Writing a Summary

Teens' cell phone use linked to memory problems

Exposure to radiation from phones might affect a certain type of memory in teens

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Teenagers who talk on the phone a lot, and hold their cell phones up to their right ears, score worse on one type of memory test. That's the finding of a new study. That memory impairment might be one side-effect of the *radiation* that phones use to keep us connected while we're on the go.

Nearly 700 Swiss teens took part in a test of *figural memory*. This type helps us recall abstract symbols and shapes, explains Milena Foerster. She's an epidemiologist. That's someone who studies disease patterns within a population. She worked on the study as part of a team while Foerster was at the Swiss Tropical and Public Health Institute in Basel, Switzerland. (She is now at the World Health Organization's International Agency for Research on Cancer in Lyon, France.)

Teens participated in memory tests twice, one year apart. Each time, they had one minute to memorize 13 pairs of abstract shapes. Then they were shown one item from each pair and asked to match it with one of five choices.

The study volunteers also took a test of *verbal memory*. That's the ability to remember words. The two memory tests are parts of an intelligence test.

The researchers also surveyed the teens on how they use mobile phones. And they got call records from phone companies. The researchers used those records to estimate how long the teens were using their phones. This allowed the researchers to calculate how big a radiation exposure each person could have gotten while talking.

All cell phones give off energy in the form of radiofrequency electromagnetic fields, or RF-EMFs. Radio and TV broadcasts also use this type of energy. So do microwave ovens and some other gadgets.

For a phone, that energy carries information, in the form of calls or texts between phones and cell phone towers. That radiation also can travel into people's bodies as they use their phones. And some of its energy can be absorbed by the body. So far, scientists have not shown that radiation from phones causes harm, says the Federal Communications Commission. Research is ongoing, this U.S. agency notes.

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A phone user's exposure to RF-EMFs can vary widely. Some teens talk on their phone more than others. People also hold their phones differently. If the phone is close to the ear, more radiation may enter the body, Foerster notes.

Even the type of network signal that a phone uses can matter. Much of Switzerland was using an older "second-generation" type of cell-phone network when the group collected its data. That type of network can expose people to between 100 and 500 times as much RF-EMF radiation as newer networks, the study reports. Many phone carriers have moved away from such networks. And more companies plan to update their networks within the next few years.

The teens' scores in the figural memory tests were roughly the same from one year to the next. But those who normally held their phone near their right ear, and who were also exposed to higher levels of radiation, scored a little bit worse after a year. No group of teens showed notable changes on the verbal memory test.

Why might one type of memory be linked to cell phone use, but not another? Foerster and her colleagues think it could have to do where different memory centers sit in the brain. The site that deals with the ability to remember shapes is near the right ear. "This may suggest that indeed RF-EMF absorbed by the brain is responsible" for the results, said coauthor Martin Röösli. He, too, is an epidemiologist in Basel at the Swiss Tropical and Public Health Institute.

The report was published last July in *Environmental Health Perspectives*.

Citation
Journal: M. Foerster et al. A prospective cohort study of adolescents' memory performance and individual brain dose of microwave radiation from wireless communication. *Environmental Health Perspectives.* Vol. 126, July 23, 2018. doi: 10.1289/EHP2427.

Website: U.S. National Cancer Institute. Cell Phones and Cancer Risk.

Technical Report: National Toxicology Program. Toxicology and carcinogenesis studies in Hsd: Sprague Dawley SD rats exposed to whole-body radio frequency radiation at a frequency (900 MHz) and modulations (GSM and CDMA) used by cell phones. TR-595. Peer-reviewed draft, March 28, 2018. 381 pp.

Technical Report: National Toxicology Program. Toxicology and carcinogenesis studies in B6C3F1/N mice exposed to whole-body radio frequency radiation at a frequency (1,900 MHz) and modulations (GSM and CDMA) used by cell phones. TR-596. Peer-reviewed draft, March 28, 2018. 270 pp.

Next Page . . .

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1. **Read article carefully to understand what the author is saying.**
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3. **Identify key facts and findings in each paragraph.**
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Write your summary of the ENTIRE article here. ***(8 to 10 Sentences)***

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