Cellular Telephones and Cancer: How Should Science Respond?

Robert L. Park

The first exposure of most people to new scientific or medical findings is through the media, particularly television. The media stories that should inform the public, however, have usually been selected more for entertainment value than for news content.

Most people first heard about a possible cell phone/cancer connection when David Raynard, whose wife had died of brain cancer, was a guest on the television show Larry King Live. Raynard was suing the cell phone industry, insisting that his wife’s cancer had been caused by a cell phone. “She held it against her head, and she talked on it all the time,” he explained. It was January 23, 1993; from that day on, it seemed that every media story dealing with cell phones brought up the cancer issue.

Make no mistake about it, cell phones are dangerous when people use them while driving. Using cell phones in public places can also be rude and intrusive. I personally dislike cell phones, but can their use lead to cancer?

Eight years after Raynard’s appearance on Larry King Live, we have a convincing answer to that question. A beautifully designed, nationwide, epidemiologic study of cell phone use and cancer has been carried out in Denmark. It is reported on in this issue of the Journal by Johansen et al. (1). The study included all of the nearly half a million users of cellular telephones in Denmark during the period from 1982 through 1995. Users were identified from subscriber lists, and their cancer incidence was determined by linkage with the Danish Cancer Registry. The large cohort and the rock-solid database make it difficult to take issue with the report’s conclusion: The results “do not support the hypothesis of an association between use of these telephones and tumors of the brain or salivary gland, leukemia, or other cancers.” Other recent epidemiologic studies of cellular telephone use and cancer (2,3), although less powerful, report similar findings.

It must be remembered that, in 1993, there was a widespread conviction that electromagnetic fields (EMF) from power lines and household appliances were linked to the occurrence of childhood leukemia and other cancers. Indeed, the public had been exposed to media stories about the supposed hazards of EMF since 1989, when the New Yorker magazine ran a series of scare stories by staff writer Paul Brodeur.

Most scientists, however, remained skeptical. The epidemiology was weak, and laboratory evidence was scanty and contradictory. But above all, there was simply no plausible mechanism by which 60-Hertz fields could induce cancer. The public, it seems, is more easily persuaded by anecdotal accounts than by science, and the scientific community should bear that in mind when communicating with the public. But for issues that have major social implications, we must insist that, by itself, evidence of an association between health effects and environmental factors is not sufficient. A plausible mechanism must be identified and supported by laboratory evidence.

All known cancer-inducing agents—including radiation, certain chemicals, and a few viruses—act by breaking chemical bonds, producing mutant strands of DNA. Electromagnetic radiation is absorbed by molecules as discrete packets of energy called “photons.” The energy of a photon is determined by the wavelength; the shorter the wavelength, the higher the energy. Not until the ultraviolet region of the electromagnetic spectrum is reached, beyond visible light, beyond infrared and far, far beyond microwaves, do photons have sufficient energy to break chemical bonds. It’s a little like trying to hit an object across a river with a stone. Even if your aim is poor, you might expect to hit the target now and then if you throw enough stones. But it won’t matter how many stones you throw if you can’t throw that far. Microwave photons heat tissue, but they do not come close to the energy needed to break chemical bonds, no matter how intense the radiation.

Concern that sources outside the scientific community were giving the public a distorted view of the science led to independent reviews of the hundreds of scientific papers on EMF and cancer by panels of experts (4,5). The reviews found no persuasive evidence linking residential EMF to risk of cancer. Nevertheless, public concern did not abate until an exhaustive epidemiologic study of exposure and childhood leukemia was conducted by the National Cancer Institute (6). That study, like the Danish cell phone study, was done on such a scale and with such attention to potential sources of error that it left little room for challenge. It concluded that any link between the occurrence of acute lymphoblastic childhood leukemia and exposure to EMF is too weak to detect or to be concerned about. Similar studies in Canada and the U.K. came up with essentially identical results.

Even today, however, there are those who still insist publicly that residential EMF is a “possible carcinogen” [International Working Group convened by the National Institute of Environmental Health Sciences as cited in (6)]. They include many of the fear merchants that now claim that cell phones are linked to cancer, such as the publication Microwave News.

Regardless of how convincing the evidence exonerating cell phones may be, there will continue to be those who will argue that the issue has not been completely settled. In science, few things ever are. The scientific community has a responsibility to put all the evidence into perspective for the public.

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REFERENCES


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Robert L. Park is the author of Voodoo Science: The Road from Foolishness to Fraud.