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STRESS, CELL PHONES AND ELECTRO-SMOG

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"Electro-smog" refers to the hidden dangers of electromagnetic pollution that we are now subjected to 24/7. Few people are aware they are increasingly being bathed in a sea of varied electromagnetic fields (EMFs) from cell and cordless phones, computers, BlackBerrys and other accessories, as well as refrigerators, air conditioners, electric heaters, dishwashers, microwaves, fans and other electrical appliances found in almost every home. Save for hypersensitive people, these invisible fields can't be detected, so they cause no symptoms or signs until chronic exposure produces significant and sometimes irreversible damage. At greatest risk are infants, children, the elderly and people with impaired immune system defenses.

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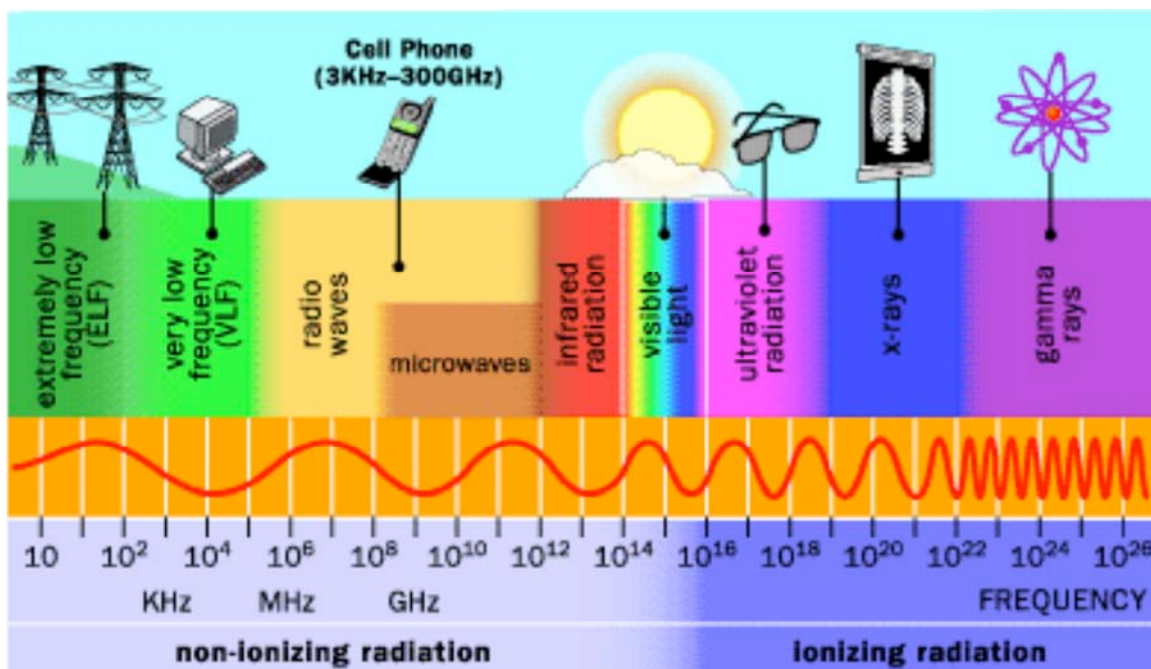
Is There Any Relief Or Solution In Sight?

The European Environment Agency now advises avoiding the use of Wi-Fi and cell phones (especially in anyone under 18) until more safety studies are done. Israel has banned cellular antennas on residential buildings. International experts warn that increased wireless technologies could cause a public health disaster much worse than smoking, asbestos, or gasoline lead emissions. Lloyd's of London is "preparing for the next big liability action -- for personal injury damages based on the use of cell phone technology."

Why American EMF Safety Standards Are Obsolete And Dangerous

Compared to other countries, the USA has lagged far behind in alerting the public to any potential dangers of cell phones and cell phone towers as well as implementing measures to prevent harm. The FDA repeatedly reassures us that **there is no evidence of "danger to users of wireless phones, including children and teenagers."** However, the studies cited to support these claims have all been cherry picked by reviewers on the payroll of cell phone companies and conveniently ignore many others with contrary conclusions. Similarly, reports on this topic that appear in the *Journal of the National Cancer Institute*, the *Journal of the American Medical Association* and the American Cancer Society's publications, come from organizations with strong ties to the telecommunications industry that provide lucrative income. In addition to denying any dangers from cell phones, such articles point out that it is impossible to prove any association with cancer because EMF radiations can come from different magnetic, electric, radio, microwave, ground current or high frequency radiation sources and may be influenced by genetic and other factors. They also emphasize the FDA's statement that "Measurements made near cellular and PCS base station antennas mounted on towers have confirmed that ground-level exposures are typically thousands of times less than the exposure limits adopted by the FCC."

As illustrated below, the electromagnetic spectrum consists of EMFs from varied sources that can be ionizing or non-ionizing.



Ionizing radiation from X-Rays and radioactive substances generate high frequency waves that detach electrons from atoms or molecules, which changes their structure and function. These effects can be utilized for

diagnostic and therapeutic purposes and are particularly effective in detecting and treating various malignancies. Unfortunately, this is a two-edged sword, since repeated or prolonged exposure to radioactive substances or X-rays have cumulative effects that can also cause cancer.

Because non-ionizing radiation does not have enough energy to detach electrons from their orbits, it has been erroneously assumed that they do not have any cumulative biological effects. Non-ionizing EMFs include extremely low frequency (ELF) and very low frequency (VLF) electromagnetic fields from electrical appliances and power lines, as well as radiofrequency radiation (RF) from wireless devices such as cell phones, cordless phones, cellular antennas, and radio transmission towers. It should be noted that the FDA does not always review the safety of radiation-emitting consumer products before they can be marketed as it does for new drugs or medical devices. **A maximum safety limit of 1 mG (milligauss) is recommended for exposure to EMFs from appliances, but electric razors, vacuum cleaners and hair dryers can emit levels that are 300 to 400 times higher.** Swedish safety standards specify a maximum of 2.5 mG at a distance of 20" from a computer display screen, **but some U.S. manufactured computers have EMFs up to 100 mG at this distance, several hundred times greater.** EMF radiation from the back of the computer is even higher, so that 40" or more is considered a safe distance. This could be a problem in schools and offices that have rows of terminals in confined spaces.

The only two enforceable EMF emission standards in the USA are for microwave ovens, set by the FDA, and for cell phones, which are established by the FCC (Federal Communications Commission). However, neither of these agencies monitors possible health effects or compliance with standards. Microwave ovens emit two types of radiation, microwaves and ELF, and since most have some leakage, it is important to avoid being near them while they are in use. Microwaves are measured in milliwatts per centimeter squared (mW/cm²). **The Russian safety limit for microwave exposure is .01 mW/cm², but our current safety limit, established in 1993, is 1 mW/cm², 100 times higher. Prior to that, it was a thousand times higher!** Although cell phones emit radiofrequency energy in the microwave range, there was no safety testing prior to their availability in 1983. In fact, **cell phones are the only radiation emitting devices ever sold without pre-market safety testing.** The reason for this is that the FCC contracted to have the safety standards written by an engineering society with strong ties to telecommunication and cell phone companies with scant or no input from physicians or health authorities. The FCC has little expertise in biology and accepted as gospel that the only harm that could come from cell phone radiofrequencies would be from a thermal or heating

effect. Therefore, since cell phone emissions had no heating effects on biological tissues, there was no need for any objective safety testing.

The argument used to convince regulatory authorities that cell phones should be exempt from pre-market safety testing was based on microwave ovens, which generate high power microwaves that oscillate at a very high frequency. When foods are placed in a microwave oven, it causes their water molecules to move faster and faster, which creates friction that produces heat and eventually cooks the food. Since the small amount of power from cell phones was insufficient to cause any detectable tissue heating, they could not possibly cause any damage. This no heat, no harm rationale remains the sole criterion for current standards that insist radiation exposure levels are safe if they do not produce heat. The late Dr. Ross Adey was the first to disprove this fallacy by demonstrating that non-ionizing radiation indeed had significant biological effects. In the early 1970's, long before cell phones became popular, he showed that very similar radiofrequency fields could cause the release of calcium ions from cells. This effect was associated with exposure to particular carrier and modulation frequencies that had insufficient energy to cause any heating or thermal effect. We now know that calcium ion influx/efflux plays a major role in intercellular communication and membrane permeability, especially in the brain and central nervous system and that it can be influenced by other factors. As will be seen, this helps to explain why presumably safe cell phone radiofrequency fields with no heating effects can contribute to numerous and very varied health problems ranging from behavioral changes and insomnia, to cancer, Alzheimer's, Parkinson's and autoimmune diseases.

Ross Adey was a good friend and a giant in the field of the biological effects of electromagnetic and radiofrequency radiation. I was honored to have him contribute the lead chapter for *Bioelectromagnetic Medicine*. It was the last paper he published and a masterful summary of his own and other relevant research that essentially warned **there might be no lower limit at which EMF exposures do not affect us**. Ross Adey was also one of the first to explain the potential for cell phones to cause cancer. As Lou Slesin, editor of *Microwave News*, who has reported on EMF safety for three decades noted in a recent interview, scientists who questioned the safety of current standards or practices were apt to suffer severe personal retaliation as well as cessation of any funding. Despite his stature in the field, Ross was one of these victims as was Dr. Robert Becker, another pioneer physician whose 1985 *The Body Electric* is still a classic. In this and other books and papers he emphasized the dangers of electropollution and particularly the power line practices in the state of New York. As a result, his laboratory was also shut down and he suffered personal attacks and abuse by powerful vested interests he was never able to identify. There is a compelling account of this

unbelievably cruel retaliation in his Postscript to *The Body Electric*. Nevertheless, his repeated protests were largely responsible for the New York State Power Line Project directed by David Carpenter, which convincingly confirmed prior studies linking EMFs to childhood leukemia.

There were other critics whose complaints also stimulated increased interest in safety issues that were picked up by the media. The wireless industry was under pressure to prove that cell phones were safe in order to defend themselves, especially against claims like the 1993 death of Deborah Reynard from brain cancer. **Reynard's cancer was unusual since it grew from the outside to the inside of her head at the precise location of her cell phone antenna.** Details of the lawsuit provided by her husband in a compelling interview on the Larry King show attracted national attention. The Cellular Telecommunications and Internet Association promptly offered to fund a \$25 million five-year Wireless Technology Research project to settle the issue of cell phone safety once and for all. However, it also struck a deal with the regulating bodies that stipulated they would only research the damaging effects of cell phones if they could continue to be unregulated until all the research had been completed. Dr. George Carlo, an epidemiologist with a strong medical background and a law degree was hired to direct the project. He recruited 200 doctors and scientists from around the world who were the most prominent authorities on electromagnetic radiation. Since all of the funding was derived from the cell phone industry, Carlo wanted to make certain that the study was credible in every way. Each study done was duplicated in at least two laboratories and protocols were peer reviewed before being initiated. Preliminary data were peer reviewed before interpretation and final reports and data were peer reviewed at the conclusion of the process. Every conceivable effort was made to insure the study was above reproach. Carlo put together the formal Interagency Working Group consisting of representatives from the FDA, the National Institutes of Health, the Environmental Protection Agency, the Occupational Safety and Health Administration, the Federal Communications Commission as well as a few other representatives. This committee participated in every step of the research process. Carlo also created a Peer Review Board at the Harvard Center for Risk Analysis to examine the findings to further insure that the conclusions were credible and unbiased due to industry funding. Between 1993 and 1999, more than 56 studies were reviewed in the largest program ever conducted on the dangers of cell phones and wireless communications.

The eagerly anticipated results of this massive undertaking were not made public. There was only the official conclusion (released by the sponsor) that there was no definitive proof that cell phones caused cancer or were a health hazard. The increased brain cancer mortality found in hand-held cell phone

users compared to those who used car phones was not deemed to be statistically significant. Since there were some other unsettled issues, further investigation was definitely indicated, and would be undertaken in the near future to provide further clarification. In point of fact, the results of this massive project that cost \$28.5 million have never been published, nor have there been any further studies as promised. Many believed that this was because of disturbing findings that the industry wanted to conceal. This was supported by the fact that, long before the conclusion of the study, the industry began to file for safety patents on devices, which would depend on proof that cell phones posed a danger, despite manuals that insisted they did not. Carlo was also frustrated, since after submitting his analysis and recommendations, he expected industry executives would try to remedy problems he had identified and consider his suggestions. Instead, they tried to find ways to discredit his research and destroy his reputation. In October 1999, he sent 28 identical letters to the chairmen and CEO's of the cellular telephone industry criticizing this and emphasizing the immediate need to implement corrective changes to prevent what he felt was an impending public health disaster. The lengthy letter detailed his concerns about the brain tumor link, as well as other possible damaging cell phone effects that had been misquoted or ignored in their press release, such as:

Alarming, indications are that some segments of the industry have ignored the scientific findings suggesting potential health effects, have repeatedly and falsely claimed that wireless phones are safe for all consumers including children, and have created an illusion of responsible follow up by calling for and supporting more research. The most important measures of consumer protection are missing: complete and honest factual information to allow informed judgment by consumers about assumption of risk; the direct tracking and monitoring of what happens to consumers who use wireless phones; and, the monitoring of changes in the technology that could impact health.

His request for a personal meeting to discuss the above and other sensitive issues he believed they should be alerted to were rejected by every one of the 28 recipients of his letter. Suspicions that the study had resulted in disruptive findings were confirmed when Dr. Carlo publicly stated that the study had indeed shown a link between cell phone use and brain tumors, in addition to a host of other possible harmful effects. He resigned his position to become a whistleblower and strong critic of the very interests that had hired him and founded the international Safe Wireless Initiative project to alert the public about possible dangers. He has subsequently revealed how flawed industry funded studies have been skillfully utilized to maintain the irresponsible use of cell phones practices, as well as current woefully inadequate standards, by thwarting any government intervention.

Is There Proof That Cell Phones Can Cause Brain Tumors And Cancer?

Since Dr. Carlo's initial report of the Wireless Technology Research project almost ten years ago, non-industry funded research has provided strong support for his numerous concerns. There are now more than 300 studies in peer-reviewed journals showing increased risk of brain cancer and other tumors in cell phone users many of which confirm a higher rate with greater exposure. Last year, Swedish cancer researchers reviewed sixteen studies dealing with cell phone use and brain cancer rates in the USA, Finland, Sweden, Denmark, United Kingdom, Germany, and Japan, and concluded:

For both acoustic neuroma and glioma, overall risk was increased in the whole group, but significantly increased for ipsilateral exposure (tumor on the same side of the brain as cell phone use). These results are certainly of biological relevance, as the highest risk was found for tumors in the most exposed area of the brain, using a latency period that is relevant in carcinogenesis.

Acoustic neuromas are benign tumors that develop on the nerve connecting the ear to the brain. Symptoms include hearing loss, ringing (tinnitus) in the affected ear, dizziness, facial numbness and tingling. Tumors may also press on the brainstem causing other symptoms, and in rare cases, may grow large enough to threaten life. Gliomas are brain tumors that arise from glial cells that tend to be malignant and difficult to treat. Symptoms depend on the tumor's location but can include convulsions, headache, nausea and vomiting, progressive memory loss, impaired vision or even paralysis of one side of the body. Acoustic neuromas and very malignant gliomas increased significantly after ten years of cell phone use and **some wonder whether this might have contributed to Senator Kennedy's malignant glioma.**

In a prior Swedish study, researchers reviewed the histories of over 1,400 adults aged 20 to 80 who had been diagnosed with a malignant or benign brain tumor between 1997 and 2000. These patients were compared with a similar number of healthy adults living in the same area and all participants were asked to recall their daily use of mobile and cordless phones. The incidence of brain tumors was found to be significantly higher with cell phone use, especially in rural areas. **The chance of developing a malignant brain tumor was about eight times higher for country dwellers compared to those in urban areas. The risk for any brain tumor was four times higher for those using a mobile phone for five or more years, compared to others in the same rural region that did not use the devices.** The explanation for this is that cell phones in remote areas deliver a higher dose of electromagnetic radiation because they need to transmit a stronger signal in order to reach distant transmission towers. Since urban sites have multiple towers that are much closer, cell phones can make a connection with a comparatively weaker signal.

Professor Vini Khurana, an award winning Australian neurosurgeon, became concerned about the increase in brain tumors allegedly associated with mobile phone use. He spent over a year reviewing over 100 scientific publications in addition to numerous pertinent press and Internet reports dealing with this possible relationship. In a 69-page report released earlier this year, he concluded **"There is a growing body of statistically significant evidence for a relationship between the overall length of use of a mobile phone and the delayed occurrence of a brain tumour on the same side of the head as the 'preferred side' for mobile phone usage. The elevated risk (increased odds) appears to be in the order of 2 - 4 fold."** He noted that widespread cell phone usage started in Scandinavia in the 1980's and had progressively increased. Since the carcinogenic effects of radiation are cumulative and may take decades to detect, he reasoned that any such cell phone effects would not be likely to surface for at least ten or fifteen years. Therefore, it should not be surprising that it was not until the 1990s that Swedish scientists were among the first to report an association between prolonged cell phone use and brain tumors. **Because close to three billion people now use cell phones, triple the number of smokers, he predicted that cell phone radiation would cause a public-health disaster much worse than that from cigarettes.**

Dr. Khurana's report led to sensational headlines in the British press, such as "Mobiles May Be a Death Sentence", "Mobile Phones More Dangerous than Smoking", and "Could Mobile Phones Be the Cigarettes of the 21st Century? Minutes after the web editors of London's *Independent* posted the story, it became the #1 most read and most e-mailed article on their site and was still in the top ten a week later. It quickly spread to other Internet sites and was featured on the NBC *Nightly News* program in the U.S. Other prominent scientists had also made similar warnings, including the very comprehensive 610-page *Biointiative Report* compiled by 14 internationally renowned scientists and public health experts that was also reviewed by a half dozen or more other authorities with expertise in relevant areas. Dr. Khurana's indictment attracted more attention because he was a brain surgeon, had no preconceived opinion or conflict of interest, and his unbiased investigation carefully examined unsupportive as well as supportive studies. In an attempt to offset the negative press generated by Dr. Khurana's report, which urged tighter controls until more long-term study results were available, the industry mounted its own publicity campaign. The Mobile Operators Association dismissed his study as "a selective discussion of scientific literature by one individual" that "does not present a balanced analysis of the published science, and reaches opposite conclusions to the WHO and more than 30 other independent expert scientific reviews". To counter their

previous report on Dr. Khurana, NBC's *Nightly News* aired an interview with a spokesperson from the American Cancer Society, which has long maintained that the link between cell phones and cancer is nothing more than a "myth". The segment also cited U.S. "experts" (but did not name them) who concluded there "is no evidence of danger" and dismissed Khurana's report as "absurd." Nevertheless, the American Cancer Society's representative admitted that there was some "legitimate uncertainty" over long-term cell phone use. NBC's chief science officer similarly concluded the segment with a precautionary hedge by advising "It's never a bad idea to use your earpiece to get the antenna away from your head."

How And Why The Public Has Been Deceived About Cell Phone Dangers

This double talk also appears in current FDA and FCC recommendations:

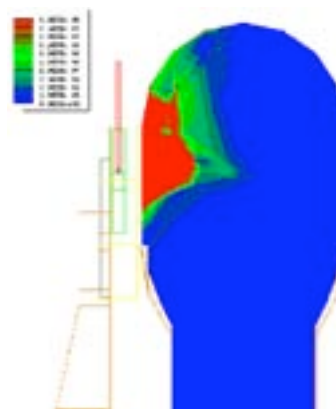
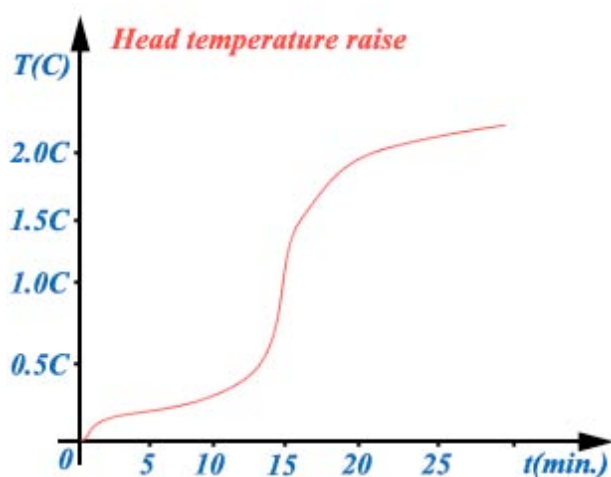
The available scientific evidence does not show that any health problems are associated with using wireless phones. There is no proof, however, that wireless phones are absolutely safe. (Ambiguous and not very reassuring.)

Studies have shown that environmental levels of RF energy routinely encountered by the general public are *far below* levels necessary to produce significant heating and increased body temperature.^{32,37,45,46,48,54} **However, there may be situations, particularly workplace environments near high-powered RF sources, where recommended limits for safe exposure of human beings to RF energy could be exceeded.** (The six references cited are all over ten years old and some date back more than 25 years.)

Since **there are no known risks from exposure to RF emissions from wireless phones**, there is no reason to believe that hands-free kits reduce risks. (Although all risks might not be eliminated, this could help to reduce effects on the brain.)

The FDA derives its authority from the Radiation and Control for Health and Safety Act of **1968** and the FCC's authority comes from the National Environmental Policy Act of **1969** and the Telecommunications Act of **1996**. Relatively little has changed since these archaic standards were established decades ago except for the adoption in 1996 of Specific Absorption Rate (SAR) limits. This is the maximum rate at which RF microwaves are absorbed by the body and the FCC requires SAR levels at or below 1.6 watts per kilogram. SAR values vary for different cell phone brands and models and may be stated on the device or are available on the web sites of most manufacturers. They can also be accessed by noting the FCC ID number on the case or under the battery pack and going to www.fcc.gov/oet/fccid to find that rating. Up to 60% of the microwave energy transmitted by a cell phone generates heat that can cause a temperature rise in the brain of up to 0.2°F. While this heating is considered to be insignificant, there is a cumulative effect with prolonged or repeated use.

Talking on a cell phone for 20 minutes or more can raise local brain temperature up to 2°C (36°F) as illustrated below.



Thermal image of a cell phone in use

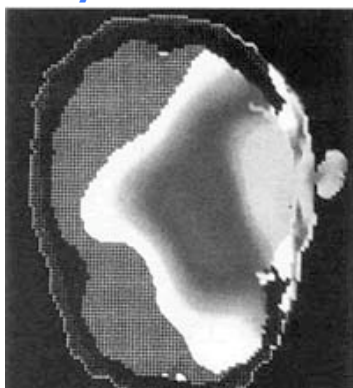
Talking for just one hour daily has unappreciated cumulative effects.



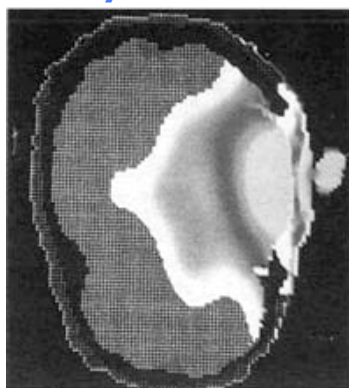
1 hour a day **X** *365 days a year* **=** *365 hours*
365 hours **X** *3 watts* **=** *1095 Watts in one year*
1095W **X** *10 years* **=** *10950 WATTS*

After ten years, this adds up to 10,000 watts of radiation, ten times more than from putting your head in a microwave oven. It is very important to emphasize that the degree of penetration and heating varies with age. It is very much greater in children, as shown below.

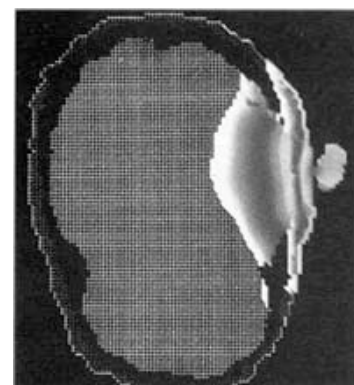
5-year-old child



10-year-old child

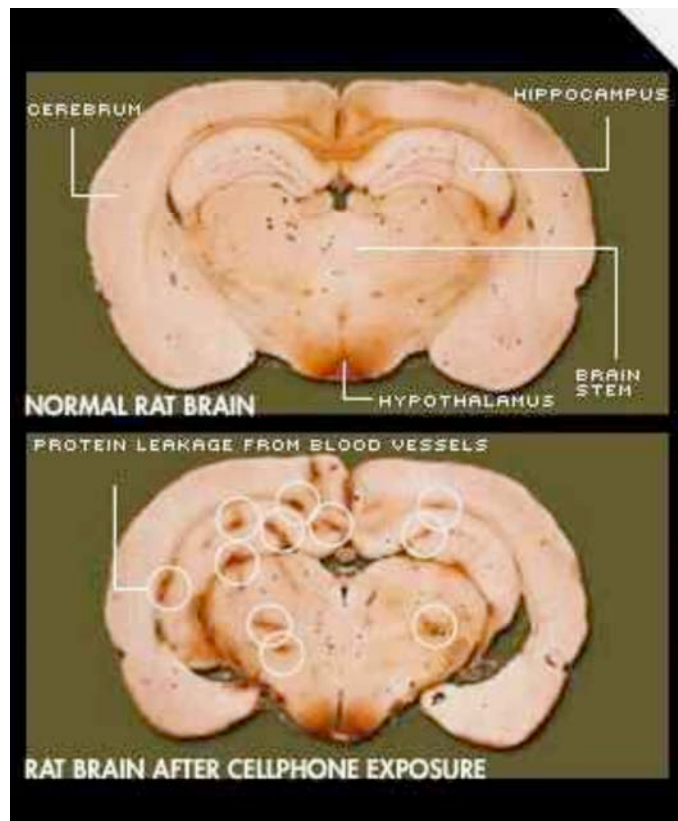


Adult



A two-minute call can alter brain function in a child for an hour. That is why other countries ban or severely limit cell phone use in children or teenagers. In contrast, this is the segment of the population now being targeted in US advertising, which views "tweens" (children between 8 and 12

years old) as the next big cell phone market. Disney and Sprint recently joined in a **\$2 billion deal to market cell phones to tweens. The UK has a Teddyphone that looks like a teddy bear and the US promotes the Firefly and Barbie cell phones for 6 to 8-year-olds.**



Proof that the EMFs emitted by mobile phones can damage neurons in the brains of rats is shown to the left. The cross-section on top is of the healthy brain of a control rat. The bottom cross section shows the effect of a two-hour dose of GSM cell phone radiation on a young littermate. The dark patches are proteins that have leaked through the blood-brain barrier and caused significant damage in the basal ganglia, hippocampus as well as the cerebral cortex. This study used 12 to 26-week-old rats since this is close to the development of human teenagers, some of the heaviest users of mobile phones. As the authors noted "The situation of the growing brain might deserve special concern, since biological and maturational processes are particularly vulnerable. **We cannot exclude that after some decades of often daily use, a whole generation of users may suffer negative effects as early as middle age.**"

Consumer Reports, the leading consumer protection publication, has a yearly cell phone report on companies with the best service plans, least dropped calls, cutest Mickey Mouse logo - but never a word about possible health hazards. Nor will you learn about this from regulatory authorities because **taxes on cell phone minutes are the government's largest source of consumer product revenue after gasoline.** Cell phone and related stocks are also a huge percentage of financial portfolios. Any mention of a safety problem could cause a catastrophic plunge in the stock market and result in more massive decreases in government income. Lawsuits would escalate but no insurance company, including Lloyd's of London, offers coverage for cell phone health risks. At least one brain tumor suit has already been successful and manufacturers could be crippled by the costs and losses from litigation. Although buried in fine print, customers who sign Verizon's new contracts **must now agree not to sue the cell phone manufacturer for any bodily damages or harm**, or to participate in any class action lawsuit.

Why Cell Phone And Other Wireless Worries Will Only Worsen

As many have noted, **those who do not learn from the mistakes of history are doomed to repeat them.** The health effects of tobacco were first debated in **1856** in a British medical journal, Dr. Isaac Adler suggested lung cancer was related to smoking in **1912**, another British medical journal article in **1950** found that smokers were 50 times more likely to get lung cancer, but it was not until **1997** that tobacco companies agree to fund healthcare costs from smoking. Thomas Edison noted injuries from X-Rays in **1896**, his assistant died from X-Ray exposure in **1904**, fluoroscopes were widely used in shoe stores to aid proper fitting in **1930**, a **1934** report attributed the death of over 200 radiologists to radiation-induced cancer, safe radiation levels for fluoroscopes were questioned in **1949**, but it was not until **1990**, over forty years later, that cancer risk from radiation was found to be five times greater than previously thought. A similar lengthy timeline exists for the deadly consequences of asbestos. It can take decades for all of these carcinogenic effects of cumulative exposure to surface.

Cell phones, transmission towers and wireless technologies are relatively recent environmental pollutants, but there is already little doubt of their carcinogenic potential. There is also mounting evidence that they may be implicated in a host of other health problems that have markedly increased in the last two decades, including: Alzheimer's and Parkinson's disease, autism, ADHD and learning disabilities, leukemia, depression, chronic fatigue, migraine and other headaches, loss of memory, inability to focus or concentrate, insomnia and sleep disorders, lowered sperm counts, impaired immune system resistance and autoimmune disorders like lupus and multiple sclerosis, hormonal disturbances, hypertension, damage to DNA, as well as disruption of the blood-brain barrier, which can occur in less than two minutes. Children are especially susceptible and increased leukemia rates have been documented in those living near transmission towers. Leukemia and brain tumors are now the top two childhood malignancies and some studies have now linked EMF exposure to autism, Down syndrome and other diseases due to chromosomal abnormalities.

Almost one in four people who live near cell phone towers complain of neurological symptoms, including headache, memory loss, and sleep disturbances. Electromagnetic fields inhibit the production of melatonin, a hormone that regulates the sleep-wake cycle, which might contribute to the recent rise in insomnia. Melatonin also provides powerful antioxidant and immune system benefits that prevent breast cancer and aging. Levels tend to be low in breast and other malignancies, and melatonin supplementation is increasingly being used to treat cancer patients, especially those with poor responses to chemotherapy and radiation.

We currently have close to 2 million cell towers and some have multiple antennas that emit radiofrequency signals. Antennas are also increasingly being placed in churches, schools, firehouses, condos, advertising signs, utility poles, cemeteries and other desirable locations. This eliminates the need for cell phone companies to purchase or lease expensive land or buildings to erect their towers and since antennas are small and easily hidden or camouflaged, they are difficult to spot. Churches, schools and others welcome the "rent money", which can vary from a few hundred to several thousand dollars a month and there's little that can be done to prevent this. The 1996 Federal Communications Act written by the industry **makes it virtually impossible for local governments to prohibit the construction of cell phone towers based on health or environmental concerns**. There are about 2500 antennas in one square mile of Manhattan and the average person now lives within a half mile of an antenna. You can obtain a map of those near any address at www.antennasearch.com.

There are also over 2,000 communications satellites in outer space that constantly shower us with radiation to tell GPS devices where people are and where they want to go. Wi-Fi installations are increasingly common in schools, airports, hotels and even private homes. It is estimated that sitting in a classroom where 20 or 30 students are using wireless computers for one hour is equivalent to 20 minutes of cell phone use. However, Wi-Fi will be dwarfed and probably supplanted by the \$12 billion WiMax network just announced by Sprint Nextel and Clearwire, that also involves Comcast, Time Warner, Google and Intel. WiMax transmitters on cell phone towers will have a range of up to two square miles compared to Wi-Fi's 300 feet and 30 feet for Bluetooth devices. The project, which will turn the core of North America into one huge electromagnetic hot spot, could be completed within two years and should be available to half the population by 2010.

In 1988 there were some 500,000 US cell phone subscribers, by 1993 this grew to 13 million and there were 223 million in 2006. The number of cell phones in 5 - 9 year olds increased fivefold between 2000 and 2006. Two decades ago, cell phones were big and bulky and were used sparingly to talk to someone because charges were much more costly compared to plans offered today. Half of all 10 - 18 year olds now have cell phones they use for an average of 70 minutes a day not only to talk, but for text messaging, taking and receiving pictures, playing games, videos or digital music, and internet access. Many become addicted. In one survey of 19 - 23 year olds, 90% said they took their cell phones everywhere, felt lost without them, and some kept them under their pillows at night to get text messages. In another study, **81% of people 15 to 20 years of age sleep with their cell phone on**. However, cell phones still emit small amounts of radiation when in standby mode and 6-8 hours of exposure every night can add up.

Is There Any Relief Or Solution In Sight?

Not as long as the fox is guarding the chicken coop and the wireless industry continues to determine safety standards based on heating effects. It is now lobbying to have US cell phone standards lowered rather than raised. The government has abdicated its responsibility and admits on its web site that it conducts no safety studies for civilians since "this is being funded by industry organizations such as Motorola", and that much of this research is done in Europe. International cooperation is crucial as evidenced by the Interphone study. Although 13 nations have been participating in this huge venture to investigate possible cancer risks from cell phones, the USA is not cooperating in this. With respect to Motorola, it apparently only releases research results that favor the industry. Dr. Robert Kane, former Motorola Senior Research Scientist recently admitted "The body of available research indicates that **operation of a nearby portable cellular telephone will expose a non-user to radiation, some of which will be deposited into the brain of the non-user at levels higher than necessary to elicit undesirable biological effects even though the phone may be more than ten feet away from the non-user.**" The dangers of second hand smoke seem to pale in comparison.

All life on earth evolved under the influence of solar radiation and geomagnetic forces that we have learned to adapt to and even utilize. As emphasized in my Preface to *Bioelectromagnetic Medicine*, the health and life of all living systems is dependent on good communication - good communication not only within, but also with the external environment. All communication in the body eventually takes place via very subtle electromagnetic signaling between cells that is now being disrupted by electropollution. Lower forms of life are particularly sensitive and sharks can detect a few billionths of a volt per centimeter in seawater. Ross Adey, who participated in all our Congresses and was the recipient of our 1999 Hans Selye Award, told us in his acceptance address that **if you placed the plus pole of a standard 1.5-volt battery in the Pacific off San Francisco, and the minus pole off San Diego, sharks can detect the intervening electric field.** EMF fields have also been implicated in the recent mysterious and massive disappearance of honeybee colonies that are needed for the pollination of over 90 commercial crops in the U.S. In one report, 30 nests of bees in an attic that had resisted two attempts by professional exterminators, completely vanished after Wi-Fi was installed. Albert Einstein speculated that "If the bee disappeared off the surface of the globe, then man would only have four years of life left."

We are engaged in a very dangerous biological experiment, and, as Dr. Robert Becker warned, **"increasing electropollution could set in motion irreversible changes leading to our extinction before we are even aware of them."** For more details on this and why current protective practices and devices are not the answer, see the very authoritative 610 page *Bioinitiative Report* (www.bioinitiative.org) — and stay tuned.

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