

Do mobile phones give you brain cancer?

August 9 2016, by Dariusz Leszczynski



Credit: AI-generated image ([disclaimer](#))

It is a question any mobile phone user would be keen to have answered – and science does offer some clues. In 2011, for example, the International Agency for Research on Cancer (IARC) classified mobile phone radiation as a [possible human carcinogen, group 2B](#).

The classification was based predominantly on evidence from population studies. A [study](#) by the European Union-funded INTERPHONE group

and [another](#) led by L. Hardell, a Swedish epidemiologist, showed an increased risk (40-170%) of developing glioma, a malignant brain cancer, in people who used a mobile phone for 30 minutes a day over ten years.

The idea of mobile phone radiation increasing the risk of cancer was strengthened by two other studies. The [Cerenat](#) study, published in 2013, confirmed observations of the INTERPHONE and Hardell studies. And an [animal study](#) in 2015 showed cell phone radiation enhanced the carcinogenic effects of chemicals.

This evidence indicates that mobile phone radiation might indeed be "possibly carcinogenic" (IARC's group 2B) or even "probably carcinogenic" (IARC's group 2A) to humans.

IARC classifies agents as carcinogenic (group 1), probably carcinogenic (group 2A), possibly carcinogenic (group 2B), not classifiable as carcinogen (group 3), probably not carcinogenic (group 4).

However, [other studies](#) show the number of people getting brain cancer has remained unchanged or only slightly increased. This is in spite of the dramatic increase in the number of users of mobile phones over the last ten to twenty years.

And so there is a contradiction between the evidence that shows an increased risk of brain cancer and the studies that show that the rate of brain cancer in populations "saturated" by mobile phones is fairly constant.

Which view is right?

Those who believe the case-control studies that indicate a causal link between brain cancer and mobile phone radiation to be correct suggest it

is still too early to see the clear increase in brain cancer in the general population. There is, after all, a long latency for this cancer (tens of years) and it's only during the last ten to 15 years that people have begun to use mobile phones intensively. Before that, they were too expensive.

Those who favour the studies that show no particular increase in brain cancer in populations with dramatically increased phone usage, meanwhile, consider the evidence from the case-control studies to be a statistical "glitch".

But what if both views are correct? What if mobile phone radiation does not itself cause cancer but long-term exposure increases the risk of developing cancer from other causes?

This hypothesis may explain the apparent discrepancy.



Credit: fauxels from Pexels

Animal studies, evaluated by IARC experts in 2011, suggest that mobile phone radiation alone does not cause cancer. However, it may still have "co-carcinogen" properties. [In five studies](#), mobile phone radiation increased development of cancer in animals simultaneously exposed to low doses of known chemical carcinogens. One of the five was recently [replicated](#) and confirmed the co-carcinogenic effect of mobile phone radiation.

To date there has only been a handful of co-carcinogenicity studies where animals or living cells were simultaneously exposed to chemicals and to mobile phone radiation. This poses a serious problem for proper risk estimation.

Based on the very limited, currently available knowledge, mobile phone radiation might not cause cancer itself. Instead, it might activate regulatory processes and accelerate development of the disease.

Using this hypothesis, it is possible to explain several of the "inexplicable" contradictory scientific results.

First, it could be that case-control studies show increased risk of brain cancer not because mobile phone radiation causes it, but because it accelerates the development of brain cancers caused by other carcinogens or which occur due to spontaneous gene mutations.

Second, the incidence of brain cancer is low compared with the high rate of mobile phone use because the increases are solely due to co-

carcinogenic effects of mobile phone radiation. Not all users are in danger of developing brain cancer, only those who are developing it as a result of other carcinogenic or genetic factors.

Finally, published in May 2016 [first results](#) from the animal study conducted at the US National Toxicology Program showed a lack of brain cancer in the control group and a very small number of brain cancer cases among the exposed rats.

Animals were exposed solely to mobile phone radiation and because of the small number of brain cancers caused by mobile phone radiation, some questioned the significance of this observation. But the above proposed hypothesis explains this result. Exposed animals developed a small number of brain cancers not because of the mobile phone radiation alone but because it accelerated the development of cancers caused by spontaneous mutations. In the control group, the same brain cancers, caused by spontaneous mutations, had no time to develop because there was no extra stimulus to accelerate them.

Risk of brain cancer remains low

Assuming the hypothesis is correct, mobile phone radiation would have less severe implications for public health than suggested by some epidemiological studies. Not all mobile phone users would be in danger of developing brain cancer. Only those exposed to carcinogenic factors or who develop spontaneous gene mutation would be at risk of the development and manifestation of the cancer.

The proposed hypothesis does not invalidate the IARC classification of mobile phone radiation as a possible carcinogen. IARC classification informs only that avid users have an increased risk of developing cancer. It does not say whether radiation is a "carcinogen" or a "co-carcinogen".

So this hypothesis does not give mobile phone radiation a clean bill of health. It suggests, however, that it might be unlikely that there will be an epidemic of brain cancer but only a modest increase in prevalence.

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