

Does Gene Hike Radiation's Cancer Risk?

Following exposure to low levels of radiation, individuals suffering from a rare genetic disorder called ataxia-telangiectasia (A-T) not only develop severe rashes but also face a heightened risk of cancer. People acquire the disease only by inheriting an as-yet-unidentified gene from each parent. However, a controversial new study suggests women with just one copy of the gene face up to six times the normal breast-cancer risk when exposed to extremely low doses of radiation.

An estimated 1 million U.S. females carry a single A-T gene. Because current screening techniques cannot identify such carriers among the general population, the study's authors recommend tighter safety precautions for everyone undergoing medical diagnostic procedures that employ X-rays. But other physicians argue against changing radiology practices until the new results have been confirmed.

In the new study, Michael Swift and his colleagues at the University of North Carolina in Chapel Hill monitored 161 families of A-T patients for about six years. The researchers sought to discover whether the single A-T gene carried by an A-T patient's parents or close relatives might also render them more vulnerable to radiation.

Overall, blood relatives of A-T patients proved three to four times as likely to develop cancer from all causes as their spouses, who served as controls, the team reports in the Dec. 26 *NEW ENGLAND JOURNAL OF MEDICINE*. Female blood relatives faced five times the risk of breast cancer observed in the female spouses, the researchers found.

When the researchers analyzed the medical records of the 19 female relatives who developed breast cancer, they uncovered their most surprising finding — an apparent heightened vulnerability to radiation. Women who underwent diagnostic medical procedures that involved low doses of X-rays — such as mammograms, chest X-rays and gastrointestinal imaging — more than five years earlier than the study's beginning faced six times the risk of breast cancer seen in other potential female carriers of the A-T gene.

Swift says his team's results show that medical X-rays boost the susceptibility to cancer of all carriers of the A-T gene. But because researchers have not yet isolated the A-T gene, he says physicians have no way to test patients about to undergo an X-ray procedure to see if it might increase their cancer risk. "Since we can't tell yet who carries the A-T gene — except for A-T patients and their parents — we need to be more cautious with everybody" by limiting all X-ray tests and

shielding women's breasts, Swift asserts.

The Chapel Hill researchers calculate that between 1 and 2 percent of the U.S. population unknowingly carries one copy of the A-T gene. Thus, Swift estimates, the gene may account for between 7 and 14 percent of all U.S. breast cancer cases.

These new findings by Swift's group also raise questions about the safety of mammography. Many other studies have shown that by allowing the early detection of breast cancer, routine mammograms extend the lives of women over 50. However, a typical mammogram exposes a woman to between 1 and 3 milligrays (0.1 to 0.3 rads) of radiation. Swift estimates that the female A-T carriers that he studied developed breast cancer after cumulative exposure to between 5 and 30 milligrays.

But Edward Hendrick of the University of Colorado Health Sciences Center in Denver points out that if A-T carriers are so prevalent, they must have been included in every epidemiologic study showing mammography's benefits. Hendrick, who chairs the American College of Radiology's committee on mammography quality assurance, contends that until physicians have a test to identify A-T carriers, all women over age 50 should receive regular mammograms.

Epidemiologist John D. Boice of the National Cancer Institute agrees, adding that a mammogram exposes women to "a trivial amount of radiation," equivalent to one year's typical background radiation. While he terms Swift's team's results "interesting and provocative," he says "their finding needs to be confirmed by further work."
— C. Ezzell

Industrial countries warmed most at night

A study of temperature records in the United States, China and the former Soviet Union indicates that these regions have warmed over the last 40 years, but that most of the warming has occurred at night, with daytime temperatures staying about the same through the decades.

"This could be rather important in terms of understanding the impact of a [greenhouse] warming," says Thomas R. Karl of the National Climatic Data Center in Asheville, N.C., who worked with U.S., Soviet and Chinese researchers on the project. The team presents its results in the December *GEOPHYSICAL RESEARCH LETTERS*.

Karl and others noted in 1984 that nighttime temperatures in North America had risen over the previous four decades. But, he says, "we were really quite surprised to find an even stronger effect in China and the Soviet Union."

The researchers analyzed daily records from 497 stations in the United States, 57 in China and 190 in the former USSR. They adjusted the temperature data for the so-called "heat-island effect," which plagues weather stations in regions with a growing urban population. The analysis revealed statistically significant increases in the annual averages of each country's daily minimum temperatures.

The group also found an increase in extreme minimum temperatures in U.S. and Soviet records — meaning that the coldest nights had grown less frigid over four decades. But certain areas, including the eastern United States, showed the opposite trend: progressively lower minimum temperatures during winter over the last four decades.

The researchers say they do not know why the nights are warming more than the days, though they suspect that sulfur-based aerosol pollutants from fossil-fuel burning play a role. These microscopic droplets of sulfuric acid can stimulate the growth of clouds, which trap heat during the night. However, the rise in nighttime temperatures may result from other factors, including natural ones.

The day/night discrepancy suggests that the task of predicting long-term climate change is even tougher than scientists thought, Karl says.

If sulfur aerosols account for the "extra" nighttime warming, then less industrialized regions should show greater uniformity between their daytime and nighttime warming trends. Karl and his co-workers are now examining records from other parts of the world. Preliminary analysis of data from the Australian interior seems to show a more balanced night and day warming, he says.

Climate experts are becoming increasingly interested in sulfur aerosols because they can block sunlight, cooling Earth's surface. Some scientists suggest that sulfur aerosols have so far offset a significant portion of the greenhouse warming over industrialized regions of the Northern Hemisphere.

The newly reported increase in nighttime temperatures supports that idea, says James Hansen of NASA's Goddard Institute for Space Studies in New York City. But he warns that society cannot view aerosol pollution as a solution to the greenhouse problem, because the warming from greenhouse gases will dominate in the long run.
— R. Monastersky