BIOMEDICINE

New test for colorectal cancer

Colorectal cancer is the second most common form of cancer in the United States. If diagnosed early it is, like uterine cancer, also one of the most treatable cancers. But whereas uterine cancer is detectable with a routine Pap test, there has been no easy method of screening large populations for colon cancer.

Now, researcher Charles Culling and his colleagues at the University of British Columbia have developed a test that they believe may enable physicians to detect colon cancers while they are most curable. The method, as reported in the Sept. 7 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, has proved accurate in one study of tissue samples from 37 patients.

The basis of Culling's test is that colonic mucin, a mucoprotein that occurs in the secretions of mucous membranes, stains differently depending on whether the tissue is normal or malignant. After being stained with a method called the PAT/KOH/PAS procedure, normal colon tissue turns red and malignant tissue turns blue and various shades of purple. Using this method, physicians could screen for colon cancer by taking a rectal swab and staining the cells.

Culling will soon start clinical trials.

Why some people find saccharin bitter

Because of their genes some people are more disturbed by bitter tastes than are others. And now it appears that persons who have a genetically based sensitivity to bitterness in general are also particularly sensitive to the bitterness in saccharin, at least at lower saccharin concentrations, according to a report in the Aug. 31 SCIENCE by Linda M. Bartoshuk of Yale University in New Haven, Conn.

Bartoshuk selected persons known to be genetically sensitive and genetically insensitive to a bitter substance called 6-n-propylthiouracil (PROP) and tested their responses to the bitterness of saccharin at various concentrations. She found that saccharin tasted significantly less bitter to the persons genetically insensitive to PROP than to those genetically sensitive to PROP at the two lowest saccharin concentrations tested. As saccharin concentrations were increased, however, genetically insensitive subjects also started to be bothered by the bitterness of saccharin.

These findings, Bartoshuk believes, have some practical implications. They explain why sacchairn tastes more bitter to some people than to others, and suggest that future nonnutritive sweeteners be carefully evaluated to make sure they won't be too bitter for persons especially sensitive to bitter tastes.

The TLC factor and heart disease

Diet, smoking and stress have been implicated as possible factors in the development of heart disease. Now, according to Robert Nerem and Fred Cornhill of Ohio State University in Columbus, Ohio, a less tangible factor may also be of significance: Tender Loving Care.

The researchers found that 14 rabbits that were cuddled and played with showed only half as much evidence of atherosclerosis as rabbits that received the more impersonal, ordinary care. Nerem and Cornhill took tissue samples from the aortas of both groups and applied a stain that turns fat tissue bright red. The researchers repeated the experiment twice, with the same results.

Finding the TLC factor was serendipitous; the rabbits were being used originally as a control group for a study of the effects of drugs on high cholesterol diets. Nerem and Cornhill have no explanation, but plan to do further experiments to try to uncover the mechanism.

TECHNOLOGY

Tooling on turpentine

The search for alternative automotive fuels has prompted two Scandinavian firms—Saab AB of Sweden and Finnish Palmet Co. in Finland — to develop a turpentine powered car. The duel-fueled Saab-99, scheduled for a Finnish unveiling this year, would be capable of running on either turpentine or gasoline, according to the April CANOPY, a newsletter of the Philippine Forest Research Institute. Oleoresins of the Scotch pine, the major conifer in Finland, are used to produce the turpentine. The CANOPY report adds that a private U.S research group (which it does not identify) has applied to patent a process for producing a high-mileage turpentine motor fuel.

Coal wins in electrowinning

Preliminary results suggest that the energy consumed in refining several industrially important metals can be slashed — in some cases by half—by adding coal to electrowinning solutions. Used to refine or recover metals from solution, electrowinning harnesses a current passed between electrodes in a solution to deposit metal on a negatively charged electrode. Describing their technique in the Aug. 23 NATURE, University of Connecticut chemical engineers Mohammad Farooque and Robert Coughlin found that when pulverized coal is made available to the anode, the chemical energy of the coal compensates for much of the outside electricity ordinarily needed to power the reaction.

Small-scale low-current experiments with copper showed that coal reduced by two-thirds the electricity needed to drive the reaction. And the cost of coal and electricity used was only half the cost of the electricity that would have been needed in a similar experiment using the conventional process.

The authors signal the significance of their finding in an appendix which shows that for the United States, as of 1971 75 percent of all chromium, 53 percent of all zinc, 50 percent of all copper and cobalt, 11 percent of all nickel and 10 percent of all copper was produced via electrowinning.

Adoption of energy conserving processes such as these could help stave off a problem that Aldo Barsotti's computer model portends: that although the world has raw materials to meet the demand for copper, aluminum and iron through the year 2000, there won't be energy available/affordable to produce them. The Case Western Reserve University earth scientist's submodel of the well-known World Integrated Model System predicts a possible 2.9 trillion btu shortfall in energy by the year 2000 for metal production in North America—the largest shortfall for any of the 12 regions into which he divides the world's metal producers.

Laser views of combustion

Toward design of cleaner, more efficient engines, lasers are taking gas temperature and density measurements during combustion. At United Technologies' Research Center in East Hartford, Conn., jet fuel is analyzed via a process using two laser beams of differing frequencies which are focused at a point within the combustion chamber. The spectral shape and intensity of the exiting signal relay data. UT claims its is the first application of the laser technique to a nongaseous fuel.

Jaguar Rover Triumph Ltd. in Britain is similarly studying the movement and behavior of air, fuel and exhaust gases in a running one-cylinder auto engine that can be braked to simulate different speeds and engine loads.

The principal advantages of laser monitoring are that it does not interfere with combustion, nor have an upper temperature limit to what it can view. Physical probes may perturb gases in the combustor and deform under intense heat.