SKEPTICS CORNER

Cell Phones And Cancer

How Sensational Reporting Influences Our Perception

By Daniel Liang

Daniel Liang looks at a familiar world in an unfamiliar way - through a skeptical lens. Every month he peeks under the hood of a meme, myth, bias, or news article. Disclaimer: the opinions expressed do not represent the magazine, advertisers, employer, or Apple or Samsung.

We live in an age where people choose to WeChat rather than talk, often even in each other's presence. The cell phone, once an unwieldy instrument that required significant upper body strength to use, is now a sleek extension of our bodies, and a gateway to our fantasized digital personas.

With our extended usage of cell phones, it is natural and prudent to be wary of any potential adverse health effects. Naturally it is no surprise that a recent study conducted by the National Toxicology Program about the potential cancer risks of cell phones has been getting a lot of attention. This story has been widely reported in the media, and was a featured story on China's official CCTV channel. With terrifying headlines in mainstream media like "Game-Changing Study Links Cellphone Radiation to Cancer" and "Cellphone-Cancer Link Found in Government Study", it sure seems like it is time to panic. However, before we reluctantly settle for cancer rather than give up our phones, let's take a closer look.

存疑之隅——手机与癌症

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The Actual Study

After reading the original study, a few things really stood out. First of all, this was a controlled experiment on rats, not humans. The rats were subjected to rather extreme radiation - 9 hours a day of whole-body exposure, starting not at birth but in utero, with up to 3.75 times the maximum Specific Absorption Rate (SAR) allowed by the FCC. This is presumably based on the realistic simulation of someone talking for 9 hours a day in a full body iPhone suit and helmet, starting in the womb.

After exposure to radiation for their entire lives, some male rats did in fact get two certain types of cancer. This sounds alarming, but careful reading reveals an important fact: these rats are far more cancer prone than humans. For example, in these rats the background lifetime incidence rate for malignant glioma is 1.67%, which is incredibly high compared to humans. According to data from the National Cancer Institute, the incidence rate (age-adjusted 6.4/100,000) and prevalence (~0.03%) are both very low, and these numbers are for all brain and nervous system cancers, not just malignant glioma.

Quirky Results On A Shaky Foundation

Out of sheer luck, none of the 90 rats in the control group got the cancer being studied. With a historical background rate of 1.67% for glioma (range 0-8%), it is lower than expected, and an unrealistic base to be compared against. In fact, when a reviewer hypothetically added one cancer in the control group (a reasonable expected value), a lot of the positive results disappeared. I'm not a statistician, but any result that relies solely on luck is on a shaky foundation.

Another quirk is that it the effect was only seen in male but not female rats, a puzzling result seemingly suggesting that cell phone radiation practices sexual discrimination. It brings out a bigger question: if the results are completely different even between male and female rats of the same species, how far a stretch is it to pretend the results can apply to a different species far less prone to the disease?

And finally, the groups that were bathed in radiation actually lived longer than their non-radiated counterparts; yet the headlines don't read "Cell Phone Use Associated with Increase in Longevity". Since cancers develop over time, it's likely that the increase in cancer was due to the rats living longer and not the radiation.

This reminds me of a myth I hear all the time: that our ancestors were healthier and lived cancer-free, and modern medicine is the real culprit behind cancer. It is largely true that not dying of cancer is one of the upsides of living in Ye Olde Tymes. The downside is that you have a life expectancy of 33 compared to a modern life expectancy of over 80. Yes, nowadays people are dying from cancer, clogged arteries and small lead projectiles, but only because modern medicine eliminated premature death from things like smallpox, plague, and bacterial infections.

Plausibility

One aspect of the study rarely discussed is how far-fetched the idea actually is. Cell phones emit non-ionizing radiation, which produces heat but does not contain enough energy to damage DNA. Ionizing radiation from say, X-rays and nuclear meltdowns, can damage DNA - which is the key to how it induces cancer.

The difference between non-ionizing and ionizing radiation is like getting hit by a different objects shot out of a gun. Feathers and marshmallows are pretty harmless, plastic pellets might pierce the skin, and lead bullets are rather undesirable. This study is essentially asking, "even though marshmallows cannot penetrate the skin, is there a lethal dose if you fire enough of them?"

A Better Perspective

Cell phones have been around for decades. If they did present a genuine cancer risk, we would expect to see a positive correlation in the cancer statistics. It doesn't exist. In fact, the incidence of brain cancer has not been on the rise, but actually decreasing by about 0.2%-0.3% per year. Despite a general lack of evidence and out of an abundance of caution, the International Agency for Research on Cancer (IARC) still classified cell phones as

category "2B" – possibly carcinogenic to humans. That sounds scary, but to put it in perspective, that is in the same category as pickles and aloe vera.

Conclusion

When we put the study into context, the actual findings are far less ominous than what the headlines portray. It is sad that instead of taking a balanced perspective, the media engage in fear mongering and sensationalism. The reality is that this is an underpowered study done on rats, with underwhelming results that only apply to one sex, with no known mechanism of causation. It is a starting point that warrants further study, but about as far as it can be from being a smoking gun.

Despite what the media proclaim, topics like these are nuanced and require a broader examination of all the available evidence. It is human nature to crave certainty, yet science by definition cannot prove a negative. Science is incremental and messy but will eventually converge towards the truth, and in this case, it still leans towards cell phones not causing cancer.

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