

BIOMEDICINE

Heart deaths dramatically down

Deaths from heart disease have plummeted dramatically in the United States during the past 15 years. This good news comes from the National Institute of Heart, Lung and Blood. Some data indicate that the downswing is due to changes in lifestyle among middle-aged American men — smoking less, consuming less cholesterol, getting more exercise and seeking treatment for high blood pressure. Other factors may also be at work because other causes of death in the United States are declining.

Ulcerative colitis and autoimmunity

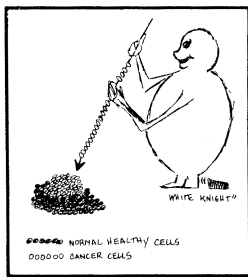
Ulcerative colitis, which is characterized by inflammation of the lining of the large intestine and the passage of bloody mucus, can lead to complications that are crippling or even fatal. Yet no physical cause for the disease has ever been found — until recently. There is now mounting evidence that ulcerative colitis may have an autoimmune basis.

First, blood from ulcerative colitis patients was found to react with large intestinal tissue. Antibodies reactive against large intestinal tissue were then taken from the blood of ulcerative colitis patients. And now Kiron M. Das and co-workers at the Albert Einstein College of Medicine in the Bronx, N.Y., report the isolation of antibodies from the lining of large intestinal tissue taken from ulcerative colitis patients. The antibodies were directed against mucosal epithelial cells in the lining. The next challenge, the researchers write in the September PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, will be to determine the role of the antibodies in the pathogenesis of the disease.

Fighting cancer with mental images

Imagery, which is at the heart of various kinds of psychotherapy, is also being used to put cancer patients in touch with their bodies and to favorably influence their treatment course. So report Jeanne Achterberg and G. Frank Lawlis of the University of Texas Health Science Center and North Texas State University, respectively, in their book, *Imagery of Cancer* (Institute for Personality and Ability Testing, 1978). The book describes the Dallas psychologists' imagery research with 90 cancer patients.

One of the things the patients are required to do is visualize their immune systems and cancer cells during treatment, then draw pictures of what they see. The immune cells are often given symbolic interpretations — say, white knights attacking cancer cells. A psychotherapist or physician then discusses each patient's drawing in order to better understand how the patient views the disease and treatment and to strengthen the patient's outlook on treatment if it is more negative than positive.



Escaping cancer in the mountains

Moving to the mountains might be one way to avoid cancer. The higher the altitude, the lower the cancer death rate, according to an epidemiological study conducted by J. Frederick Cornhill of Ohio State University and Alan C. Burton of the University of Western Ontario. Similar findings have also been reported by the World Health Organization from 35 different countries.

Escape from chemical carcinogens might be the reason, but Cornhill and Burton think it may have to do with a change in acid-base balance in the body that comes with acclimatization at high altitudes.

TECHNOLOGY

French underwater reconnaissance

French physicist Hubert Debart is studying use of a stationary array of underwater sound receivers, called hydrophones, suspended as much as a mile beneath the waves to identify not only the presence of ships and submarines, but also their structural details. He says tests in the Mediterranean by the French navy using two hydrophones 7.5 meters apart obtained structural details accurate to within two meters' resolution.

The approach uses sound emitted by the ship within a narrow band, such as 795 to 805 hertz. Debart told Nelson M. Blachman, an American visiting one of his laboratories outside Paris, that as long as the range of distances between any submerged part of the ship and either of the two hydrophones is small compared with the wavelength of sound in water at a typical "difference frequency (e.g. 803 Hz-800 Hz = 3Hz)," the sound field is essentially "quasimonochromatic" and this technique applicable. Blachman reports on Debart's work, performed for CIT-ALCATEL (Compagnie Industrielle des Télécommunications, Société Alsacienne des Constructions Atomiques et Télécommunications Electroniques), in the July 31 EUROPEAN SCIENTIFIC NOTES (published in London by the U.S. Office of Naval Research).

Fourier transform analyses of the hydrophone signals show a series of peaks corresponding to the distances between the regions of acoustic emission, Blachman writes. Although some data "smearing" occurs, Blachman says that "sufficient information remains" to determine ship length, bulkhead separations and perhaps even the loading of ship compartments.

Bone tap predicts healing rate

An experimental technique to determine the strength of healing bone involves lightly tapping one end of the bone while measuring the motion of the other end with an accelerometer. As the bone heals, the response to tapping changes dramatically. This response change could help determine the rate of bone healing. Although such information is needed to accurately estimate how long a cast must be worn, it is often unavailable from X-rays or a patient's description of discomfort.

James W. Phillips and colleagues at the University of Illinois (Champaign-Urbana) Department of Theoretical and Applied Mechanics have constructed a mechanical model using an aluminum "bone" with a simulated, partial fracture to find out why the technique works. Electrical-resistance strain gauges to measure stretching at given points were mounted on either side of the fracture. Experimental results closely matched predictions from stress-wave theory, confirming that the procedure should be clinically useful, according to the school's September ENGINEERING OUTLOOK. It may also prove useful in nondestructive tests for serious flaws in structures similar to bone, the engineers say.

Electrifying assault on cancer eye

Cancer eye, a general term for eye and eyelid tumors in cattle, costs livestock and related industries an estimated \$20 million annually. Now field tests of an electronic package designed by James D. Doss of the Los Alamos Scientific Laboratory have demonstrated a better than 90 percent "apparent cure rate" for cancer eye tumors ranging from 0.2 to 2 centimeters in diameter. The device places electrodes on either side of the diseased tissue and then passes a high-frequency electric current through it. Resistance to the current heats the tissue to 50°C (122°F), damaging the tumor cells that are more susceptible than normal cells to temperatures exceeding that of the body. Treatment does not require a veterinarian, and is generally easier and less expensive than alternatives.