Colon cancer: Clues to fiber's benefits

Among the deadly malignancies, colorectal cancer ranks second only to lung cancer in U.S. incidence and mortality. Though dozens of epidemiologic studies have linked its occurrence to diet – and especially to foods low in fiber – researchers know little about how fiber might affect cancer development. Now, a small study of people at high risk of colorectal cancer offers some potentially important clues.

The three-month study of breakfast cereals involved 11 women and six men who had portions of the colon or rectum removed during cancer surgery one to eight years earlier. The first month's daily cereal portions included only 2 grams of fiber; all later servings contained 13.5 grams. However, the low- and high-fiber ⅔-cup rations looked and tasted identical, the researchers say.

Colorectal cancer survivors "have an extremely high recurrence rate" of up to 40 percent, notes study director David S. Alberts at the Arizona Cancer Center in Tucson. The rectal surface cells of people at high risk of developing colorectal cancer also tend to proliferate at an abnormally rapid rate.

To measure the proliferation of these cells, Alberts and his co-workers biopsied tissue from each volunteer at the end of the first month (baseline) and again at the end of the third month. They incubated the tissue samples with tritium, a radioactive form of hydrogen. The degree to which DNA incorporated the tritium provided a gauge of the rate at which each batch of biopsied cells grew.

In the Aug. 1 JOURNAL OF THE NATIONAL CANCER INSTITUTE, the team reports that high-fiber cereal induced a dramatic and statistically significant reduction in cell proliferation among patients with a rapid baseline rate. The same cereal did not affect rectal-cell turnover in people with an initially low proliferation rate.

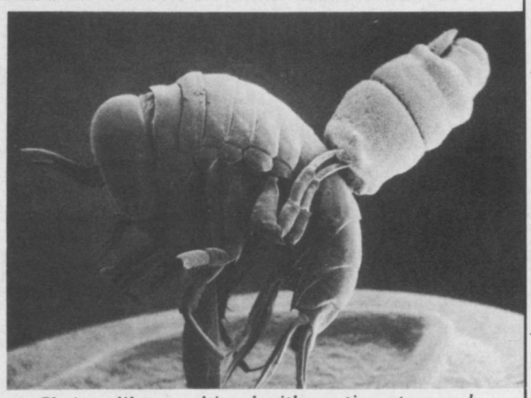
The decrease seen among patients who had the highest initial proliferation rates "hints that the fiber is effective in inhibiting whatever stimulates cancer in the colon," comments Jerome J. DeCosse at New York (City) Hospital. It not only "gets you closer to understanding the mechanism" behind fiber's inhibition of colorectal cancer, says Peter Greenwald of the National Cancer Institute, but also provides "clinical evidence that changing your diet may have some effect [on cancer risk] within a fairly short period."

Alberts' group is just finishing a 100-patient follow-up study on fiber and calcium – another potential inhibitor of colorectal cancer. And on July 1, he began a fiber-treatment trial involving 1,400 people with colorectal polyps, a precancerous abnormality. *– J. Raloff*

Kidnapped plankton shares its defenses

In the frigid waters of Antarctica's McMurdo Sound, some plankton turn to kidnapping as a survival tactic, according to new observations.

Scientists have discovered that tiny, shrimp-like animals called amphipods capture snail-like pteropods and carry them around piggyback-style for days at a stretch. On its own, the shrimpy *Hyperiella dilatata* – about the size of a rice grain – lacks defenses against predators. But the captive pteropod, *Cline limacina*, provides a chemical that protects them both, report biologists James B. McClintock of the University of Alabama at Birmingham and John Janssen of Loyola University in Chicago in the Aug. 2 NATURE.



McClintock, Janssen/NATURE

Shrimp-like amphipod with captive pteropod.

"It's the only case I know in which one organism captures another for a chemical defense," says marine ecologist Diane K. Stoecker of the Woods Hole (Mass.) Oceanographic Institution.

Janssen and McClintock observed that plankton-eating fish – which normally feast on amphipods and avoid pteropods – nearly always spit the duo out, often with violent head shakes. But while the abduction routine appears to help the amphipod avoid becoming a meal, the unwieldy "backpack" also slows the amphipod, making foraging more difficult. And although the pteropod can no longer forage for its normal fare (other pteropods of even smaller size), abduction seems neither to harm nor help it in the long run.

The odd coupling falls under the umbrella category of symbiosis but doesn't fit neatly into the standard subcategories of parasitism, mutualism or commensalism, McClintock says. "This is a good example of how sophisticated some of these interrelationships can become," he adds. *– I. Amato*

Five-year hunt locates Saturn's 18th moon

Add another moon to the list of natural satellites orbiting Saturn. Temporarily designated 1981 S13, the tiny moon apparently creates the 320-kilometer-wide "Encke's gap" in the planet's A-ring, the outermost of its clearly visible rings. Mark R. Showalter of NASA's Ames Research Center in Mountain View, Calif., confirmed the moon's presence in an analysis of photos taken by Voyager 2 during its 1981 Saturn flyby.

Indirect evidence of an undiscovered moon in the Voyager images first emerged in 1985 when Jeffrey N. Cuzzi and Jeffrey D. Scargle of Ames noticed wavy ripples, resembling the wake of a speedboat, along the inner and outer edges of Encke's gap. The two suggested that the ripples could be due to a small moon in the gap that pushes material away from its orbit. In 1986, Cuzzi and Showalter joined two other researchers in determining the orbit and mass of the proposed satellite. However, they found no trace of it in the best of the photos.

"The '86 study pretty much made an ironclad case that the moon was there, though it did not appear in any of the few dozen high-quality images we were studying at the time," Showalter says. Four more years passed before Showalter spotted the bright moonlet while using a computer program he wrote to analyze 30,000 lesser-quality Voyager photos.

"The consensus at first was that we wouldn't find it till Cassini gets there," he says. Cassini is a planned Saturn-orbiting spacecraft due to reach the planet in 2002; it will also carry a probe to plumb the atmosphere of Titan, Saturn's biggest moon.

The newly found moon measures about 20 kilometers in diameter and ranks as Saturn's smallest known satellite, the 18th confirmed to date. Showalter bases his size estimate on an assumed albedo (reflectivity) of 0.5, which he says resembles that of the other moons close to Saturn's rings. "An albedo of one-half is pretty bright," he adds, "so there really isn't much it could be covered with except water-ice."

Showalter would like to name the object Pan, after the Greek god of shepherds. Space scientists use the term "shepherding" to describe gravitational interactions among satellites and smaller particles in orbit "whereby a moon can repel ring material and clear open a gap," he explains. Official adoption of the name will require approval by the International Astronomical Union. *– J. Eberhart*