

Electromagnetic Pollution



By Richard Conant

“ The environment we inhabit is filled with an invisible form of pollution that until recently has been largely ignored. But a growing volume of research has heightened concern that electromagnetic pollution may be negatively impacting the health and well-being of millions. ”



Who may be at risk ?

Anyone who uses electricity. Do you have a hair dryer, a digital alarm clock, a toaster, coffee maker, TV, or computer in the house ? If you occupy a dwelling or office located near high-tension power lines, you may be at even greater risk. Only if you live like a hermit, far from a city and with no electricity at all are you unaffected.

In the mere two hundred years since we first began to even understand electricity, our ability to harness electrical power has transformed our world.

But electricity is more than just the energy that travels through lines and wires. It creates an energy field that radiates from any electronic device, appliance, wire, or high-power transmission line. Our proximity to electricity places us within electrical fields twenty four hours a day.

Not until the 19th century did scientists understand that forces other than mechanical ones (such as gravity) are at work in our world. From this insight grew the concept of force fields. Scientists began to realize that space is filled with invisible regions of energy that, unlike gravity, exist independently of material objects. These fields are what we now call electromagnetic fields, or EMFs.

Magnetism and electricity are interrelated. As electricity moves through a conductor, an electromagnetic field is generated. EMFs occur naturally, and the earth is enveloped in a static magnetic field, believed to be created by its metallic inner core. The human body itself is also electrodynamic, as all cells and tissues generate electromagnetic fields.

Manmade EMFs emanate from whatever conducts or uses electricity - appliances, wiring, distribution lines under homes and along streets and highways, railroad cars on electrified lines, and high-tension power lines.

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All electromagnetic energy travels in waves. The fields generated are commonly measured and quantified in two ways. Frequency, a function of its wavelength, is measured in hertz (Hz = 1 cycle per second) or multiples of Hz : kilohertz (KHZ) = 1000 cycles/second, megahertz (MHz) = 1 million cycles / second) and so forth. Intensity of a field is measured in gauss, or milligauss (mG).

The human body

The human body is naturally accustomed to the earth's static magnetic field. But we're now being continually bombarded by a growing array of manmade EMFs, to which we have not adapted. The frequencies of greatest health concern are the extremely low frequency range, 30 to 300 Hz, and the very low frequency range, 3 to 30 kHz. High-tension power lines generate extremely low frequency electromagnetic fields. Video display terminals, another source of worry, fall within the very low range.



“...anything over 3 mG is potentially hazardous.”

The field intensity emanating from common household items can vary from 3 mG to as high as 1600 mG. The intensity drops off sharply with increasing distance, but we may spend hours each day within a 300 mG field, for instance one surrounding a computer. For total day-in and day-out exposure, the EPA has proposed a safety standard on one mG. According to many experts, anything over 3 mG is potentially hazardous. The potential detrimental health effects is turning EMFs into a major public health issue, and triggering debate within the scientific community.

Research and Controversy

A growing body of research suggests that prolonged exposure to EMFs increases the risk of cancer.

These studies are mainly epidemiological and occupational – they examine various population and occupational groups to look for trends and associations (e.g., a study of the lung cancer among male smokers between 20 and 50 in a particular locale). The problem with epidemiological research, from a purely scientific standpoint, is that it only shows correlations between simultaneously occurring phenomena, such as smoking and lung cancer. In such research, there is no way to isolate all the variables - thus, correlations do not constitute proof.

Many scientists thus tend to dismiss or at least minimize findings based on such evidence alone - yet numerous others,

including investigators with the Environmental Protection Agency, think the overall evidence does indeed justify serious concern. In 1990, an EPA report Evaluation of the Potential Carcinogenicity of Electromagnetic fields concluded that exposure to 60 Hz fields characteristic of high tension power lines, is a probable carcinogenic risk factor. A top EPA official presented this report in a meeting with OSTP officials, after which the statement calling EMF a probable carcinogen was deleted. Nevertheless, the report cites case-controlled studies showing that children living in homes near high tension lines had higher rates of cancer than those who did not.

Public awareness of EMFs was increased by the famous and controversial book *The Great Power Line Cover-up* by Paul Brodeur. Brodeur meticulously examined reports about neighborhoods located near power lines and electrical substations where cancers were occurring in sometimes

shockingly high numbers. The picture painted was alarming. A disturbingly large number of these cancer clusters, areas with increased cancer rates, could be found where people lived and worked in close proximity to powerful sources of EMFs.

Local and state officials, citing the lack of proof and the wish to avoid creating public panic, tend to downplay any connection between EMFs and cancer. The pattern is one of reluctance among officials to even

call for serious investigation, let alone take action. Thus “innocent until proven guilty” is the stance adopted at virtually all levels of government. But does this serve the public's interest ?

If we wait for conclusive proof before taking action, it may be too late. Moreover, what should be glaringly obvious amidst all the discussion about EMFs is the narrow health focus. The argument is mostly limited to whether or not EMF exposure causes cancer. Could EMFs also be factors in other health problems ?

The Body Electric

More than a collection of atoms and molecules, the body is electrodynamic in nature. Within the body's biomagnetic field, cellular activity is regulated by the harmonious flow of electrical impulses. It seems reasonable to believe that externally generated fields foreign to our natural environment could be disruptive to our biomagnetic field. If this is the case, we would expect that being bombarded by various frequencies and intensities of man-made EMFs could alter cellular activity in ways not necessarily beneficial to health.



The twentieth century has seen the appearance of new therapeutic methods that work with the body as an electrodynamic system, so-called energy medicine. Though largely ignored or suppressed in the U.S., energy medicine has been practiced widely and with success in Europe and other countries. The body's ability to be healed by electromagnetic energy has been known since at least the 19th century. One of the pioneering geniuses in electronics, Nikola Tesla, conducted research into the effects of electromagnetic waves on living cells which he reported in 1889. Experiments done in the 1920s showed that plant tumors could be destroyed by radio frequencies. In the 1930s, Royal R. Rife invented a machine which used radio frequencies to destroy cancer cells in humans. (Few people have even heard of Rife. When reports of clinical successes using Rife's technology began receiving national attention, his discoveries, which might have heralded a new era in medical treatment, were ruthlessly suppressed, and remain so to this day.)

If the fundamental nature of living organisms is electrodynamic, and if, as the discoveries of Rife and others have shown, electromagnetic energy

can be harnessed for healing purposes, does it follow that these energies bombarding us daily have ill effects on health? Research has already found that electromagnetic fields do indeed alter cellular activity in numerous ways. According to Thomas S. Tenforde, a leading scientist and researcher in environmental health with the Department of Energy, a glaring omission in the executive summary of the OARU panel report is the failure to mention recent advances in understanding the molecular-level events that occur in cells exposed to ELF fields. These events include alterations in membrane functional properties and altered gene expression. Research at UCLA has demonstrated changes in the brain cell activity and behavior of animals exposed to electromagnetic fields. Other studies have found that human cancer cells exposed to electromagnetic radiation in the test tube grow more quickly than normal, and resist destruction by the immune system.

One of the keys to understanding how EMFs can influence the body may lie in the pineal gland, a tiny organ located at the center of the brain.

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The Melatonin Connection



Melatonin is an endocrine hormone secreted from the pineal gland that controls the body's circadian rhythms, the natural cycles of sleeping and waking, temperature changes, moods, and so forth. The pineal's melatonin output fluctuates naturally with changes in daylight and seasonal variations. Man-made electromagnetic fields have been shown to alter circadian rhythms, including the sleep-wake cycle, performance, and rectal body temperature rhythms. There is now ample evidence that EMFs alter melatonin secretion. According to a report in Science magazine, female rats with EMF-suppressed levels of melatonin are more susceptible to chemically induced breast tumors. The OARU report cited earlier also notes that changes in pineal melatonin production as a result of either electrical or magnetic field exposure may be substantial. Reductions in melatonin, it is now believed, impair the immune system and promote cancer cell growth.

Unproven as it yet is, the melatonin connection is being taken with increasing seriousness by the scientific community. Melatonin may be an even more critical factor, based on research showing it does far more than simply regulate our biorhythmic patterns. Melatonin now appears to be an important modulator of immune system function. Recent studies reveal that melatonin also neutralizes free radicals, highly reactive molecules in the body which are believed to be involved in cancer and other chronic illness, and may play a role in determining our sensitivity to stress.

In fact, stress itself may be the key factor in the EMF-health equation.



Smart Meter

Amidst the confusion and controversy about the health effects of EMFs, clearly years away from resolution, a revolutionary new theory has emerged about how both high and low frequency radiation impact the human biomagnetic field. Based on recent discoveries, the most profound effects of EMFs may lie beneath the level of wavelength and frequency, at the subatomic level, the world of the electron and the photon. Photons are packets of energy in the electromagnetic spectrum. Electrons, surrounding the nucleus of the atom, are not really particles in the material sense. Electrons are actually energetic regions in space, called shells, which absorb and emit energy in the form of photons. The cell can be thought of as an information center, composed of molecules which in turn are composed of atoms constantly sending forth and receiving streams of photons. Photons create a signal potential of subatomic information. In order for cells to function together in the body, the signal potential - the transfer of information in the form of photon streams from cell to cell - must flow smoothly in an orderly and coherent fashion.

If something disturbs the natural order and coherence of this dynamic flow of photons, the photon stream becomes disrupted. As photon streams become more incoherent, the cellular information flow breaks down. It may be that optimal function of the human body depends upon the smoothness and coherence of the photonic signal potential at the subatomic level. If this is true, disease itself could be a direct manifestation of a breakdown in this subatomic energetic communication, which is perhaps the fundamental coordinating mechanism for all physiologic activity.

This research, based on an understanding of sub-particle physics, may have profound implications, and has led to the development of a new technology for removing EMF pollution from the home and work environment. This technology takes the form of software that can be encoded into the circuitry of electronic devices such as digital clocks. The effect is to realign the random, chaotic sub-particle energy in the environment, thus restoring a naturally coherent field. The stress-inducing sub-particle static created by surrounding EMFs is neutralized. EMF fog, the electromagnetic pollution pervading the environment, is cleaned-up.'

Electromagnetic pollution is here to stay. The electronic age has brought us many wonderful benefits no one would want to give up, but we clearly need to better understand the consequences of living and working in environments filled with electromagnetic energies.

Everything that is electrical gives electromagnetic radiation. The dangers of electromagnetic radiation became apparent after World War II, when certain diseases started appearing with greater frequency among WW II radar personnel. Since then, the science and medical communities have produced a crush of evidence that exposure to certain radio frequencies is linked to cancers, brain tumors, lymphomas, headaches, melanomas, leukemia, Alzheimer's, memory loss, Parkinson's, Huntington's, high-blood pressure, and brain damage.

How Electromagnetic Frequencies (EMF) can harm



Everything that is electrical – microwaves, televisions, computers – emits electromagnetic radiation.

Measured in Hertz (Hz), electromagnetic radiation is arranged in a spectrum. A healthy human body resonates with the earth's magnetic field at just under 10 Hz. Naturally occurring electromagnetic fields don't significantly alter the body's innate electromagnetic balance.

As Hertz increase, the biological stress inflicted on the human body increases, too. As you move up the spectrum, the link between electromagnetic fields (EMFs) and damage to the human body grows stronger. Our bodies are extraordinarily sensitive to electromagnetic energies. The 60-Hz electrical power lines that supply our electrical appliances have been scientifically proven to cause biological stress and are linked to dozens of health problems. And cell phones operate at frequencies millions of times higher than power lines.

The types of radiation— Extremely Low Frequency (ELF) and radio frequency (RF) and even microwave frequency (MF) are on the low end of the spectrum. Unlike radiation at the high end (gamma rays, x-ray and ultraviolet light), radiation at the low end doesn't have enough energy to destroy atoms. But it can agitate them. While electrical fields can easily be shielded, magnetic fields penetrate concrete, steel and human bodies. The entirety of a magnetic field will enter the body.

Agitation that occurs from microwave frequencies can be extremely destructive. The vibration causes friction, which in turn causes cells to heat up. Cell phones in particular are dangerous because they operate in the microwave frequency range.

The same phenomenon that enables a microwave to cook a chicken breast straight through can also occur within your body. Only rather than dinner, you're cooking your brain, your cheek, your nose anything within a few inches of your cell phone.

Research studies conducted Worldwide

The dangers of electromagnetic radiation became apparent after World War II, when certain diseases started appearing with greater frequency among WW II radar personnel. Since then, the science and medical communities have produced a crush of evidence that exposure to radio frequencies is linked to cancers, brain tumors, lymphomas, headaches, melanomas, leukemia, Alzheimer's, memory loss, Parkinson's, Huntington's, high-blood pressure, and brain damage.

Thousands of scientific studies have been conducted to analyze the effects of ELF, microwave and radio frequency radiation on the human body. Here's just a sampling of what's been discovered :

Scientists in Russia, Europe, and America have found alarming disturbances of brain, nerve, endocrine, and reproductive function in individuals exposed to electromagnetic radiation. Many investigators report functional alterations in the neuroendocrine system of both animals and humans



exposed to microwave or radio frequency energies. These changes occur in the pituitary gland, adrenal cortex, thyroid and gonads.

A clear connection between low-voltage power distribution lines in residential neighborhoods and increased incidence of childhood leukemia. (Source : 1979, at the University of Colorado, by epidemiologist, Nancy Wertheimer, Ph.D.)

A quadrupling in the risk of brain tumors among children whose mothers slept under electric blankets during the first trimester of pregnancy. A second study indicated that children who used electric blankets were more likely to develop cancer. (Source : 1990, The American Journal of Epidemiology)



A fourfold increase in the risk of leukemia among children who live near power lines and the doubling of the risk for adults. (Source : comprehensive study done

by Swedish researchers on the effects of electromagnetic pollution on 500,000 people over a 25 year period)

Cellular phones operate at frequencies millions of times higher than the 60 Hz. emitted by the electric lines. Cell phone radiation can triple the number of chromosome abnormalities in human blood cells. (Source : Dr. George Carlo former chairman of WTR (Wireless Technology Research), a research group founded and sponsored by the wireless industry, in a study conducted at Stanford University)

Exposure of human T-cell lymphocytes to a low strength 60Hz electric field for 48 hours significantly reduced their ability against foreign cells. This demonstrated the link of electromagnetic fields to weakened

cells of the immune system and to such diseases and syndromes as AIDS, Autism, Sudden Infant Death Syndrome, Alzheimer's and Parkinson's. (Source: Becker 1990 reporting researchers in Loma Linda, California)

A study of the health threatening effects of microwaved nutrients on the blood and physiology of humans showed that microwave cooking changed the nutrients evidenced by the changes in the participants' blood. Microwave radiation during cooking causes destruction and deformation of molecules of food which results in the formation of new compounds (radiolytic compounds) unknown to man and nature. (Source: Swiss scientist Hans Hertel)

Workers at the Military Institute of Aviation Medicine, Warsaw Poland engaged in the use, maintenance, repair and production of microwave sources complained of headaches, fatigue and copious sweating and those with the highest exposures exhibited flat EEG readings ! (Sulman 1980 Source : 1975 Baranski and Edelwejn)

People living within a quarter of a mile of high output FM and TV broadcasting towers can suffer from heat stress, damaged organs and body chemistry changes. (Schauss 1984).

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Low-level RF radiation decreases certain chemical agents that are essential for spatial learning. In this experiment, rats had difficulty learning a maze after 45 minutes of exposure to the radiation. (Source : Dr. Henry Lai at Washington University.)

Your chance of developing brain cancer increases by 26% if you've used a mobile phone for up to ten years by 77% if you have 10+ years of use. (Source : oncology professor Dr. Lennart Hardell)

Nocturnal melatonin levels were suppressed in rats exposed to electric fields. Similar and significant results indicated that low EMF's can depress night time melatonin, a valuable cancer inhibiting hormone, in humans. Melatonin, secreted

by the pineal gland, affects the sleep cycle, the fertility cycle and the human immune response system that fights disease. (Source : Barry Wilson's research in the early 1980's)



Many research studies have found that the ELF and radio frequency radiation can cause other biological changes.

- Enzyme changes that affect DNA and cell growth ; possible cancer and birth defects.
- Changed metabolism and increased cell growth.
- Fetal abnormalities, probably caused by enzyme changes.
- Gene expression changes, which creates stress on your body and possibly cancer.
- Increased production of stress proteins within cell, possibly to Alzheimer's disease.
- Chronic stress induced by exposure to EMFs, which can lead to heart conditions.
- Neuro-hormone changes, which can result in memory loss and impaired brain function.
- Electro-smog disturbs the growth of cells and the information flow between cells



TECHNOLOGIES IN THE ELECTROMAGNETIC SPECTRUM

NONIONIZING RADIATION			
LOW FREQUENCY FIELDS RADIO FREQUENCIES AND MICROWAVES			
Extremely Low Frequency	Powerlines	Telephone	Video Display
	Hydro lines	Mobile phones	Office equipment
	Power Generation	Cell phones	Battery power
	Electric Appliances	Computer terminals	Small Appliances
Very Low Frequency	Induction heating	Telephone	Video Display
	VDUs	Mobile phones	Flourescent lighting
	Power Generation	Cell phones	Halogen lamps
	Pagers	Computer terminals	Security Systems
Radio Frequencies	Mobile Radio / CB	Mobile phones	Wireless “toys”
	Broadcast AM FM TV	Cell phones	Wireless Computer
	Radar, Navigation	Computer terminals	Satellite receivers
	Pagers	Video Display	Telephones
Microwaves	Rader, Navigation	Mobile phones	Computer terminals
	Microwave ovens	Cellphones	
Infrared	Sunlight	Furnace	
	Germicidal lamp	Welding arc	
Visible Light			
Scientific research has shown that the higher frequency EM fields interact more strongly with tissue and cells.			

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