the NASA Goddard Space Flight Center in Greenbelt, Md. "This is what our galaxy looks like in starlight."

Astronomers have long pictured the Milky Way as a spiral galaxy — a large, flattened disk of stars orbiting a common center. But direct, visual evidence for that view has been sparse. Although the sun traces an orbit near the fringes of the Milky Way, Earth-based observers have difficulty seeing through the dust that threads the galaxy's disk and surrounds its core. At visible wavelengths, they see only the relatively dust-free parts.

The new portrait of the Milky Way combines images obtained at three near-infrared wavelengths: 1.2 microns (represented in blue), 2.2 microns (green) and 3.4 microns (red). These wavelengths, slightly longer than those of visible light, correspond to radiation emitted mainly by stars rather than by dust particles, which absorb visible light and then reradiate that energy as infrared radiation. The image appears redder in directions where dust absorption is stronger. Images constructed previously from data obtained by the Infrared Astronomical Satellite revealed the sky's appearance at longer infrared wavelengths, where dust emissions play a much greater role.

The COBE-derived picture shows only that part of the galaxy closer to the galactic center than the sun, which orbits about 20,000 light-years out from the center. Discrete points that appear away from the Milky Way's central disk correspond to individual stars in the sun's immediate neighborhood.

"It's a spectacular image," says David T. Wilkinson of Princeton (N.J.) University. "It's almost as though you were in Andromeda [a nearby galaxy], taking a picture of our galaxy."

The new view is "one of the fringe benefits" of a COBE program designed to provide a detailed infrared map of the sky, Hauser says. By looking for regions in the sky with the smallest possible infrared signal, investigators hope to find the fossil residue of light given off by the first luminous objects created after matter started to collapse into lumps early in the universe's history. That search requires separating the faint, primordial infrared signal from the intense infrared sources now active within the galaxy and solar system (SN: 1/20/90, p.36). — *I. Peterson*