Cell Phone Radiation Increases Cancers in Rats, but Should We Worry?

Source: Carina Storrs, CNN.com

The issue of whether cell phone use could cause cancer has been mired in confusion, with some studies failing to find an increased risk of brain tumors among cell phone users, while others suggest greater risk among the most frequent of users.

Part of the problem is that studying people is less controlled than testing animals in labs. Researchers have asked individuals diagnosed with brain tumors to recall how much they used their cell phones and compared it with usage by healthy people, but it can be hard for people to accurately remember their use. Other studies have followed healthy people for years to see whether those who use their phones the most develop more cancers, and while they have not found that to be the case, heavy users could differ in other ways that affect their cancer risk.

To get around these challenges, some researchers have turned to rodents. They expose mice or rats to known doses of radiation that are equivalent to -- or sometimes more than -- what people get from their cell phones.

In the latest rodent study (PDF), released Friday, researchers at the National Institute of Environmental Health Sciences gave rats high doses of radiation every day for two years and compared them with rats that did not receive radiation. The researchers looked at how many animals developed tumors in the brain and in nerve cells of the heart.

The researchers found that 2% to 3% of the hundreds of male rats that were irradiated developed brain tumors, compared with none of the control rats. The number of female rats that developed these cancers was smaller, about 1% of the animals, and could have been due to chance. Similarly, between 2% and 7% of the irradiated male rats developed heart tumors, compared with only about 2% of the irradiated female rats and none of the control rats.

"Our report outlines small increases in tumors of male rats," said John R. Bucher, associate director of the National Toxicology Program and one of the researchers involved in the new report. He explained that the tumors were "of types similar to those" in other research that found radiofrequency from cell phones is a possible carcinogen (PDF).

However, "much work remains to be done to understand the implications of these findings, if any, for the rapidly changing use of cell phone technology today," Bucher said. For the time being, he is still using his cell phone, putting it next to his head or wearing earbuds, depending on what he is doing.

'It may raise more questions than it answers'

The bulk of the research on this topic has not found a link between cell phone radiation and tumor risk, although the possibility had not been ruled out, said Salvatore Insinga, a neurosurgeon at Northwell Health's Neuroscience Institute in Manhasset, New York.

Because of the unusual findings in the new study, "it may raise more questions than it answers," Insinga said. Nevertheless, it suggests that researchers should double down on studying the possible cancer link, he added.

For now, Insinga said, there are not enough data to advise people to cut their cell phone use or to use earbuds. The Federal Communications Commission states that people could reduce their exposure to cell phone radiation by using an earpiece or headset when they talk, and by keeping the device away from their bodies. However, the agency falls short of endorsing these
practices and states that "no scientific evidence currently establishes a definite link between wireless device use and cancer."

One of the conundrums with the current study is that, for reasons unclear to the researchers, rats in the control group did not live as long as the rats that received radiation. "If rats are living longer, the chance statistically is increased they will get cancer," Insinga said.

Several researchers provided feedback as part of the study and echoed this concern. "It is puzzling why the control [rats] had short survival rate," one researcher wrote. If these animals had lived as long as the irradiated rats, he added, they might have developed brain and heart tumors at similar rates. The rate that rats develop brain and heart tumors, even without receiving radiation, is typically 1.7% and 1.3%, respectively.

It is also unclear why the male rats in the study developed more cancer than the females. Bucher noted that studies in rats generally find males to be more susceptible to developing tumors, but the few studies in people that observed a link between cell phone use and cancer risk did not find gender differences.

The third conundrum is whether the animals received too much radiation. The lowest dose the animals received was 1.5 watts per kilogram, just below the limit of 1.6 watts per kilogram set by the Federal Communications Commission for the amount of energy the body can absorb. However, the animals were exposed to this amount of radiation over their entire bodies nine hours a day for two years.

The rationale for using this amount of radiation is that people could be using their cell phones more and more in the future, and the radiation emitted by newer cell phones and cellular networks could increase, Bucher said. "We wanted to make sure we captured future use," he said.

The researchers also chose to expose the rats' entire bodies to radiation to mimic the situation with people who hold their cell phones on different parts of their bodies, Bucher said.

Previous research in rodents has found that exposing animals to cell phone radiation across their entire bodies for only an hour a day or six hours a day for a shorter number of days did not lead to increases in the rates of lymphomas and brain tumors, respectively.

**Action item: More research**

The value of the new study is really to strengthen the biological possibility that cell phone radiation could cause cancer, said Jonathan M. Samet, chairman of preventive medicine at the University of Southern California, who led the World Health Organization panel in 2011 that determined cell phone use is a possible cancer risk.

"It really signals the need for a more integrated research agenda than we have had and to try to get a better mechanistic understanding," Samet said.

Some researchers have dismissed the possibility that cell phone radiation could cause cancer, because it is non-ionizing and does not carry enough energy to damage DNA like the ionizing radiation in X-rays and CT scans does. Hopefully, animal studies can help shed light on how non-ionizing radiation could be increasing cancer risk, Samet said.

The current report is the first of two installments of the National Institute of Environmental Health Sciences study. The second report, which should be released in the fall of 2017, will include data from mice as well as rats and will look at rates of cancers in other organs and tissue types.

**Possible Response Question(s):**

- Pick a passage from the article and respond to it.