# The Hidden Dangers of Cell Phone Radiation

While the communications industry insists that cell phones are safe, abundant evidence indicates that radiation from cell phones poses deadly health risks. Find out how to limit dangerous radiation.



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Every day, we're swimming in a sea of electromagnetic radiation (EMR) produced by electrical appliances, power lines, wiring in buildings, and a slew of other technologies that are part of modern life. From the dishwasher and microwave oven in the kitchen and the clock radio next to your bed, to the cellular phone you hold to your ear—sometimes for hours each day—exposure to EMR is growing and becoming a serious health threat.

But there's a huge public health crisis looming from one particular threat: EMR from cellular phones—both the radiation from the handsets and from the tower-based antennas carrying the signals—which studies have linked to development of brain tumors, genetic damage, and other exposure-related conditions.[1-9] Yet the government and a well-funded cell phone industry media machine continue to mislead the unwary public about the dangers of a product used by billions of people. Most recently, a Danish epidemiological study announced to great fanfare the inaccurate conclusion that cell phone use is completely safe.[10]

George Carlo, PhD, JD, is an epidemiologist and medical scientist who, from 1993 to 1999, headed the first telecommunications industry-backed studies into the dangers of cell phone use. That program remains the largest in the history of the issue. But he ran afoul of the very industry that hired him when his work revealed preventable health hazards associated with cell phone use.

In this article, we look at why cell phones are dangerous; Dr. Carlo's years-long battle to bring the truth about cell phone dangers to the public; the industry's campaign to discredit him and other scientists in the field; and what you can do to protect yourself now.

## Cell Phones Reach the Market without Safety Testing

The cellular phone industry was born in the early 1980s, when communications technology that had been developed for the Department of Defense was put into commerce by companies focusing on profits. This group, with big ideas but limited resources, pressured government regulatory agencies—particularly the Food and Drug Administration (FDA)—to allow cell phones to be sold without pre-market testing. The rationale, known as the "low power exclusion," distinguished cell phones from dangerous microwave ovens based on the amount of power used to push the microwaves. At that time, the only health effect seen from microwaves involved high power strong enough to heat human tissue. The pressure worked, and cell phones were exempted from any type of regulatory oversight, an exemption that continues today. An eager public grabbed up the cell phones, but according to Dr. George Carlo, "Those phones were slowly prompting a host of health problems."

Today there are more than two billion cell phone users being exposed every day to the dangers of electromagnetic radiation (EMR)—dangers government regulators and the cell phone industry refuse to admit exist. Included are: genetic damage, brain dysfunction, brain tumors, and other conditions such as sleep disorders and headaches.[1-9]

The amount of time spent on the phone is irrelevant, according to Dr. Carlo, as the danger mechanism is triggered within seconds. Researchers say if there is a safe level of exposure to EMR, it's so low that we can't detect it.

The cell phone industry is fully aware of the dangers. In fact, enough scientific evidence exists that some companies' service contracts prohibit suing the cell phone manufacturer or service provider, or joining a class action lawsuit. Still, the public is largely ignorant of the dangers, while the media regularly trumpets new studies

showing cell phones are completely safe to use. Yet, Dr. Carlo points out, “None of those studies can prove safety, no matter how well they’re conducted or who’s conducting them.” What’s going on here? While the answer in itself is simplistic, how we got to this point is complex.

## FLAWED DANISH STUDY REPORTS CELL PHONES ARE SAFE

In December, 2006, an epidemiological study on cell phone dangers published in the Journal of the National Cancer Institute sent the media into a frenzy.[10] Newspaper headlines blared: “Danish Study Shows Cell Phone Use is Safe,” while TV newscasters proclaimed, “Go ahead and talk all you want—it’s safe!” The news seemed to be a holiday gift for cell phone users. But unfortunately, it’s a flawed study, funded by the cell phone industry and designed to bring a positive result. The industry’s public relations machine is working in overdrive to assure that the study get top-billing in the media worldwide.

According to Dr. George Carlo, the study, by its design, could not identify even a very large risk. Therefore, any claim that it proves there’s no risk from cell phones is a blatant misrepresentation of the data that will give consumers a very dangerous false sense of security.

“Epidemiological studies are targets for fixing the outcome because they’re observational in nature instead of experimental,” Dr. Carlo explains. “It’s possible to design studies with pre-determined outcomesthat still fall within the range of acceptable science. Thus, even highly flawed epidemiological studies can be published in peer-reviewed journals because they’re judged against a pragmatic set of standards that assume the highest integrity among the investigators.”

Key problems with the study are:

1. There are few discernable differences between who was defined as cell phone users and who wasn’t. Thus, people defined as exposed to radiation were pretty much the same as those defined as not exposed to radiation. With few differences, it’s nearly impossible to find a risk.
2. Users were defined as anyone who made at least one phone call per week for six months between 1982 and 1995. So any person who made 26 calls was a cell phone user and therefore considered exposed to radiation. Those with less than 26 calls were non-users. In reality, the radiation exposure between users and non-users defined in this manner is not discernable.
3. The “exposed” people used ancient cell phone technology bearing little resemblance to cell phones used today. The results, even if reliable, have no relevance to the 2 billion cell phone users today.
4. From 1982 to 1995, cell phone minutes cost much more than today and people used their phones much less. Thus there was very little radiation exposure.
5. During the study’s time frame, people likely to use their cell phones the most were commercial subscribers. Yet this highest exposed group, in whom risk would most easily be identified, was specifically excluded from the study.
6. There were no biological hypotheses tested in the study. It was therefore only a numbers game. Ignored were mechanisms of disease found in other studies of cell phone radiation effects, including genetic damage, blood-brain barrier leakage, and disrupted intercellular communication. The study did not discuss any research supporting the notion that cell phones could cause problems in users.
7. The study itself was inconsistent with cancer statistics published worldwide addressing the Danish population. This study showed a low risk of cancer overall, when in fact Denmark has some of the highest cancer rates in the world. This inconsistency suggested that something in the data does not add up.

The cell phone industry constantly guards its financial interests, but unfortunately, an unwitting public can be harmed in the process, says Dr. Carlo. “Industry-funded studies in many cases now produce industry-desired outcomes. By tampering with the integrity of scientists, scientific systems and public information steps over the lines of propriety that are appropriate for protecting business interests—especially when the casualty of the

interference is public health and safety."

To learn more about the dangers of cell phones and to read Dr. George Carlo's full formal analysis of the Danish cell phone study, visit the Safe Wireless Initiative website at www.safewireless.org.

## Lawsuit Prompts Safety Studies

In 1993, the cell phone industry was pressured by Congress to invest $28 million into studying cell phone safety. The cause of this sudden concern was massive publicity about a lawsuit filed by Florida businessman David Reynard against cell phone manufacturer NEC. Reynard's wife, Susan, died of a brain tumor, and he blamed cell phones for her death. Reynard revealed the suit to the public on the Larry King Live show, complete with dramatic x-rays showing the tumor close to where Susan held her cell phone to her head for hours each day.

The next day, telecommunications stocks took a big hit on Wall Street and the media had a field day. The industry trade association at the time, the Telecommunications Industry Association (TIA), went into crisis mode, claiming thousands of studies proved cell phones were safe and what Reynard and his attorney said was bunk. TIA reassured the public that the government had approved cell phones, so that meant they were safe. The media demanded to see the studies, but, says Dr. Carlo, "The industry had lied. The only studies in existence then were on microwave ovens. At that time, 15 million people were using cell phones, a product that had never been tested for safety."

## Dr. Carlo Heads Cell Phone Research

### CELL PHONE RADIATION: WHAT YOU NEED TO KNOW

- Originally developed for the Department of Defense, cell phones devices were never tested for safety. They entered the marketplace due to a regulatory loophole.
- Questions about cell phone safety arose in the early 1990s, when a businessman filed a lawsuit alleging that cell phones caused his wife's death due to brain cancer.
- To address the questions surrounding cell phone safety, the cell phone industry set up a non-profit organization, Wireless Technology Research (WTR). Dr. George Carlo was appointed to head WTR's research efforts.
- Under Dr. Carlo's direction, scientists found that cell phone radiation caused DNA damage, impaired DNA repair, and interfered with cardiac pacemakers.
- European research confirmed Dr. Carlo's findings. Studies suggest that cell phone radiation contributes to brain dysfunction, tumors, and potentially to conditions such as autism, attention deficit disorder, neurodegenerative disease, and behavioral and psychological problems.
- Dr. Carlo brought safety information about cell phones to the public through his book, Cell Phones: Invisible Hazards in the Wireless Age, and by creating the Safe Wireless Initiative and the Mobile Telephone Health Concerns Registry.
- The best protection against cell phone radiation is keeping a safe distance.
- Always use a headset to minimize exposure to harmful cell phone radiation.

Forced to take action, the cell phone industry set up a non-profit organization, Wireless Technology Research (WTR), to perform the study. Dr. Carlo developed the program outline and was asked to head the research. Oversight of the issue was charged to the FDA, though it could have and probably should have gone to the Environmental Protection Agency (EPA), which fought hard for jurisdiction. But the industry had enough influence in Washington to get whatever overseer it wanted. It simply didn't want to tangle with EPA because, says Dr. Carlo, "… the EPA is tough."

"Anything that's ever made a difference in terms of public health has come from the EPA," he says. "But safety

issues that are covered in corruption and questions seem to always have a connection to the FDA, which has been manipulated by pharmaceutical companies since it was born."

When called to help with the cell phone issue, Dr. Carlo was working with the FDA on silicone breast implant research. The choice of Dr. Carlo to head WTR seemed unusual to industry observers. An epidemiologist whose expertise was in public health and how epidemic diseases affect the population, he appeared to lack any experience in researching the effects of EMR on human biology. Based on this, a premature conclusion was drawn by many: Dr. Carlo was an "expert" handpicked by the cell phone industry, and therefore his conclusions would only back up the industry's claim that cell phones are safe.

Dr. Carlo, however, refused to be an easy target. He quickly recruited a group of prominent scientists to work with him, bulletproof experts owning long lists of credentials and reputations that would negate any perception that the research was predestined to be a sham. He also created a Peer Review Board chaired by Harvard University School of Public Health's Dr. John Graham, something that made FDA officials more comfortable since, at the time, the agency was making negative headlines due to the breast implant controversy. In total, more than 200 doctors and scientists were involved in the project.

## Strict Study Guidelines

Once all involved agreed on what was to be done, Dr. Carlo presented the study's stakeholders in the industry, the government, and the public with a strict list of criteria for moving forward.

"The money had to be independent of the industry—they had to put the money in trust and couldn't control who got the funds," he says. "Second, everything had to be peer reviewed before it went public, so if we did find problems after peer review, we could use that information publicly to recommend interventions."

A third requirement was for the FDA to create a formal interagency working group to oversee the work and provide input. The purpose of this was to alleviate any perception that the industry was paying for a result, not for the research itself. But the fourth and last requirement was considered by Dr. Carlo to be highly critical: "Everything needed to be done in sunlight. The media had to have access to everything we did."

## The Research Begins

The program began, but Dr. Carlo soon discovered that everyone involved had underlying motives."The industry wanted an insurance policy and to have the government come out and say everything was fine. The FDA, which looked bad because it didn't require pre-market testing, could be seen as taking steps to remedy that. By ordering the study, law makers appeared to be doing something. Everyone had a chance to wear a white hat."

Dr. Carlo and his team developed new exposure systems that could mimic head-only exposure to EMR in people, as those were the only systems that could approximate what really happened with cell phone exposure. Those exposure systems were then used for both in vitro (laboratory) and in vivo (animal) studies. The in vitro studies used human blood and lymph tissue in test tubes and petri dishes that were exposed to EMR. These studies identified the micronuclei in human blood, for example, associated with cell phone near-field radiation. The in vivo studies used head only exposure systems and laboratory rats. These studies identified DNA damage and other genetic markers.

Says Dr. Carlo: "We also conducted four different epidemiological studies on groups of people who used cell phones, and we did clinical intervention studies. For example, studies of people with implanted cardiac pacemakers were instrumental in our making recommendations to prevent interference between cell phones and pacemakers. In all, we conducted more than fifty studies that were peer-reviewed and published in a number of medical and scientific journals."

## Industry Seeks to Discredit Findings, Scientists

But manipulation by the industry had begun almost immediately at the start of research. While Dr. Carlo and his team had never defined their research as being done to prove the safety of cell phones, the industry internally defined it as an insurance policy to prove that phones were safe. From the outset, what was being said by the cell phone industry in public was different from what was being said by the scientists behind closed doors.

The pacemaker studies were a harbinger of bad things to come. Results showed that cell phones do indeed interfere with pacemakers, but moving the phone away from the pacemaker would correct the problem.

Amazingly, the industry was extremely upset with the report, complaining that the researchers went off target. When Dr. Carlo and his colleagues published their findings in the New England Journal of Medicine in 1997,[11] the industry promptly cut off funding for the overall program. It took nine months for the FDA and the industry to agree on a scaled-down version of the program to continue going forward. Dr. Carlo had volunteered to step down, since he was clearly not seeing eye-to-eye with the industry, but his contract was extended instead, as no one wanted to look bad from a public relations standpoint.

The research continued, and what it uncovered would be a dire warning to cell phone users and the industry's worst nightmare. When the findings were ready for release in 1998, the scientists were suddenly confronted with another challenge: the industry wanted to take over public dissemination of the information, and it tried everything it could to do so. It was faced with disaster and had a lot to lose.

Fearing the industry would selectively release research results at best, or hold them back at worst, Dr. Carlo and his colleagues took the information public on their own, creating a highly visible war between the scientists and the industry. An ABC News expose on the subject increased the wrath of the industry.

According to Dr. Carlo, "The industry played dirty. It actually hired people to put negative things about me and the other scientists who found problems on the internet, while it tried to distance itself from the program. Auditors were brought in to say we misspent money, but none of that ever held up. They tried every angle possible."

This included discussions with Dr. Carlo's ex-wife to try to figure out ways to put pressure on him, he says. Threats to his career came from all directions, and Dr. Carlo learned from Congressional insiders that the word around Washington was that he was "unstable." But all the character assassination paled in comparison to what happened next.

Toward the end of 1998, Dr. Carlo's house mysteriously burned down. Public records show that authorities determined the cause of the blaze was arson, but the case was never solved. Dr. Carlo refuses to discuss the incident and will only confirm that it happened. By this time, enough was enough. Dr. Carlo soon went "underground," shunning the public eye and purposely making himself difficult to find.

## WHY CELL PHONES ARE DANGEROUS

A cellular phone is basically a radio that sends signals on waves to a base station. The carrier signal generates two types of radiation fields: a near-field plume and a far-field plume. Living organisms, too, generate electromagnetic fields at the cellular, tissue, organ, and organism level; this is called the biofield. Both the near-field and far-field plumes from cell phones and in the environment can wreak havoc with the human biofield, and when the biofield is compromised in any way, says Dr. Carlo, so is metabolism and physiology.

"The near field plume is the one we're most concerned with. This plume that's generated within five or six inches of the center of a cell phone's antenna is determined by the amount of power necessary to carry the signal to the base station," he explains. "The more power there is, the farther the plume radiates the dangerous information-carrying radio waves."

A carrier wave oscillates at 1900 megahertz (MHz) in most phones, which is mostly invisible to our biological tissue and doesn't do damage. The information-carrying secondary wave necessary to interpret voice or data is the problem, says Dr. Carlo. That wave cycles in a hertz (Hz) range familiar to the body. Your heart, for example, beats at two cycles per second, or two Hz. Our bodies recognize the information-carrying wave as an "invader," setting in place protective biochemical reactions that alter physiology and cause biological problems that include intracellular free-radical buildup, leakage in the blood-brain barrier, genetic damage, disruption of intercellular communication, and an increase in the risk of tumors. The health dangers of recognizing the signal, therefore, aren't from direct damage, but rather are due to the biochemical responses in the cell.

Here's what happens:

- Cellular energy is now used for protection rather than metabolism. Cell membranes harden, keeping nutrients out and waste products in.
- Waste accumulating inside the cells creates a higher concentration of free radicals, leading to both disruption of DNA repair (micronuclei) and cellular dysfunction.

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- Unwanted cell death occurs, releasing the micronuclei from the disrupted DNA repair into the fluid between cells (interstitial fluid), where they are free to replicate and proliferate. This, says Dr. Carlo, is the most likely mechanism that contributes to cancer.
- Damage occurs to proteins on the cell membrane, resulting in disruption of intercellular communication. When cells can't communicate with each other, the result is impaired tissue, organ, and organism function. In the blood-brain barrier, for example, cells can't keep dangerous chemicals from reaching the brain tissue, which results in damage.

With the background levels of information-carrying radio waves dramatically increasing because of the widespread use of cell phones,Wi-Fi, and other wireless communication, the effects from the near and far-fields are very similar. Overall, says Dr. Carlo, almost all of the acute and chronic symptoms seen in electrosensitive patients can be explained in some part by disrupted intercellular communication. These symptoms of electrosensitivity include inability to sleep, general malaise, and headaches. Could this explain the increase in recent years of conditions such as attention-deficit hyperactivity disorder (ADHD), autism, and anxiety disorder?

"One thing all these conditions have in common is a disruption, to varying degrees, of intercellular communication. When we were growing up, TV antennas were on top of our houses and such waves were up in the sky. Cell phones and Wi-Fi have brought those things down to the street, integrated them into the environment, and that's absolutely new. The recognition mechanism, where protein vibration sensors on the cell membrane pick up a signal and interpret it as an invader, only works because the body recognizes something it's never seen before."

As to increases in brain tumors tied to cell phone use, it's too early to tell due to a lack of hard data, says Dr. Carlo. "We're never going to see that in time to have it matter. Here in the US, we're six years behind in getting the brain tumor database completed, and currently the best data are from 1999. By the time you see any data showing an increase, the ticking time bomb is set."

Epidemic curve projections, however, indicate that in 2006, we can expect to see 40,000 to 50,000 cases of brain and eye cancer. This is based on published peer-reviewed studies that allow calculation of risk and construction of epidemic curves. By 2010, says Dr. Carlo, expect that number to be between 400,000 and 500,000 new cases worldwide.

"This means we're on the beginning curve of an epidemic, with epidemic defined as a change in the occurrence of a disease that is so dramatic in its increase that it portends serious public health consequences," says Dr. Carlo. "This is what's not being told to the public. One of the things that I suggest to people who use a cell phone is to use an air tube headset. If you use a wired headset, the current moving through the wire of the headset attracts ambient informational carrying radio waves and thereby increases your exposure."

## GAUSS METERS: DETECTING ELECTROMAGNETIC RADIATION

Invisible electromagnetic radiation surrounds us each day, emanating from diverse sources such as power lines, home wiring, computers, televisions, microwave ovens, photocopy machines, and cell phones.

While undetectable to the eye, scientists have proposed that electromagnetic radiation may pose serious health effects, ranging from childhood leukemia to brain tumors.

As scientists continue to unravel the precise health dangers of electromagnetic radiation, it makes good sense to avoid these potentially dangerous frequencies as much as possible.
A gauss meter is a useful tool you can use to measure electromagnetic radiation in your home and work environments.

Using the gauss meter at varied locations, you can easily detect electromagnetic radiation "hot spots" where exposure to these ominous frequencies is the greatest. Armed with this crucial information, you can then avoid these areas, re-arranging furniture or electronic devices as needed in order to avoid unnecessary exposure to

electromagnetic radiation.

## Dr. Carlo's Continuing Work

Following the loss of his home, Dr. Carlo collaborated with Washington columnist Martin Schram—who in the course of the work did his own research to corroborate Dr. Carlo's view on things—to write Cell Phones: Invisible Hazards in the Wireless Age (Carroll & Graf, 2001). He wrote his book as what he thought would be a last volley at the cell phone industry.

"I needed to tell the whole story in one place. I didn't have the resources or the manpower to match what the cell phone industry was doing to try to discredit the work," says Dr. Carlo. "Based on the book, a number of lawsuits were brought against the industry, and insurance carriers began excluding cell phone-related health risks in their coverage. It created a very difficult situation in the industry and for myself. I was worn out fighting that battle. In 2002, after I'd done my book tour, I just decided to take a break for a couple of years."

Instead of taking a break, however, Dr. Carlo ended up working behind the scenes, setting up an organization and a registry for the benefit of consumers. It was a creative solution as part of the settlement of a lawsuit brought by a Illinois citizen against the cell phone industry, WTR, and Dr. Carlo personally. The lawsuit alleged that the cell phone industry, WTR, and Dr. Carlo were conspiring to hide the dangers of cell phones. Dr. Carlo was offered a way out of the suit because his book had made it clear he wasn't on the same page as the industry.

"I wanted to make sure the litigation brought at least some value to consumers. We created the Safe Wireless Initiative for disseminating information on the dangers and on prevention, and the Mobile Telephone Health Concerns Registry to track information voluntarily provided by cell phone users, particularly those who believe they're experiencing health effects. Post-market surveillance hadn't been done before, and the registry does that. It will help direct future research of potential health effects related to cell phone use. In the end, we did the best we could to get some benefit for consumers."

### PROTECTION IS KEY

To repair damage and build the body's defenses against the onslaught of EMR, supplements—along with dietary changes, stress reduction, weight control and exercise—make you stronger, more balanced, and better able to face the assaults of EMR. Antioxidant supplements that fight free radicals are especially desirable.

Says Dr. Carlo: "You as a human being are put under siege by the electromagnetic soup we're swimming in, and this isn't hyperbole, it's true. When you answer your cell phone, radio signals are around you. Just because you can't see it doesn't mean it's not there. Our general ability to compensate for those insults is becoming compromised by the ever-increasing background of EMR."

Taking as many precautions as you can goes a long way to reducing the risks. However, Dr. Carlo cautions that there is no silver bullet solution. "It's a complicated problem, and while we tend to look for a quick fix, there is none here. Over the next decade, I hope we figure out how to change the way signals are transmitted. A thousand years from now we will have evolved, but that's not helping us now. This will take time, but consumers have to be empowered to help themselves in the interim."

## European Research Confirms Cell Phone Dangers

The industry took its tricks elsewhere—to Europe, which had picked up the ball and began funding independent research to corroborate or confirm the work of Dr. Carlo and his team. The work was completed in mid-2004 and when it was released,[12] it not only provided independent scientific corroboration of the work done by Dr. Carlo's group, but also took the work a step further and showed how the problems were occurring mechanistically. This information formed a biologically plausible hypothesis for how cell phone radiation could be related to so many diseases.

Dr. Carlo noted, “The industry exerted pressure on the scientists who conducted the work, including renowned German scientist Dr. Franz Adlkofer. It first tried to change the conclusions of the work, then to delay its public release. Then Dr. Adlkofer, the lead scientist, was attacked in the media and threatened privately with no more research money, a ruined reputation—similar to what we experienced in the WTR. But this situation attracted the attention of a German documentary filmmaker, who decided to do a film on the cell phone issue.”

It was enough to bring Dr. Carlo into view again, as he was asked to participate. The film, The Boiling Frog Principle, by Klaus Scheidsteger, builds on information from his first film, The Cell Phone War, and will be released in 2007. Its intent is to integrate the latest political and scientific evidence from around the world, and bring forth to consumers important information on cell phone dangers that was previously withheld.

## Economic Implications

Currently in the US, there are seven class action lawsuits moving forward against the cell phone industry, says Dr. Carlo, and nine other cases that are personal injury cases brought by people with brain cancer. In the past two years, two workers compensation awards were given to people with brain tumors based on a link between their tumors and their cell phone use in the workplace. Both of these cases occurred in California.

“What we have now is a major litigation burden, a vulnerability the cell phone industry has never before been under,” Dr. Carlo says. “They’re uninsured for these health risk claims and are already positioning themselves for a congressional bailout, like the Savings and Loan crisis of the late 1980s. They’ll lose a couple of these lawsuits and once they do, there’ll be an onslaught of new litigation against them.”

The country can’t afford for the cell phone industry to go under, Dr. Carlo says, as it would have a disastrous impact on the entire economy—some estimates say over 30% of investment stocks in retirement funds are tied to telecommunications shares. That’s why Congress will figure out a way to bail out the industry.

“The industry thinks they can afford to continue on with this institutional arrogance, endangering millions of men, women and children because, at the end of the day, they believe they’ll not be held accountable. They think they can continue to manipulate consumers.”

## A Looming Health Crisis

It’s been nearly 12 years since the WTR was funded. Despite Dr. Carlo’s revealing research and the corroborating research of other scientists from around the world that continue to follow, a search of media reports today on the subject of cell phone dangers tends to suggest one of only two conclusions: There is no risk, or no one has yet proven the risk. That’s at odds with more than 300 studies in the peer-reviewed scientific literature supporting an increased risk of disease. Clearly, something doesn’t add up.

The industry’s manipulation of the media to consider only one study at a time obfuscates the big picture.Individually, there’s little to see. But the depth and breadth of the science that points to the problem, and the compilation of studies, make the future look frightening. Like the September 11 tragedy, where no one in government talked to each other and did not see it coming for lack of a big picture view, the health crisis from cell phone use looms darkly.

“When you put all the science together, we come to the irrefutable conclusion that there’s a major health crisis coming, probably already underway,” warns Dr. Carlo. “Not just cancer, but also learning disabilities, attention deficit disorder, autism, Alzheimer’s, Parkinson’s, and psychological and behavioral problems—all mediated by the same mechanism. That’s why we’re so worried. Time is running out. When you put the pieces of the puzzle together, it’s such a wide ranging problem. It’s unlike anything we’ve ever seen before.”

## Protecting Yourself

The most effective technique for protecting yourself against the dangers of cell phone radiation is keeping the phone at a distance from the body. Simply using a hands-free headset is a big step. Headsets keep the cell phone’s antenna at a distance of six to seven inches away from the body, thus eliminating near-field exposure. Wired headsets can act as an antenna to draw some ambient EMR, but not much, so using one is still preferable to holding the phone to your head. Wireless headsets should be avoided, as they draw much more far-field EMR.

The safest headsets have hollow air tubes, similar to those used in stethoscopes, instead of wires.They offer protection against both near-field and far-field exposure. If possible, avoid wearing the phone at your waist, which

exposes the hip bones to radiation. Eighty percent of red blood cells are formed in the hip bones. There are also newer cell phones available capable of functioning in speaker phone mode. This enables you to talk on the phone while keeping it at a safe distance from your body. If you are able to conduct most of your conversations using a speaker phone, this could enable you to use a cell phone without encountering the intense radiation exposure that occurs when holding it to your ear.

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### NUTRITIONAL PROTECTION AGAINST CELL PHONE RADIATION

As growing evidence points to the potential adverse health impact of exposure to cell phone radiation, scientists are seeking strategies to prevent or mitigate these effects. Currently, nutritional researchers are exploring whether melatonin, vitamin C, and and vitamin E can ameliorate the detrimental effects caused by radiation emitted by cell phones.

To date, a total of eight studies have pointed to the protective effects of melatonin and vitamins C and E in stemming the damage caused by cell phone emissions. In particular, these agents show promise in averting the increased oxidative stress that is thought to contribute to an increased risk of certain cancers. These studies have unveiled statistically significant protective effects of melatonin and vitamins C and E against the effects of the radiation frequency at which cell phones emit and receive radio frequency radiation.

Six of these eight studies were controlled, short-term studies (ranging from 10-30 days) in rodents. Each study examined 24-30 subjects. Study subjects were divided equally into three groups: one group received radiation exposure; another received active treatment with melatonin only, vitamin C only, or vitamins C and E before radiation exposure; and a control group did not receive radiation or active treatment. After the treatment period, scientists examined skin sections for radiation injury and analyzed blood and urine for markers of oxidative stress. They found significant kidney damage, skin changes, oxidative stress, and fibrosis in the animals who received radiation exposure only. Remarkably, these effects were reversed in the groups that received melatonin[13-16] and vitamins C[17,18] and E.[17]

Another two controlled studies in rodents, one of 10 days'[19] and another of 60 days' duration,[20] revealed that melatonin significantly protects against retinal (eye)[20] and kidney tissue[19] damage caused by cell phone radiation, as compared with subjects that did not receive melatonin.

Despite this compelling evidence, other avenues of research still need to be pursued after contradictory findings from seven different studies that have looked into the effect of cell phone radiation on melatonin levels in the body.

In one study, melatonin levels in the blood were measured in 226 male electric utility workers who were categorized according to cell phone use. The study concluded that workers who used cell phones for more than 25 minutes per day had decreased melatonin production and revealed a relationship between increased cell phone use and decreasing melatonin levels in the blood.[21]

Yet six other studies—two in humans[22,23] and four in rodents[24-27]— found that melatonin levels remained unchanged after radiation exposure. One human study did suggest that cell phone radiation may impact melatonin onset time. These were small studies, however, the majority of which were less than [28] days' duration.

Melatonin is a vital natural neurohormone (hormone secreted by or acting on a part of the nervous system) that acts as a potent free radical scavenger and antioxidant. Melatonin regulates the daily circadian rhythm and is essential to self-repair and regeneration. Given melatonin's protective effects, these findings warrant further research into the effect of cell phone radiation on melatonin in larger, longer-term, well-controlled human studies.

—Bina Singh


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