High-Level Cell Phone Radiation Linked to Possible Cancer Risk in Rats

Radiofrequency radiation was associated with heart nerve tumors in male rats, but not female rats or mice.

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Exposure to radiofrequency radiation (RFR) at levels well above those usually emitted by cell phones was associated with a small increase in the risk of heart tumors in a rat study, according to a news release from the National Institutes of Health. However, the researchers added, there was "little indication of health problems in mice" related to cell phone radiation.

The study data were inconsistent. Two draft reports released last week by the National Toxicology Program (NTP) showed that male rats exposed to more than the highest level of cell phone radiation allowed today were more likely to develop tumors known as malignant schwannomas around the nerves of the heart. These tumors affect Schwann cells, which produce the protective myelin sheath around nerve cells.

About 6 percent of male rats exposed to the highest RFR levels—many times the levels emitted by modern cell phones—developed the tumors, compared with up to 2 percent of unexposed rats in other studies. Female rats and mice of either sex showed no increased risk of this type of tumor.

The studies saw a small increase in the number of rats and mice with tumors in other organs, including the brain, liver, pancreas and prostate. Although some of the differences were statistically significant—meaning they likely were not due to chance—the researchers said that the evidence was equivocal, meaning it was unclear whether the increase in tumors was actually attributable to radiofrequency radiation.

"The levels and duration of exposure to RFR were much greater than what people experience with even the highest level of cell phone use and exposed the rodents' whole bodies. So these findings should not be directly extrapolated to human cell phone usage," said NTP senior scientist John Bucher, PhD. "We note, however, that the tumors we saw in these studies are similar to tumors previously reported in some studies of frequent cell phone users."

To learn more, scientists are now examining tissue samples from exposed rats and mice at the molecular level, Bucher told reporters during a February 2 media telebriefing. He added that the latest findings would not cause him to alter his own cell phone use or encourage his family to do

so.

The latest findings contribute to the lack of clarity about the link between cell phones and cancer. In December, the California Department of Public Health released guidance for minimizing exposure to radiofrequency energy from cell phones, renewing debate about whether the ubiquitous devices can raise the risk of brain tumors or other cancer types.

According to the National Cancer Institute, low- to medium-frequency electromagnetic fields (such as those produced by power lines, Wi-Fi devices or cell phones) do not cause DNA damage that can lead to cancer, unlike high-frequency ionizing radiation (such as X-rays or ultraviolet radiation from the sun), which is powerful enough to knock electrons off atoms.

The National Cancer Institute and the American Cancer Society say cell phones are not a recognized cancer risk factor. The World Health Organization's International Agency for Research on Cancer classifies electromagnetic fields produced by mobile phones as "possibly carcinogenic" to humans, but the agency says, "To date, no adverse health effects have been established as being caused by mobile phone use."

In the NTP studies, rats and mice were put in special chambers that exposed them to RFR levels ranging from 1.5 to 10 watts per kilogram for up to two years. They were exposed every other 10 minutes for 9 hours a day, approximating a heavy phone user. The low power level for rats (2.5 W/kg) was equal to the highest level of local tissue exposure to cell phone emissions allowed today. Of note, the studies used the older 2G and 3G frequencies and modulations (900 and 1900 megahertz), although 4G and 5G are increasingly used today.

In addition to cancer, the researchers also looked at other potential health problems. They saw some DNA damage in exposed animals, contrary to the belief that cell phone radiation does not cause such damage. They found that exposed male and female rats had a higher rate of cardiomyopathy, or heart muscle damage. Infant rats born to mothers exposed to high radiation levels during pregnancy or breast feeding had a lower body weight, but they ultimately grew to normal size. And interestingly, the radiation-exposed rats lived longer on average than unexposed ones.

"I want to underscore that based on our ongoing evaluation of this issue and taking into account all available scientific evidence we have received, we have not found sufficient evidence that there are adverse health effects in humans caused by exposures at or under the current radiofrequency energy exposure limits," Jeffrey Shuren, MD, JD, director of the Food and Drug Administration Center for Devices and Radiological Health, said in a statement. "Even with frequent daily use by the vast majority of adults, we have not seen an increase in events like brain tumors. Based on this current information, we believe the current safety limits for cell phones are acceptable for protecting the public health."

While experts acknowledge the lack of evidence to conclusively link cell phone use and cancer, California public health officials offered some tips for minimizing potential risk. These include keeping cell phones away from your body (for example, using the speaker or texting instead of

holding a phone next to your head), carrying phones in a bag rather than in a pocket or tucked in a bra, keeping your phone away from your bed while you sleep and avoiding cell phone use when the signal is weak or while in a moving car or train because phones emit more RFR when trying to connect to or switch between cell towers.

The NTP will hold an expert review meeting in late March to discuss the recent findings. The draft reports are currently open for public comment.

Click here to read the National Institutes of Health Press release.

Click here to access the National Toxicology Program cell phone reports.

Click here to read the FDA's statement about the reports.

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