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Radiation from long cellphone calls stimulates brain, study finds

MARTIN MITTELSTAEDT

U.S. scientists have discovered that the tiny bursts of microwaves emitted by cellular phones cause physiological changes in the brain.

The safety of cell phones is one of the most contested areas of science. In the new study, scientists discovered that the parts of the brain nearest the phone's antenna experience increased activity during long calls. Although they don't yet know whether the discovery has any health significance, it gives future work a focus: glucose, a sugar that is the primary fuel for brain cells.

In the study, the researchers strapped wireless phones to the ears of volunteers who received a call lasting 50 minutes and were then scanned for changes in their brains' levels of glucose, which increases in concentrations during brain activity. Increases were found in areas that absorbed the most radiation, but the researchers could not determine if this is was dangerous.

The unusual finding, published on Tuesday in the Journal of the American Medical Association, is likely to lead to new calls for stricter regulation of radiation emissions from the ubiquitous phones. The government currently assumes the signals have no effects other than a harmless warming of tissues near where they're held.

The increased activity occurred in the right orbitofrontal cortex, a region of the brain linked to learning and emotional processing, and in the right superior temporal gyrus, a region linked to such functions as being able to identify single tones.

It is one of the strongest indications to date that the phones can have unexpected impact other than the generally accepted thermal effects.

"We do not know whether this is benign," said Nora Volkow, a director at the U.S. National Institutes of Health and lead author of the study, which was conducted by scientists at the NIH and Brookhaven National Laboratory.

Much of the science of cell phone safety is in dispute, however, the NIH's stature as one of the premier U.S. government health institutions suggests that the validity of the new research is less likely to be contested. It was published in the JAMA, one of the top medical journals in the country, another sign of its significance.

“What they’re showing is that there’s something going on in the brain” due to cell phone radiation, said Louis Slesin, editor of Microwave News, a website that tracks research on radiation safety. “It’s really a total game changer.”

While Dr. Volkow said a single call of the kind her volunteers took has no health impact, the same can’t be said with certainty for hours of daily use over many years, which would lead to chronic increases in brain activity.

“The question is, ‘Does repeated stimulation of this type over long periods of time ... two or three hours a day over, say, five or 10 years, [have] long-lasting effects?’ That’s the question,” Dr. Volkow said.

About 75 per cent of Canadian households have access to cell phone. Experts are divided on whether they harm the brain, which, along with the hand, absorbs radiation when the devices are pressed against the ear.

In the past year, a study by the World Health Organization’s cancer watchdog found a 40 per cent increase in the risk of glioma, a deadly brain cancer, after a decade of heavy use. But a report released last month by researchers in the United Kingdom who studied brain cancer incidence in that country didn’t detect any increases. Other researchers have noted that wireless radiation weakens the barrier that keeps contaminants from the brain, although the health impact of this finding isn’t clear.

With conflicted scientific results, governments haven’t accepted as proven any health hazards from the devices, and in setting radiation exposure standards, have limited emissions to prevent tissues near the phones from heating up.

For her part, Dr. Volkow said she’s using her cell phone with an earpiece as a precaution. She also advises children and teenagers to text, rather than holding phones against their heads, because their brains are still developing.

All cell phones in use are safe because they are designed to meet these government radiation standards, said Marc Choma, spokesman for the Canadian Wireless Telecommunications Association, a group representing phone makers and telecommunications companies. He declined to comment on the newest study until it is reviewed by the group.

The research involved 47 volunteers who had cell phones over each of their ears and were kept in a dimmed room. Brain glucose was monitored after the phones over their right ears were activated for 50 minutes and received a call with the sound turned off while the other phone was deactivated. They were tested again with both phones deactivated.

Glucose increased by 7 per cent due to the call. This is equal to the rise that would occur in people whose brains were being stimulated by looking at pictures, among other causes.

Health Canada declined to comment, saying “it would be inappropriate” because it hadn’t yet seen or reviewed the finding.