

## Behavior

### Depression puffs up lung cancer . . .

Several controversial studies have suggested that people who experience bouts of depression run a greater risk of developing all sorts of cancers, possibly because depression weakens the immune system's ability to control the spread of cancerous cells.

Now, a long-term investigation conducted in Finland casts doubt on those sweeping conclusions. Overall, new cases of cancer do not crop up disproportionately among people who have endured moderate to severe depression, investigators report in the Dec. 15 *AMERICAN JOURNAL OF EPIDEMIOLOGY*. However, lung cancer does develop more frequently in depressed men, the scientists find. The underlying link in some cases may be that the mood disturbance encourages depressed men to smoke more cigarettes rather than that it depresses the immune system or has some other biological effect.

Paul Knekt, an epidemiologist at the National Public Health Institute in Helsinki, directed the study of 7,018 men and women. Participants, who entered the project between 1978 and 1980 showing no signs of any cancer, filled out medical and psychiatric questionnaires. In late 1991, the investigators tallied the cases of cancer that had been diagnosed in volunteers.

Men who initially reported that in the weeks before they enrolled in the study they had experienced symptoms of depression, such as feelings of hopelessness or loss of interest in daily activities, displayed a markedly higher lung cancer rate 11 to 14 years later than nondepressed men did. This finding held when the researchers controlled statistically for age, weight, cholesterol concentration, amount of exercise, and use of cigarettes, alcohol, and antidepressant drugs.

Moreover, lung cancer rates were highest among the severely depressed men who smoked cigarettes, Knekt's group finds.

Lung cancer afflicted too few women in the study to allow for a comparable statistical analysis, the researchers add.

Other studies indicate that depressed cigarette smokers tend to smoke heavily and find it especially difficult to kick their habit, remarks epidemiologist Gary D. Friedman of Kaiser Permanente Medical Care Program in Oakland, Calif., in an accompanying editorial. Their attachment to cigarette smoking, rather than mood-inspired immune breakdowns, most likely accounts for the link between depression and lung cancer, Friedman argues. —*B.B.*

### . . . and may lie heavy on the heart

Whether depression promotes certain forms of cancer or not, it can be a heartbreaker, according to a study conducted by scientists at Johns Hopkins University in Baltimore. Heart attacks show an unfortunate affinity for people who have endured major depression (with symptoms of extreme sorrow, apathy, and hopelessness) or recurring periods of intense sadness, content epidemiologist William W. Eaton and his coworkers.

The Hopkins study is based on medical and psychiatric interviews conducted with 1,551 adult Baltimore residents in 1981 and again in 1994. None of the volunteers had a history of heart problems at the start of the project.

Over the next 13 years, the heart attack rate among people who had previously experienced major depression was more than four times that of volunteers who had no history of mood disorders; individuals who had endured the milder forms of depression before the study had twice the heart attack rate of never-depressed folks.

The researchers controlled statistically for age, sex, cigarette smoking, blood pressure, use of antidepressant drugs, and other factors that may contribute to heart problems.

Potential biological consequences of major depression that foster heart attacks remain unclear, the researchers state in the December *CIRCULATION*. —*B.B.*

## Earth Science

*From a meeting in San Francisco of the American Geophysical Union*

### Spying on a deep-sea eruption

On Feb. 28, 1996, oceanographers listening in on the Pacific Ocean heard something sweeter than music: the sound of rhythmic oceanic earthquakes. The tremors signaled a volcanic eruption along the Gorda Ridge, a deep-sea mountain range off the Northwest coast. Within 10 days, researchers sped to the ridge to witness the birth of new ocean floor through a process called seafloor spreading.

This marked only the second time that oceanographers have detected ridge quakes and caught seafloor spreading in the act. "Nobody had any idea of how often seafloor spreading events occurred. Now we're getting the pulse of what's going on down there," said Ed Baker of the National Oceanic and Atmospheric Administration in Seattle.

In their first survey, conducted while the eruption was occurring, Baker and his colleagues found a large pool of warmed water just above Gorda Ridge, whose summit at that point lies 3,100 meters below sea level. During a subsequent cruise in April, they searched the ridge with a remote camera and spotted fresh lava, which they judge had erupted just a month earlier, says William W. Chadwick Jr. of Oregon State University in Newport.

Gorda Ridge forms where two ocean plates abut. As the plates pull apart, they open up a crack that allows lava to rise from inside Earth. Geologists have rarely witnessed this process of seafloor spreading because it plays out kilometers below the ocean surface. In 1993, the Navy gave researchers a boost, providing access to a formerly classified network of undersea microphones built to track submarines. This array detected the recent Gorda Ridge eruption and one that occurred to the north in 1993. —*R.M.*

### A nuclear waste experiment at sea?

For 10 years, a Soviet submarine carrying nuclear warheads has rusted quietly on the seafloor 800 kilometers east of Bermuda. While many consider the downed sub an environmental hazard, Charles Hollister views it as an opportunity.

A marine geologist at the Woods Hole (Mass.) Oceanographic Institution, Hollister has long championed the idea of storing nuclear waste in the thick blanket of clay and mud that covers the deep ocean basins. If plutonium has leaked from the Soviet sub, as some evidence hints, this accident could provide a chance to test whether the deep sea is a suitable graveyard for some of the world's most dangerous material.

"The question I'd like to see answered is, What happens to the plutonium from the nuclear reactors and weapons? Does it get into the food chain, or has it stayed put, as we think that it should?" Hollister says.

Hollister first raised the idea of sub-seabed nuclear disposal in the early 1970s. Initial research suggested that seafloor clay particles should bind to radionuclides and immobilize them. In 1986, however, the U.S. Department of Energy decided to abandon the sub-seabed option and focus instead on land-based disposal. Hollister charges that ocean disposal research died for purely political reasons.

The submarine off Bermuda holds the largest amount of plutonium ever lost or dumped at sea. What's more, it sits in an area of major seafloor currents, giving researchers a chance to see whether radionuclides migrate or stay put, he says.

The idea of monitoring the submarine draws support from Bruce F. Molnia of the U.S. Geological Survey in Reston, Va., who has studied Russia's nuclear waste problems. But even if the seabed turns out to be an ideal disposal site, Molnia remains critical of the option because it requires long and dangerous transport of waste from inland sites to the middle of the ocean. —*R.M.*