

Studies offer no clear answers on safety of cellphone use

February 2 2018



In this Thursday, Oct. 11, 2012 file photo, a pedestrian talking on a cellphone is silhouetted in front of a fountain at John F. Kennedy Plaza, also known as Love Park in Philadelphia. Released on Friday, Feb. 2, 2018, two government studies that bombarded rats and mice with cellphone radiation found a weak link to some heart tumors, but the research does not provide any clear answers about the safety of the devices that seem like extensions of our bodies. (AP Photo/Matt Rourke)

Two government studies that bombarded rats and mice with cellphone

radiation found a weak link to some heart tumors, but scientists and federal regulators say don't worry—it is still safe to use your device.

Previous studies of cellphone users had found little reason for concern, but the newest research took a closer look at the effects of super-high doses in animals to address some lingering questions that could not be tested on humans.

The rat study released Friday found a small increase in an unusual type of heart [tumor](#) in male [rats](#) but no other significant problems in females or in a separate study of mice. In particular, scientists could not find hard evidence for concern about brain tumors.

The lead author of the research, John Bucher of the National Institute of Environmental Health Sciences, is not changing his cellphone use or advising his family to.

Adding to the confusion about how to weigh these results, the same study that found heart tumors nonetheless showed that the radiated rats somehow lived longer than the control group that was not radiated.

The findings about the rare nerve-tissue tumor discovered in the hearts of male rats do not translate directly into a concern for humans, Bucher said.

Bucher's agency conducted the \$25 million study at the behest of the Food and Drug Administration, which quickly said cellphones are safe.

"The current safety limits for cellphones are acceptable for protecting the public health," FDA radiation health chief Dr. Jeffrey Shuren 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."

Bucher said the typical cellphone use is "very, very, very much lower than what we studied."

Rats and mice were bombarded for nine hours a day for up to years with a level so high that humans would only experience it briefly, if they have a weak cell signal, Bucher said in a news conference.

The toxicology program released preliminary results two years ago and finalized them Friday. The earlier report showed a hint of increased brain tumors in male rats, but the final results did not bear that out.

Bucher said the odd finding of the radiated rats surviving longer could be just chance or it could be that the radiation reduced inflammation in the rats, which in turn decreased the risk of a rat disease.

In 2011, a working group of the International Agency for Research on Cancer said cellphones are possibly carcinogenic. But numerous studies over the years, before and after that listing, have found little evidence of a problem.

Among the largest studies, a 2010 analysis in 13 countries found little or no risk of [brain tumors](#), with a possible link in the heaviest users that the study's authors found inconclusive. And a large Danish study that linked [phone](#) bills to a cancer registry found no risk even from more than 13 years of cellphone use, according to the latest update in 2007.

In December, the state of California put out a guide on how people could reduce [exposure](#) to radiofrequency from cellphones. It said "although the science is still evolving, some laboratory experiments and human health studies have suggested the possibility that long-term, high use of cellphones may be linked to certain types of cancer and other [health effects](#)."

National Institutes of Health press release:

High exposure to radiofrequency radiation linked to tumor activity in male rats

High exposure to radiofrequency radiation (RFR) in rodents resulted in tumors in tissues surrounding nerves in the hearts of male rats, but not [female rats](#) or any mice, according to draft studies from the National Toxicology Program (NTP). The exposure levels used in the studies were equal to and higher than the highest level permitted for local tissue exposure in [cell phone](#) emissions today. Cell phones typically emit lower levels of RFR than the maximum level allowed. NTP's draft conclusions were released today as two technical reports, one for rat studies and one for mouse studies. NTP will hold an external expert review of its complete findings from these rodent studies March 26-28.

The incidence of tumors, called malignant schwannomas, that were observed in the heart increased in male rats as they were exposed to increasing levels of RFR beyond the allowable [cell phone](#) emissions. Researchers also noted increases in an unusual pattern of cardiomyopathy, or damage to heart tissue, in exposed male and [female rats](#). Overall, there was little indication of health problems in mice related to RFR.

The reports also point out statistically significant increases in the number of rats and mice with tumors found in other organs at one or more of the [exposure](#) levels studied, including the brain, prostate gland, pituitary gland, adrenal gland, liver, and pancreas. However, the researchers determined that these were equivocal findings, meaning it was unclear if any of these tumor increases were related to RFR.

"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 John Bucher, Ph.D., NTP senior scientist. "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 conduct the studies, NTP built special chambers that exposed rats and mice to different levels of RFR for up to two years. Exposure levels ranged from 1.5 to 6 watts per kilogram (W/kg) in rats, and 2.5 to 10 W/kg in mice. The low power level for rats was equal to the highest level permitted for local tissue exposures to cell phone emissions today. The animals were exposed for 10-minute on, 10-minute off increments, totaling just over 9 hours each day. The studies used 2G and 3G frequencies and modulations still used in voice calls and texting in the United States. More recent 4G, 4G-LTE, and 5G networks for streaming video and downloading attachments use different cell phone signal frequencies and modulations than NTP used in these studies.

The NTP studies also looked for a range of noncancer health effects in rats and mice, including changes in body weight, evidence of tissue damage from RFR-generated heating, and genetic damage. Researchers saw lower body weights among newborn [rats](#) and their mothers, especially when exposed to high levels of RFR during pregnancy and lactation. Yet, these animals grew to normal size.

"These studies were complex and technically challenging, but they provide the most comprehensive assessment, to date, of health effects in [rats](#) and mice from exposure to RFR," said Bucher. "Cell phone technologies are constantly changing, and these findings provide valuable information to help guide future studies of cell phone safety."

The U.S. Food and Drug Administration (FDA) nominated cell phone radiofrequency radiation for study by NTP because of widespread use of

cell phones. FDA and the Federal Communications Commission are jointly responsible for regulating wireless communication devices.

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Citation: Studies offer no clear answers on safety of cellphone use (2018, February 2) retrieved 26 April 2024 from

<https://medicalxpress.com/news/2018-02-high-exposure-radiofrequency-linked-tumor.html>

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