



Radio Frequency RF & Microwave Prevention Tips

Radio Frequency Waves (RF) and Microwave Radiation are produced by all wireless communication devices and cell phone transmission towers. They are invisible and exist almost everywhere. Current technology is now using pulsed digital signals which increase the risks of exposure. Obtaining an RF free sleeping area is important because we spend 1/3 of our life asleep. The goal is to reduce long term, low level exposure to Radio Frequency (RF) Radiation. Obtaining accurate exposure readings is very important. Some of our competitors' meters do not measure pulsed digital signals. Our complete line of RF Meters will measure pulsed digital signals including the RF-Detector. Please visit our EMF Meter, RF Meter and Body Voltage Meter pages for Bau-Biologie approved testing equipment. See below for our suggestions on how to lower your RF exposure at home:

- Avoid Living near cell phone transmission towers or any other radio/TV transmitter.
- Have your sleeping area evaluated by a Bau-Biologist for Radio Frequency (RF) radiation from cell phone towers and all other wireless radiation sources. Bau-Biologie Exposure Standards indicate RF radiation should be below 1 $\mu\text{W}/\text{m}^2$ (microWatts per square meter) and below 0.1 $\mu\text{W}/\text{m}^2$ for digital pulsed radiation signals.
- If elevated RF Radiation is found, determine whether its source is internal or external to the building. If the source is external (local cell phone tower), installing RF shielding fabric curtains, a bed shielding canopies or RF reflective window foil is recommended. If the source is internal, find the source and turn it off (cordless phone, wireless router). Seek the professional advice of a trained Bau-Biologist for more protection solutions.
- Avoid the use of cordless telephones. Most new models (DECT) base stations constantly transmit RF radiation even when they are not in use.
- If a cordless phone is necessary, choose 900 MHz cordless phone before higher frequency phones. Most 2.4 GHz and 5.8 GHz phones base stations constantly broadcast where as the majority of 900 MHz phones do not. Also the 900 MHz cordless phones use an analogue signal where the 2.4 GHz and the 5.8 GHz phones use more biologically damaging pulsed digital signals.
- Avoid the use of a microwave oven. If using a microwave oven, leave the area. The RF will cover a large area (30-40 feet and more).

- Avoid eating or drinking microwaved food or water. Don't feed microwaved food or milk to babies or young children.
- Avoid the use of wireless baby monitors. Use a hard wired intercom system.
- Avoid the use of an RF security system, use the hard wired one.
- Avoid the use wireless router internet sharing devices. Use a hard wired type. (Ethernet Cat 5 cables)
- If required, use cellular telephones for emergency back-up. Use them with the SLT1 headset.
- Avoid speaking on a cell phone in the car without an external antenna. The RF waves will be reflected back at you from the metal chassis, doors and roof magnifying the radiation. Also, the cell phone has a hard time sending its signal out of the car because of the metal chassis, and increases its transmitting strength to compensate.
- Avoid the use of a cellular phone if pregnant.
- Do not let a child use a cellular phone.
- Minimize your exposure to medical and dental x-rays.

Home EMF and RF Prevention Tips

The sleeping area is particularly important because we spend 1/3 of our life sleeping. The goal is to reduce long term, low level exposure to AC Electromagnetic Fields (EMF) and Radio Frequency (RF) Radiation. Obtaining accurate exposure measurements is also very important. Please visit our EMF Meter, RF Meter and Body Voltage Meter pages for Bau-Biologie approved testing equipment. See below for our suggestions on how to lower your EMF exposure at home:

- Sleep in a room that has been electromagnetically evaluated. Bau-Biologie Exposure Standards for sleeping areas indicate that Magnetic and Electric Fields should be as low as possible, preferably under 0.2 mG (milliGauss) or 200 nT (nanoTesla) for Magnetic Fields and below 1 V/m (Volt per Meter) for Electric Fields. Ideal Body Voltage readings should be below 10 mV (milliVolts).
- Shut off the electricity in your bedroom during sleeping hours. This can be accomplished manually by turning off the breakers or automatically with a demand switch. This will eliminate electric field exposure while sleeping. Seek the professional advice of a trained Bau-Biologist for protection solutions.
- Avoid placing a bed on a shared wall with a neighbouring apartment if in a townhouse or apartment building. Your neighbours may have electronic equipment or electrical appliances on the other side of the wall emitting high electromagnetic fields.

- Have your sleeping area evaluated for radio frequency (RF) radiation from cell phone towers, and all other wireless radiation sources. Bau-Biologie exposure standards indicate RF radiation should be below 1 $\mu\text{W}/\text{m}^2$ (microWatts per square meter) and below 0.1 $\mu\text{W}/\text{m}^2$ for digital pulsed radiation signals.
- If elevated Radio Frequency Radiation is found, determine whether its source is internal or external to the building. If the source is external (local cell phone tower), installing RF shielding fabric curtains, a bed shielding canopies or RF reflective window foil is recommended. If the source is internal, find the source and turn it off (cordless phone, wireless router). Seek the professional advice of a trained Bau-Biologist for protection solutions.
- Avoid the use of cordless telephones. Most new models (DECT) constantly transmit RF radiation even when they are not in use.
- Remove all electronic devices from all occupied bedrooms.
- Avoid the use of an electric blanket. This will produce high electric and magnetic fields.
- If possible, sleep in a bed that has no metal parts, such as innersprings or a metal frame.
- Avoid using metal head and foot boards because the electric fields will be enhanced.
- Keep metal away from the sleeping area, such as metal bookshelves, end tables or metal pole lamps.
- Use a battery operated alarm clock rather than an AC electric alarm clock.
- Avoid purchasing a home within 500 feet of high voltage power lines. This distance will vary according to the power of the lines. A magnetic and electric field strength measurement would determine the exact distance.
- Avoid running electric extension cords under chairs, beds and couches.
- If possible, maintain a distance of 10 feet from the television and other electronic devices and appliances.
- Avoid the use of fluorescent and halogen lights, use incandescent full spectrum lighting.
- Avoid the use of electric motors, such as an electric can opener, shaver or toothbrush. Rechargeable or battery operated toothbrushes and shavers are preferred to plug-in models.
- Consider replacing an ungrounded 2 wire lamp cord with a 3 wire shielded power cord to reduce electric fields. Your lamp may have to be customized in a specialty lighting store or by an electrician and meet UL and CSA approvals.
- Stand back 3 feet or more from operating motors such as juicers and blenders.

- Avoid the use of hand held hairdryers. If required, keep the motor and the cord as far from the body as possible.
- Avoid using the over head fan while in the bathroom. If it must run maintain a distance of 10 feet.
- If possible, maintain a distance of 10 feet from the heater coils when cooking with an electric stove or oven.
- If purchasing a computer monitor locally, screen it with a Magnetic Field Detector or gauss meter. The latest standards require that AC magnetic field be 1 mG (100 nanoTesla) or less one foot from the monitor.
- Don't give an older computer to a child without first measuring the magnetic fields it produces.
- Avoid the use of a sewing machine during pregnancy or balancing a laptop on the abdomen.

Automobile EMF & RF Prevention Tips

Some of us spend a great deal of time in a car, therefore it is important to choose a vehicle that has low EMF and RF emissions. The goal is to reduce long term, low level exposure to Electromagnetic Fields (EMF) and Radio Frequency (RF) Radiation. Unfortunately little can be done with the automobile. There is also very little data recorded on this subject so each automobile would require a measurement to check its emissions. Obtaining accurate exposure readings is very important. Please visit our EMF Meter, RF Meter and Body Voltage Meter pages for Bau-Biologie approved testing equipment. See below for our suggestions on how to lower your EMF and RF exposure in automobiles:

- The gasoline-ignition engine has spark plugs to ignite the fuel-air mixture. The ignition (spark) system is a tremendous source of broad spectrum RF Radiation as well as Magnetic Fields.
- The car body is used as part of the electrical system, considerable electrical emissions exist inside an automobile.
- The alternator is a strong source of Magnetic Fields.
- The diesel engine with mechanical fuel injection has no spark plugs at all. An electric spark is not required therefore lower Magnetic Field emissions
- The car stereo is a large source of EMF, even when powered off.
- Keep distance from the audio speakers which emit large magnetic fields.
- The air conditioning and heating fan generate large magnetic fields.
- Most new cars have a satellite communication system and can transmit high levels of RF radiation.
- Avoid speaking on a cell phone in the car without an external antenna. The RF waves will be reflected back at you from the metal chassis, doors and roof magnifying the radiation. Also, the cell phone has a hard time sending its signal out of the car because of the metal chassis, and increases its transmitting strength to compensate.

- New hybrid vehicles will emit high electric and magnetic fields.

Office EMF Prevention Tips

Achieving a low AC EMF emission office environment is difficult because of the constant use of electronic equipment. The goal is to reduce long term, low level exposure to Electromagnetic Fields (EMF) and Radio Frequency (RF) Radiation. Obtaining accurate exposure measurements is also very important. Please visit our [EMF Meter](#), [RF Meter](#) and [Body Voltage Meter](#) pages for [Bau-Biologie](#) approved testing equipment. See below for our suggestions on how to lower your EMF exposure in the office:

- Measure the Electric and Magnetic Fields that your monitor produces. LCD monitors are not always the best choice. Measuring with approved test equipment is the only way to know for sure. See our approved [EMF Meters](#) and [Body Voltage Meter](#) for test equipment suggestions. Seek the professional advice of a trained [Bau-Biologist](#) for more EMF protection solutions.
- Use [Shielded AC Power Cords](#) and power bars for all computer or electronic equipment.
- Plug your computer and electronic devices into a grounded 3-holed outlet.
- Use a radiation-reducing grounded glare guard on computer monitors to reduce EMF radiation.
- If possible use a telephone with a cord for the bulk of your calls.
- Only use a cellular phone for emergency back-up or with the [SLT1 Headset](#).
- Beware of Magnetic and Electric Fields from personal computers, electric typewriters, calculators, desk lamps and measure their strength with an approved Electric and Magnetic Field detector.
- Use a manual pencil sharpener rather than an electric one.
- Maintain distance from the rear and sides of a neighbour's computer monitor.
- Locate the buildings electric panels, transformers, etc. and do not sit near them.
- Keep wiring, surge protectors, power bars and extension cords 5 feet away from any body part.
- Maintain minimum distance of 10 feet from copiers, fax machines and other office equipment.
- Use a full-spectrum incandescent lamp (grounded if possible), rather than a fluorescent or halogen light if you have the option.
- If using a laptop, buy one with a 3-prong plug. Run it off the battery routinely. If it is not possible to purchase a 3-prong plug, ground the

- chassis of the laptop. This will eliminate the large electric field caused by the ungrounded laptop.
- If carrying a pager, cell phone, or any electronic device regularly rotate it around the body.
- Avoid congregating or sitting near the microwave oven when it is on. The RF radiation can infest a large area.
- Avoid work areas that use wireless networking and wireless phones if possible.

Electrical EMF Prevention Tips

A properly installed electrical system plays a key roll in the AC Electromagnetic Field (EMF) Pollution levels in a building. Proper grounding can significantly reduce Electric Fields. Neutral wire isolation can reduce unwanted Magnetic Fields thus eliminating Net Currents. It is important to reduce long term, low level exposure to Electric and Magnetic Fields. Obtaining accurate exposure readings is also very important. Please visit our [EMF Meter](#), [RF Meter](#) and [Body Voltage Meter](#) pages for [Bau-Biologie](#) approved testing equipment. See below for our suggestions on how to lower your EMF exposure at home:

- Sleep in a room that has been electromagnetically evaluated. [Bau-Biologie Exposure Standards](#) for sleeping areas indicate that Magnetic and Electric Fields should be as low as possible, preferably under 0.2 mG (milliGauss) or 200 nT (nanoTesla) for Magnetic Fields and below 1 V/m (Volt per Meter) for Electric Fields. Ideal Body Voltage readings should be below 10 mV (milliVolts). Seek the professional advice of a trained [Bau-Biologist](#).
- Shut off the electricity in your bedroom during sleeping hours. This can be accomplished manually by turning off the breakers or automatically with a [Demand Switch](#). This will eliminate electric field exposure while sleeping.
- Avoid placing a bed on a shared wall with a neighbouring apartment if in a townhouse or apartment building. Your neighbours may have electronic equipment or electrical appliances on the other side of the wall.
- Remove all dimmer switches used in the house. They emit high magnetic fields and cause dirty electricity.
- Verify that all circuits in the house are properly grounded.
- Use 3 wire shielded cable (BX) for wiring a home. The metallic jacket shields Electric Fields.
- Plug 3-wire appliances into working 3-wire outlets.
- Locate the power panel at least 15 feet from living / sleeping areas.
- Locate hot water heater (electric) at least 10 feet from living/sleeping areas.
- Locate clothes dryer 14 feet from living/sleeping areas.

- Most new Ground Fault Interrupter (GFI)'s generate constant Magnetic Fields and dirty electricity.

Install a non-metallic junction (Dielectric Union) where the metal water pipe enters the ground. (Just after the water meter) This will help prevent stray ground current from entering your home and infest the water pipes.

VIEW VIDEOS ON EMF

<http://www.youtube.com/user/EMFSolutions>



<http://www.emfsolutions.ca/tips.php>

10 Tips to Protect You and Your Family from EMF Exposure

We are all exposed to harmful EMFs in our homes but you can reduce your exposure greatly with an EMF home inspection.

Emf exposure is inked to many acute and chronic illness conditions and electrical sensitivities are a serious emerging public health concern, in which most doctors have no training. Everyday we are exposed to electromagnetic fields (EMF) from a number of common sources found around the home, in our work environment and in our sleeping quarters. Here are some common-sense tips to help you avoid exposure:

The Office and Computing Area

1. If possible avoid working on a laptop computer and never put a laptop on your lap, especially when it's plugged in.

Many laptop computers produce a strong EMF, especially when plugged in to an electrical outlet, as they are charging a battery in close proximity to where you rest your hands.

2. When replacing your computer monitor (or TV) buy a new LCD (Liquid Crystal Display)

LCDs emit much less radiation than the old CRT style monitors that use a cathode ray gun to excite the phosphors on the screen

3. Clean up the electrical power cords and transformers around your computer and desk and reroute them away from your feet and seating area.

Transformers and power bars around your feet while you work on your computer can be a huge EMF exposure point, especially if you spend a lot of time on your computer.

Wireless Technology

4. Don't install a wireless network (wi-fi).

In October of 2007 the German Government advised the public in that country to avoid using wi-fi because of the possible health risks they pose. Wireless routers emit electromagnetic radiation even when you are not using them.

5. Don't buy a DECT cordless portable phone.

In 2005 the German Government also nixed these new DECT cordless portable phones. The base station of these phones constantly transmits a strong RF signal, even when the handset is not in use just sitting idle in the cradle. If you have one, get rid of it. DECT technology is also used in some baby monitors.

6. Limit the time you spend talking on a cordless phone and cell phone and only let children under 14 use wireless phones for short periods of time when absolutely necessary.

Lately we've been hearing about the possible health risks associated with cell phone radiation. It's important to understand that cordless phones use electromagnetic radiation to communicate -- just like a cell phones -- and radiation exposure is cumulative no matter what the source.

Electrical Wiring and Devices

7. Unplug all electrical power cords and devices that are not in use and limit the use of electrical devices in the bedroom.

All devices plugged into live electrical outlets including innocuous lamps and clock radios emit an electric field when plugged into a live electrical outlet. If an electrical device is unplugged it will not produce an electric or a magnetic field. EMFs suppress melatonin; so clean up the electrical cords and devices around your bed and get a battery-operated clock radio.

Lighting

8. Avoid installing low-voltage (12 volt) halogen, florescent tube and energy-efficient compact fluorescent lighting (CLF).

Virtually all of these so-called energy-efficient technologies create "dirty electricity" and at the same time can throw a nasty electromagnetic field from the ballast or transformer. Cleaner LED lighting technology is just

around the corner so wait for it to develop and come down in price before you do major lighting upgrades.

9. Replace all the dimmer switches in your house with regular switches.

Even when turned completely on to full power a dimmer chops-off part of the electrical current, then it discards in the form of a strong electromagnetic field. Dimmer switches also create dirty electricity that can contaminate a home's electrical wiring with this dangerous high-frequency energy.

Dirty Electricity

10. The most important thing you can do to avoid ongoing exposure to EMF is to install Graham-Stetzer filters in your home and office to reduce the amount of high frequency radiation (known as dirty electricity) emitting from electrical wiring and electrical devices. In a number of well-conducted scientific tests many benefited greatly when the filters were installed in their homes and schools.

Note: If you or someone in your family is demonstrating symptoms of "Electrical Hypersensitivity" you may want to consider having your home inspected for dirty electricity and other EMF sources.

See how [children with asthma](#) in Wisconsin improved dramatically when Dirty Electricity was removed from their school using Graham-Stetzer filters. Read Professor Magda Havas' [ground breaking research](#) using Graham-Stetzer filters.

Research

Emerging research shows that our dirty power supply is linked to many of today's illness including diseases of the central nervous system, many types of cancer, diabetes, Lou Gehrig's disease (ALS), miscarriages, childhood leukemia, asthma, mood disorders, and behavioral disorders.

[Expand All](#) | [Contract All](#)

☒ "Electromagnetic Load" a Hidden Factor in Many Illnesses

Medical Director of Switzerland's Paracelsus Clinic: "Electromagnetic Load" a Hidden Factor in Many Illnesses

"Dr. Thomas Rau, Medical Director of the world renowned Paracelsus Clinic in Lustmühle, Switzerland says he is convinced 'electromagnetic loads' lead to cancer, concentration problems, ADD, tinnitus, migraines, insomnia, arrhythmia, Parkinson's and even back pain. At Paracelsus (www.paracelsus.ch), cancer patients are now routinely educated in electromagnetic field remediation strategies and inspectors are sent to patients' homes to assess electromagnetic field exposures..."

Find out more by [reading the full article](#) detailing this research.

Part B. General Questions about EMFs, Potential Health Effects, and How to Reduce EMFs...

B1. What are Electromagnetic Fields (EMFs)?

<http://www.emfcenter.com/emffaq.htm>

Electromagnetic fields (EMFs) are a type of low-frequency electromagnetic radiation emitted from virtually everything electrical and electronic in our modern world — power lines, transformers, electrical panels, building wiring, computers, lights, clocks, appliances, televisions, hairdryers, cell phones, cordless phones, microwave ovens, Wi-Fi, wireless routers and other devices, TV/radio/cell towers, etc. In general, the term "EMF" is used to refer to the wide range electromagnetic frequencies slower than visible light, called "non-ionizing" radiation. (In contrast, the frequencies faster than visible light including x-rays and nuclear radiations, are much more dangerous and are called "ionizing" radiation.)

B2. What is Electromagnetic Interference (EMI)?

Electromagnetic interference (EMI) is a common problem in which electromagnetic fields (EMFs) interfere with the proper functioning of a complex electronic or computer system, or one of its components. These interference problems can range from an annoying jitter of the image on a TV or computer screen or disruptive static on a radio station, to very serious and costly problems with the loss of data, malfunction or complete shutdown of sensitive computer and electronic equipment. For example, there is great care taken in the assignment of frequencies and power outputs for radio and television stations, cell towers and various wireless devices to make sure that the EMF signal from one station or device does not overlap and interfere with the EMF signal from another device or station. This is very important for the proper operation of all electronics and wireless devices.

B3. Can EMFs really affect human health?

Today, over a thousand research studies have linked EMFs to important biological effects. But there is still great controversy about the seriousness of the health effects, and the conclusiveness of the research data. In the beginning, many scientists assumed that EMFs could not affect human health because EMFs cannot ionize molecules like x-rays and nuclear radiation, and the exposures are usually too low to cause significant heating of body tissue. However, similar to the way that EMFs can cause interference problems for sensitive electronics and computer system, the research is beginning to suggest that low-level EMFs can indeed influence and interfere with sensitive *bio-*

electromagnetic processes within our cells, brains and bodies. For example, research suggests that our pineal gland can somehow sense the daily changes of the earth's natural magnetic field, and use this information to help regulate our wake/sleep cycle. Studies indicate that artificial magnetic fields can suppress the secretion of melatonin from the pineal gland at night, the main hormone that initiates our sleep cycle.

B4. What are the health concerns?

While there still is great controversy, studies suggest that EMFs may be linked to a variety of health problems including leukemia, lymphoma, brain and nervous system cancers, melanoma, breast cancer, miscarriage, birth defects, Alzheimer's disease, Lou Gehrig's disease, depression and suicide. Anecdotally, EMFs have been associated with symptoms such as nausea, headache, fatigue, anxiety, dizziness, mental confusion, memory loss, sleep disturbance, itchy or burning skin sensations, and skin rashes. Anecdotally, there are increasing numbers of people who report "hypersensitivity" to electromagnetic fields (EMFs), similar to the way that some individuals have become "hypersensitive" to chemicals, often as the result of over-exposure in the past.

B5. What are some of the studies that have linked EMFs to cancer?

The strongest evidence comes from a series of epidemiological studies that have reported increased childhood cancer risks in homes with higher EMFs from power lines. Scientists at the Washington State Department of Health reported that the modern rise of childhood leukemia (absent in primitive cultures) is closely linked to the original date of electrification of homes. A wide variety of occupational studies have linked EMFs to cancer in adult workers. In the laboratory, human cancer cells exposed to high EMFs grew significantly faster than unexposed cancer cells. Recently, independent studies from Europe have reported increased tumors and cancer risks linked to the use of cell phones and cordless phones. The cancer risk was highest when people started their use in childhood.

B6. Do EMFs affect the immune system?

The research suggests that certain EMFs might affect the pineal gland's secretion of melatonin at night. Melatonin is one of our bodies' most potent natural cancer fighters, as well as the vital hormone that regulates our wake/sleep cycle. Lowered levels of melatonin have been linked with breast, ovarian, prostate and melanoma cancers, as well as with psychological disorders such as depression and suicide. We all know what happens if we do not sleep well — not only are we more tired and grumpy, but we're also much more likely to catch a cold or sickness because our immune function is low. So, rather than initiate any specific disease like leukemia, it seems that EMFs may simply cause long-term stress and interference with our sleep and immune functions — weakening the body's natural ability to maintain health and fight a variety of illnesses.

B7. Where do EMFs come from?

For many people, the largest single source is from electrical wiring as well as lights, appliances and other electrical devices in the home. In particular, electrical wiring near the bedrooms can emit high EMFs all night long. Clocks and radios near the bed may also contribute. Exposures to EMFs from cordless phones, cell phones, wireless computer equipment, Wi-Fi, etc., are also increasing. Another common source is from power lines — both the high-voltage power lines on metal towers and the neighborhood distribution lines on wooden poles or buried underground. Computers, fluorescent lights and other equipment at work are another important source. And a strong EMF source that is usually overlooked is the automobile.

B8. How do I know if I am being exposed to EMFs?

In our modern world, everyone is exposed to some level of electromagnetic fields (EMFs). But exposure levels will vary greatly depending on location. Unfortunately, without testing, it is very difficult to predict the actual EMF levels found in any particular home or office because the EMFs can be emitted from unexpected and unknown sources such as electrical wiring in nearby walls, stray electricity in metal water pipes, a neighbor's wireless computer, or a cordless phone when not in use. Therefore, we recommend that everyone measure the actual levels found in their home, school or office with proper test meters. You can hire a professional to do this, or purchase or rent the proper meters to do this yourself.

B9. How can I reduce the EMFs in my home?

First, you can arrange beds, couches and chairs to stay as far away as possible from obvious EMF sources such as electrical panels, refrigerators, televisions, fluorescent lights, etc. Use a battery powered alarm clock instead of a plug-in type near your bed, and unplug electrical cords near beds, desks, couches and chairs. Limit your family's use of cell phones and cordless phones as much as possible, especially for children. For your computer, use only wired components, nothing wireless if possible. Also avoid using Wi-Fi, or at least turn it off at night. And since EMFs can be emitted from so many unseen and unexpected sources, we strongly recommend that you measure with a test meter to determine what the actual exposure levels and sources are.

B10. Can I do my own EMF testing?

Yes, in most cases you can. Rather simple, do-it-yourself test meters are available for the average person. With the proper test meter, you can test your home, school, workplace or any other location for EMFs. You can test power lines, transformers, wiring, electric meter panels, computers, televisions, appliances, cell phones, cordless phones, etc. You can test where you sleep, and where your children play. And perhaps most important for the long term, you can pre-test potential new homes and apartments before you decide to buy or rent.

B11. When do I need to hire a professional test consultant?

A professional test consultant can help assure that a thorough and accurate EMF survey has been performed. Also, some professionals may also have expertise in the reduction of EMFs – shielding refrigerators and electrical panels, troubleshooting EMFs from wiring, eliminating stray electrical currents in water pipes, etc.

B12. Are there different kinds of EMFs?

Yes, there are three basic kinds of EMF. **Magnetic fields** are the EMF component most often linked to serious health effects in the scientific research literature (e.g., between power lines and childhood leukemia). They are emitted from power lines, building wiring, lights, appliances, and virtually everything that runs on regular electricity.

Electric fields make up the other half of the "electro"magnetic fields emitted from power lines, wiring, lights and appliances. They are also related to certain biological effects, and anecdotally, electric fields are often involved when people knowingly feel discomfort or "symptoms" from electrical sources.

Finally, **Radio frequency** or "**RF**" includes the higher frequency fields and microwaves emitted by cell towers and cell phones, cordless phones, TV/radio broadcast towers, Wi-Fi and other wireless computer devices, microwave ovens, and various electronics. (The electric and magnetic parts of RF fields are not separated, so you only need one meter to detect the RF field.)

B13. How are the different kinds of EMFs measured?

Each of the three kinds of EMFs requires a different type of test meter. **Magnetic fields** are usually measured in units called *milligauss* (mG) with special instruments called "*gaussmeters*." **Electric fields** are detected by either measuring the *volts* (V) on a person's skin with a "*body voltage tester*" or the *volts per meter* (V/M) with a standard "*electric field tester*." **RF/microwave fields** require a special test meter that can detect a wide range of RF frequencies, especially the digital microwaves, in units of *microwatts per centimeter squared* ($\mu\text{W}/\text{cm}^2$).

B14. What levels are considered safe?

There is great controversy about what levels are safe, so you will have to make your own decision. For magnetic fields, the lowest level linked to childhood cancer in the power line studies is 2.0 milligauss (mG). The average in homes around the country is probably around 0.5 mG, with dense urban areas like San Francisco probably averaging closer to 1.0 mG. In our consulting work, we try to reduce long-term exposures to well below the levels linked with disease in the research studies, so we generally try to reduce magnetic field exposures to 0.5 mG or less.

Electric fields in homes are typically around 0.5 to 2.0 volts (V) using a body voltage meter. We usually use a cautionary level of 1.0 V for living areas, and 0.5 V for sleeping locations. Anecdotally, very sensitive individuals usually need to reduce electric fields below 0.1 V to feel relief of symptoms. RF/microwaves in the home vary greatly, usually depending on the use of cell phones, cordless phones, wireless and Wi-Fi. Average levels vary from 0.01 to 0.5 microwatts per centimeter squared ($\mu\text{W}/\text{cm}^2$). We generally use a precautionary level of $0.1 \mu\text{W}/\text{cm}^2$ as suggested by the Bioinitiative Report, and 0.001 or less for sensitive individuals.

B15. Are all test meters the same?

No. A triple-axis meter allows you to simply hold the test meter in any orientation, and get a full, accurate three-dimensional reading. A single-axis meter requires you to move the meter around in all possible directions to find the highest field strength, or take three readings in orthogonal directions and do a math calculation. In practice, most people will get much more accurate readings with a triple-axis meter, because it is so easy to miss the strongest direction with a single-axis meter and underestimate the true field strength.

For **magnetic fields**, we usually recommend a gaussmeter that can detect both ELF and VLF frequency ranges. ELF includes the 60 Hz frequency from power lines, wiring, refrigerators, transformers, lights, appliances and everything that runs on regular electrical power. VLF includes higher frequencies in the range of 10,000 Hz and more that often come from televisions, computers, fluorescent lights, compact fluorescent bulbs, and other electronics. For **RF/microwaves**, it is also important to use a meter which can measure a wide range of frequencies. For example, the 5.8 GHz frequency of some cordless phones is not detected by many RF meters.

B16. What particular test meters are best?

The all-purpose meter that we often recommend for general testing is the [TriField 100XE](#). This meter is a special value because it is triple-axis and can detect all three kinds of EMFs, all at a relatively low cost. However, while it does measure a very wide range of *magnetic fields*, it does not detect levels as low as we would recommend for the *RF* and *electric fields*. Therefore, when searching for a new home or apartment, we generally recommend that you test the *magnetic fields* with a more accurate gaussmeter like the [Alpha UHS](#) or [Bell 4080](#). For more sensitive testing of the *RF*, especially digital *microwaves* from cell towers and wireless devices, we recommend the [TES 92](#) or [TES 593](#). And for individuals with serious health problems or hypersensitivity to EMFs, we recommend more accurate testing of the *electric fields* with a [Body Voltage Meter](#). For more detailed information, please go to our [meters page](#).

B17. How much do test meters cost?

The TriField 100XE is very affordable and practical because it can detect all three kinds of EMFs within one instrument. It sells for around \$200, and rents for \$75 per week. (Most other gaussmeters in this low price range will (1) detect

only magnetic fields (not electric fields and RF), (2) detect only ELF frequencies (not VLF frequencies from computers, TVs and fluorescents), and/or (3) be a single-axis meter (difficult to get accurate measurements). In general, the more specialized meters with better sensitivity and accuracy will usually cost around \$300 or more. Please refer to our [meters page](#) for more information..

B18. Can I rent a test meter to help reduce my costs?

Yes, you can save money by renting a test meter instead of buying. All the meters that we sell are available for rent through our "Seven-Day Rent-by-Mail" program. We ship via US mail, UPS or Federal Express to anywhere within the US or Canada. Your cost is the cost of the rental fee plus shipping fees in both directions. Note: Many people purchase the all-purpose TriField 100XE for general long-term use, and then rent the other specialty meters (for more accuracy or sensitivity) only if needed — e.g., when searching for a new home or apartment.

B19. What can I do if I discover high EMFs in my home?

Once you measure the EMFs, the solution may be as simple as moving a bed or couch farther away from a strong EMF source (for example, away from an electrical meter or breaker panel on the other side of a bedroom wall). If the solution is not easy or obvious, then you may want to consult with an EMF professional — someone in your area who has technical experience in the reduction of EMFs

B20. Can EMFs be shielded?

Yes, sometimes. Each kind of EMF requires different kinds of shield materials and installation procedures. *Magnetic fields* are shielded with special alloys such as MuMetal[®]. (Please note that magnetic shielding requires some professional guidance, because improper placement can actually increase the fields.) *Electric fields* are easier to shield, but again the shields must be properly installed, or they can also raise the exposures rather than lower them. Similarly, *RF/microwaves* can be shielded with special materials. We provide both the materials and the technical guidance needed to shield all types of EMFs. In some cases, *electric fields* and *RF* can be shielded with common materials that are readily available to save costs.

B21. Can I reduce the EMFs from my existing wiring?

Yes, you usually can. In existing homes, high magnetic fields from electrical wiring are often caused by improper wiring connections. Fortunately, most of these wiring problems can be repaired without opening up any walls. The repairs are made by accessing and repairing the improper connections, which are usually located in accessible electrical boxes. Strong sources of magnetic fields — including the electrical meter panel, breaker panels, transformers, refrigerators, pump motors, appliances and other common sources — can usually be shielded with MuMetal[®] type alloys. And to reduce the EMFs

during sleep, some people simply turn off the electrical circuits near the bedrooms at night.

B22. Can I reduce the EMFs from the wiring for my new home or remodel project?

Yes! Definitely. You can have your new wiring installed so that it is very, very low in the emission of both *magnetic* and *electric* fields! And if the proper design and material choices are made early, your "EMF-Free" or "Low-EMF" wiring system can be installed for minimal added cost when compared to other wiring systems. We provide professional wiring design consultations to answer your questions, and to guide you, your contractor and your architect through the proper steps for installing EMF-Free wiring for your new home or remodel project.

B23. What is "EMF-Free" or "Low-EMF" Electrical Wiring?

"EMF-Free" wiring uses (1) special materials to shield or cancel the *electric* and *magnetic fields*, (2) special methods to eliminate stray currents that often cause high *magnetic fields*, and (3) proper placement of equipment, to minimize all EMF exposures. Installation costs are similar to those of regular wiring, except that the shielded materials themselves will cost more. "Low-EMF" wiring saves money by using standard unshielded materials, while still incorporating the EMF reductions of steps (2) and (3) above. Installation costs are similar to regular wiring. *(Nationwide, we provide consultations via telephone to assist you in the design and installation of special EMF-Free wiring for your new home or remodel project. In northern California, we provide licensed electrical contractor services to install the EMF-Free wiring. All methods and materials meet and exceed the current requirements of the National Electric Code.)*

B24. Can I reduce the EMFs from power lines?

High voltage transmission lines (on the tall metal towers) can emit strong EMFs for several hundred feet. Neighborhood power lines (wooden poles) and buried electrical lines can also emit very high levels. It is important to measure the levels with a gaussmeter, because emissions vary greatly and are difficult to predict. While there may be modifications that the electric utility company can do to reduce the fields, in most cases the costs will be prohibitive for the average homeowner. In some cases, the installation of an electronic "magnetic field cancellation system" may be a cost-effective alternative.

B25. What are power line "magnetic field cancellation" systems?

In some cases, the magnetic field exposures from power lines can be reduced with special electronic equipment that measures the existing magnetic field and then produces an opposing field to "cancel out" the magnetic fields within a certain area. These systems are called "Active Magnetic Field Cancellation Systems," and they were initially used to reduce electromagnetic interference for electron microscopes and other sensitive instruments. Typical costs for the complete design and installation of such a system usually start at around \$20,000. Unfortunately for most people, this price is often prohibitive.

B26. How can I reduce EMFs from my computer?

Computers emit a complex mixture of different types and frequencies of EMFs. One of the biggest and growing concerns now is the widespread use of Wi-Fi and wireless computer hardware. Many computer products are made with wireless installed, and sometimes, even if you think they are off, the hardware is still emitting. Use only hard-wired connections, and no wireless devices, to help reduce the exposure to RF fields. We recommend that you test with an RF meter to confirm that all components are indeed not emitting any RF wireless signals. Move all computer hardware, such as the CPU and printer, as far away from your body as possible. That jumble of electrical cords near your feet can be a strong EMF source. Move these farther away, and even better, they can be shielded and grounded. LCD flat screen monitors generally emit much lower EMF levels than the old CRT (big TV tube type) monitors. Finally, check to make sure that the electrical power outlet for your computer is properly grounded, or the electric fields will be greatly increased. *(We provide telephone consultations, test meters and shielding materials to help you with all of this.)*

B27. How can I reduce EMFs from my television?

Similar to computers, TVs also emit a complex mixture of EMFs. Probably the biggest concern is for children who play video games. Staying a minimum of eight feet away from the television will usually be enough to avoid the strongest fields. However, it may be wise to verify this with a gaussmeter. Since the typical gaussmeter will only measure in the "ELF" range of frequencies, we recommend that you test your TV with the Alpha UHS Meter or TriField 100XE Meter — which both have a very wide sensitivity range, including the higher frequency "VLF" magnetic fields emitted by televisions, computers and fluorescent lights.

B28. What about cell phones?

Cell phones tend to cause the greatest exposures to RF/microwaves radiation for most people, and especially for the brain. The trick is, how to shield the user from the phone's EMF signal, but yet allow that same EMF signal to reach the nearest cell tower? Practically speaking, this is difficult, and many advertised products are not very helpful. The safest choice is to severely limit and reduce the time spent on cell phones, especially for children. Even if the long distance minutes are "free," consider that an increased risk of brain tumor is not. Here are your choices, in descending order of effectiveness: (1) Don't use it. (2) Keep it off, and only use it for emergencies and very short calls. (3) Use it only on a speaker phone, don't hold it, put it down on something and back away. (4) Preferably use an "air tube" (stethoscope) type of hands-free kit, because typical hands-free kits allow the radiation to conduct up the metal wire to the ear.

B29. What about cordless telephones?

Some of the research studies from Europe are showing similar health risks, including brain cancer, from the use of cordless phones as well as cell phones. The RF/microwaves emitted from cordless telephones are similar to cell

phones, except that the exposure levels are somewhat lower. However, the base cradles for many cordless phones emit an RF signal constantly, even when the phone is not in use! Similar to cell phones, the best alternative is to severely limit the use of cordless phones. Best is to unplug them and use only land-line hard-wired telephones when possible. If you do want to keep connected, by substituting. If you do use a cordless phone, it would be prudent to test with an RF meter to see if the base cradle is emitting all the time, or only when used. To reduce exposure, we recommend the same 4 steps given above for cell phones.

B30. What about cellular antennas and TV/radio towers?

Today, with the growing profusion of cellular broadcast antennas — many of which are cleverly disguised or hidden from view — it may be wise to measure the EMFs with an RF test meter. The TES 92, TES 593 and Alpha RF are all good meters for detecting the RF/microwave fields from TV and radio towers, cellular antennas, Wi-Fi and other wireless systems. The TriField 100XE is a good all-purpose meter, but is not as sensitive as we would recommend for this kind of testing. Building materials will provide some shielding, so that levels inside a building are often 5 to 10 times lower than they are outside from these sources. These kinds of fields can be shielded, but this is a little tricky. A good time to add RF shielding is during construction, before the walls are covered up. Since many sources are unseen and unknown, it may be wise to pre-test a new home or apartment with a meter before buying or renting, if you are concerned about these exposures.

B31. What is Electro-Sensitivity?

Electro-Sensitivity is a condition in which a person reports heightened sensitivity and/or serious health symptoms related to EMF exposures of one kind or another. This condition is typically verified when, by simply removing the EMF source (or removing the person from the source) the symptoms disappear, but reappear when the source is reintroduced. People with Electro-Sensitivity are often very troubled by the normal EMF levels found in a typical home or work environment. Thus, special measures are often needed to reduce the exposure levels further. (Also called Electrical Sensitivity, Electrical Hypersensitivity, Electromagnetic Sensitivity, and Electromagnetic Hypersensitivity.)

B32. I think that I am highly sensitive to EMFs, what can I do?

We recommend that you test your environment to see what the actual EMF levels are in your home, workplace, and especially where you sleep. In our experience, many individuals with Electromagnetic Hypersensitivity will need to reduce their long-term exposures to levels well below those found in the average home or office, to relieve their symptoms. Even when a person noticeably reacts to only certain electrical items (like a computer or cell phone or Wi-Fi), from our anecdotal experience we recommend reducing all EMFs as much as possible to reduce the total EMF "exposure load" on the body. Typically, this might involve turning off certain electrical circuits at night, or perhaps doing some shielding or rewiring with shielded materials if needed. In extreme cases, some people

recover by relocating to a more remote location (often without electricity and cell phones) for a certain period of time.

B33. What do EMF research scientists say about EMFs?

Over a thousand studies have now reported biological effects related to EMFs, including effects on cells and hormones, suppression of immune function, and serious illnesses including several cancers. Scientists no longer argue whether or not EMFs can affect human health, that is generally accepted. But there is still great controversy about the extent and severity of these health effects at common exposure levels. Some believe that the overall impact on our health is relatively minimal when compared to other environmental issues like asbestos or pollutants in the air. Others argue that the studies are not yet consistent or conclusive enough to warrant action. For many years, experts such as Dr. Granger Morgan at Carnegie Mellon University have recommended a policy of "prudent avoidance" — reducing EMFs whenever possible without excessive cost or inconvenience. Most scientists agree that more research is needed.

There is growing support, especially in Europe, for applying the "precautionary principle" — that while the health risks to the general population are not conclusively proven, the risks are plausible enough to warrant protective action. In 2007, an international group of scientists, researchers and public health officials concluded that the existing scientific knowledge has grown strong enough to alert the public and urge governments to develop new safety limits. Their science based document, the BioInitiative Report, warned that existing safety limits for EMFs from power lines and wireless devices like cell phones are inadequate to protect public health, and recommended lower safety limits based on the available research.

B34. What does the EPA say about EMFs?

In 1990, scientists with the US Environmental Protection Agency (EPA) leaked a draft report that recommended EMFs be classified as a "possible human carcinogen" (similar to DDT and PCBs). The scientists were concerned that their findings were being held back from the public. Later, the EPA's final published report did not include the same strong wording as the draft, but it did state that the EMF cancer studies "...show a consistent pattern of response that suggests a causal link." To date, no official safety standards have been set by the EPA for exposure to low-frequency magnetic fields. The Federal Communications Commission (FCC) has set safety limits for public exposure to RF/microwave fields.

B35. What do official health organizations say about EMFs?

In recent years, a variety of national and international health organizations have reviewed the EMF issue. Some have concluded that the evidence for health effects is still not conclusive. Others have concluded that the scientific evidence is strong enough to demonstrate significant health effects. In 2001, scientists with the Washington State Department of Health

reviewed historical data and reported that the sudden appearance of childhood leukemia in modern societies is closely linked to the original electrification of homes. In their 2002 summary report on EMFs, scientists with the California Department of Health Services reviewed the research and wrote "all three of the DHS scientists are inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's Disease, and miscarriage."

Dirty Electricity and the Link to Cancer

by [Donna Fisher](#)

[Nexus Magazine](#) Oct-Nov 2009

[The Health Hazards of EMFs](#)
[EMFs and Cancer Clusters](#)
[The Perils of Dirty Electricity](#)
[Ongoing Risk Assessment](#)

The Health Hazards of EMFs

History has shown that the western world with its vested interests is slow to inform citizens about toxic agents and help protect them. The "dirty electricity" pandemic is no stranger to inaction, as were the asbestos, lead, acid rain, DDT, PCB and tobacco-smoking public health issues before it. The contention that artificially created electromagnetic fields (EMFs) which emanate from electricity generation can cause cancer has medical and legal experts commenting that EMFs will dwarf the tobacco-smoking issue and the asbestos crisis combined.

This health issue has a history replete with destroyed careers and tarnished reputations involving scientists who have sought to help the people, and with so-called experts who have colluded with the forces going against the precautionary principle of public health: first, *do no harm*.

In his assessment for the journal of the Royal Institute of Public Health in the UK, Dr Stephen J. Genuis reported that vested interests have been effective in delaying restrictive EMF legislation. He also noted that claims of environmental harm have been challenged by researchers who fail to disclose covert ties to industry, that economic interests exert undue influence on medical journals, and that some editors and journal staff have suppressed publication of scientific results that are adverse to the interests of industry.¹

Professor Mark Ellwood, who was installed by the Australian federal government in the most elevated position in the nation as Director of the National Cancer Control Initiative to provide advice and make recommendations to the government and other key groups regarding cancer control, submitted expert witness reports for the power companies (and telecommunications companies) for court cases. Professor Andrew Wood, installed by the federal government in

another position that serves to protect us—ARPANSA, the Australian Radiation Protection and Nuclear Safety Administration—also submits expert witness reports for the power industry for court cases. Professor Wood is currently chair of the ELF (extremely low frequency) Standard Working Group for the ARPANSA Radiation Health Committee.

It was not until 1979 that the western world took notice that these silent, invisible EMFs may be hazardous. Epidemiologist Dr Nancy Wertheimer and electrical engineer Ed Leeper conducted a study in Denver, Colorado, USA, and reported that children who were twice or three times as likely to have leukaemia tended to live in homes close to power lines and transformers. Their results, published in a scientific paper, showed an increased incidence of leukaemia, lymphomas and nervous system tumours in children.²

Their hotly debated research had an immediate effect: in response to public opposition to the construction of new high-voltage power lines, the electricity industry convened an expert panel of eminent and conservative medical scientists.

Included in this panel was Professor David Carpenter, from the Department of Public Health at New York University, and Dr David Savitz, one of America's most respected epidemiologists. Professor Carpenter's original scepticism was overturned when the Wertheimer and Leeper study, originally heavily criticised as flawed, was extended and improved. It confirmed a significantly increased risk of leukaemia.³

The reason why childhood leukaemia is studied is because the strongest evidence for a cancer is that the same cancer is significantly elevated in children.

In 2001, leading occupational medical epidemiologist Dr Sam Milham, MPH, and E. M. Ossiander, of the Washington State Department of Health, Olympia, researched the rise of electrification in the UK and USA and concluded that the childhood leukaemia peak of common acute lymphoblastic leukaemia was attributable to residential electrification: 75 per cent of all childhood acute lymphoblastic leukaemia and 60 per cent of all childhood leukaemia could be preventable.⁴ In 2007, Professor Michael Kundi reported that up to 80 per cent of all cases of childhood leukaemia may be caused by exposure to these fields.⁵

It was reported as early as the 1960s (Court-Brown and Doll) that a new leukaemia-causing agent entered the UK and USA in the 1920s-1930s.⁶ Today it is quite widely accepted that these EMFs can cause childhood leukaemia.

There is some evidence that other childhood cancers may be related to EMF exposure, but not enough studies have been done.⁷

Wertheimer and Leeper were the first to see a magnetic field-breast cancer connection in their 1982 study of residential magnetic field exposures of adults.⁸ Even though this study looked at overall cancer risk in adults and found an increase in excess cancers of the nervous system, uterus and lymphoid tumours, "they discovered a nearly threefold increase among women younger than 55 who

lived near power lines, indicating that magnetic field exposure had accelerated, development and growth of breast cancer".⁹

Breast tissue (along with foetal tissue) is the most sensitive tissue in the body and also the most sensitive to artificial (man-made) radiation, which is why any study into breast cancer has significant ramifications for all of us.

Breast cancer is a very-high-risk disease for women today. The contention that EMFs are a risk factor, let alone a *causative* factor, in female breast cancer has been heavily resisted. When individual cases of breast cancer or breast cancer clusters in women occur, various reproductive factors are also taken into account which can mask the role that EMFs play.

When, in 2001, three men in one small office developed breast cancer, Dr Sam Milham testified for the men in their 2003 court case, arguing that their cancers were caused, in part at least, by EMFs emanating from an electrical vault next to a basement office where the men worked.¹⁰ In 1997, Dr Thomas Erren, MPH, had noted that an association between ELF EMFs and breast cancer is supported in men.¹¹

In 2002, even the Washington, DC, legal counsel for electricity utilities worldwide conceded in a privileged attorney-client communication that the stance of the power industry had to change.¹² Studies are normally conducted on exposed and unexposed subjects, but with these EMFs we are all exposed, making a definitive cause hard to prove.

Also, it would be unethical to expose people to high measurements of these EMFs to prove the case. People don't welcome having to change convenient lifestyles, and, when doubt and confusion are introduced, the public is often quick to disregard the importance of data that makes changing ingrained habits a requirement.

There have been thousands of studies of EMFs, more so than with any other health issue. In 1997, Dr Erren commented that there are more epidemiological studies that link cancer to these fields than to environmental tobacco smoke.¹³ We are all concerned about the infiltration of chemicals into our wider and more personal environments, yet an analysis of 65 studies reported that the combined effects of toxic agents together with EMFs enhance the damage as compared to the toxic exposure alone.¹⁴

In 2007, the World Health Organization (WHO) stated that it is "reasonable and warranted" to lessen exposure to these ELF EMFs, "(provided that the health, social and economic benefits of electric power are not compromised"¹⁵— information that will take decades to be acted upon around the globe.

EMFs and Cancer Clusters

Fifty-three people in a small post office in Capalaba, Brisbane, Australia, with an old electricity substation next door, were diagnosed with serious and fatal diseases by 2000, although staff had started to take notice of the disease patterns in the early 1990s. Investigation of the electrical environment was incomplete, and there is still no resolution to this situation today.

When research is conducted into these disease clusters, often it's the case that measurements are taken after hours when the electrical environment has changed or that investigations are conducted after extensive remedial electrical work has been completed. Often the cancers are put down to "random chance" or "coincidence".

However, in the case of the breast cancer cluster involving 17 women working in a small area within the Australian Broadcasting Corporation (ABC) TV studios in Toowong, Brisbane, the cancers, which were diagnosed between 1995 and 2006, were thought to be workplace-related but no cause could be found. In early 2005, the women pinpointed the area which they thought was in question.

A private firm, EMC Technologies, took radio-frequency electromagnetic radiation measurements in April 2005 and concluded that all the work areas surveyed complied with the ARPANSA RPS3 standard,¹⁶ but it wasn't until 18 December 2006 that ARPANSA investigated the premises for ELF EMFs. Within three days, the ABC staff were no longer working on the premises.

The specific measurements of ELF EMFs in the area pinpointed by the staff were not mentioned in the ARPANSA report.¹⁷ Complete and precise measurements of ELF EMFs as well as transient EMFs should have been taken in the area.

Professor Bruce Armstrong led the ABC's own investigation into the cancer cluster in 2006, looking at other breast cancer risk factors such as reproductive, lifestyle and age factors.

When questioned on national television in August 2007 on this breast cancer cluster and the frustration of some of the women who felt that the proper investigations were not carried out before all the equipment was taken out, he stated: "It is very important to do the investigations properly, and indeed we did have a problem with the ABC with the fairly quick decision to remove people from the site.

It did mean that some of the measurements we wanted to do were not complete, and I do understand how the women feel in that respect; they don't feel that it's been done satisfactorily..."¹⁸

This breast cancer cluster came close to showing the world that EMFs can cause breast cancer. Even though further analysis was not conducted on male staff in this workplace, the possibility does exist that prostate and/or testicular cancers may have been present or may develop in the future.

If complete measurements of all aspects of the electrical environment had been taken, this could have been a win-win situation for all citizens of the world: the women could have known what caused their breast cancer and (along with every other woman and man) would have been able to ensure that their next working environment was safe; ABC TV would have been the perfect medium to spread the much-awaited information across the globe; and the ABC itself would have been commended on its groundbreaking achievement in helping millions of people (and scientists) throughout the world understand EMFs more fully. It also could have enabled the process of workplace reform to be instigated.

These cancer clusters serve to show us what is happening silently on a daily basis in everyone's lives. The adults and children of today have already been affected by these EMFs. Miscarriage, stillbirth, pre-term delivery, altered gender ratio and congenital abnormalities have been linked to maternal exposure.¹⁹ Testicular abnormalities, atypical sperm, chromosomal aberrations and offspring congenital defects have all been linked to paternal exposure.²⁰ Fathers employed in industries with higher than average EMF exposure have also been noted to have offspring with higher rates of brain and spinal cord tumours.²¹

The Perils of Dirty Electricity

Any harmful EMFs can be classed as "dirty"—to put into common idiom the scientific and technical language that accompanies this public health issue—yet there is another facet of electricity, termed "dirty electricity", that is now seen as even more of a threat to our health than the electromagnetic fields mentioned above. It is not only the fields from power lines and substations that can be a concern; dirty electricity is running through virtually every building on the planet. An even more prevalent and insidious agent, this secretive and subtle underlying menace is in all probability one cause of the dramatic increase in many illnesses and cancers.

Dr Sam Milham stated in 2008: "Very recently, new research is suggesting that nearly all the human plagues which emerged in the twentieth century, like common acute lymphoblastic leukemia in children, female breast cancer, malignant melanoma and asthma, can be tied to some facet of our use of electricity.

There is an urgent need for governments and individuals to take steps to minimize community and personal EMF exposures."²²

In 1994, the B Armstrong et al. study relating to dirty electricity was published.²³ However, it was not until 2005, when Dr Sam Milham and electrical engineer Lloyd Morgan came out of retirement due to their concern over a cancer cluster, that information worthy of creating a paradigm shift finally began to emerge, with the results having serious implications for all of us.

(These brave researchers had honourable intentions and impressive credentials.²⁴ Dr Sam Milham in 1982 was the first to link workers exposed to EMFs with higher rates of leukaemia. Lloyd Morgan, a brain tumour survivor and a director of the Central Brain Tumor Registry of the United States (CBTRUS),

introduced the Benign Brain Tumor Registries Amendment Act into US Congress that became law in 2002. Along with breast cancer, leukaemia and diseases of the central nervous system, brain tumours are among the diseases that are more prominent in this health issue.)

The researchers were responding to alarm over a cluster of 18 cancers reported in 2003 among the 137 teachers at a middle school in California. Even though the school district administration had refused a number of requests for these men to assist in the evaluation of this cluster, which involved nearly three times more cancers than the average, one teacher invited these researchers to visit the school after hours to take measurements of the electrical environment, which they did at their own expense. When the researchers reported their findings to the Superintendent of Schools, Dr Milham was threatened with prosecution for "unlawful...trespass" and the teacher who had invited them into the school received a letter of reprimand. The teachers then filed a California OSHA (Occupational Safety Health Administration) complaint, which ultimately led to the progressive California Department of Health Services (CDHS) becoming involved. The CDHS measured the different facets of the electrical environment and provided Milham and Morgan with the data, which showed that dirty electricity—"transients", which are radio-frequencies riding along electrical wiring—was involved. Finally, this was a study that was conducted with the highest integrity, able to break through the red tape and politics that usually accompany the problem of harmful electrical environments. Of immense importance, Milham and Morgan commented that transients may be a universal carcinogen similar to ionising radiation,²⁵ an already established cause of cancer.

The only two published studies relating to dirty electricity—Armstrong *et al.* 1994 study and the Milham-Morgan study—both show very positive increases in cancer risk with increasing *cumulative* exposure to transients.

What is of critical importance is that the cancer risks at the school in California were comparable to the smoking-lung cancer risk. Of no surprise, breast cancer cases were reported in this cluster along with several other cancers including colon cancers, uterine cancers and malignant melanomas. Artificially created EM radiation (EMR) is a determinant in the development of malignant melanoma, an increasingly prevalent cancer that was uncommon until around 50 years ago.²⁶

In fact, research on EMFs has been conducted for over 50 years in Russia,²⁷ and the newer research on dirty electricity has been carried out by Russian experts in conjunction with scientists and electrical engineers from the United States, Canada, Kazakhstan and the Ukraine.²⁸ Kazakhstan has already swiftly mandated protection against dirty electricity in industrial situations,²⁹ a model which should be implemented in all countries across the globe.

Ongoing Risk Assessment

We are in the midst of an invisible and silent plague of pandemic proportions that has been woven into our everyday lives. Dirty electricity, is in virtually every building, whether it be our homes, schools, workplaces or hospitals. Energy-efficient appliances and equipment are amongst the culprits that create dirty

electricity. Dr Magda Havas, Associate Professor of Environmental and Resource Studies at Trent University, Canada, reports that many houses with solar panels have very high levels of dirty electricity.³⁰ Wind turbines can also generate dirty electricity, which is then transferred along the grid.

If these EMFs released a visible substance on us, we would comprehend very quickly the attack on our body and that dirty electricity is creating havoc with our immune systems. Even though we cannot see it and most of us cannot feel it, dirty electricity is affecting all of us. Removing dirty electricity has seen cases of multiple sclerosis improve dramatically and even go into remission, and has also resulted in asthmatics using inhalers less often.³¹ Some diabetics are discovering that their insulin levels are being artificially raised in dirty electrical environments. In 2004, Dave Stetzer, president of Stetzer Electric, and Dr Havas presented to the WHO their research showing the difference between the blood sugar level in a dirty electrical environment (a measurement of 36) and one that was filtered (a measurement of nine).³²

Autism is now seen as the fastest-growing developmental disability. Dr Havas reported that a recent pilot research study has shown higher rates of babies born with autism where the mothers' sleeping locations had high levels of radio-frequency EMR.³³

Children who have leukaemia or are in recovery have poorer survival rates if exposure to extremely low frequency EMF levels is high.³⁴ It follows that all ill and recovering patients should be aware of their exposure to these fields.

Lichtenstein et al. concluded from their study of identical twins that environmental factors are the initiating event in the majority of cancers.³⁵ On studying cancer trends in the 20th century, Hallberg and Johansson reported that there is a common environmental stress that accelerates several forms of cancer—colon cancer, lung cancer, breast cancer, bladder cancer and melanoma.³⁶ From when electricity was first generated to the introduction of AM radio (1920s), radar (1940s), FM radio and TV (1950s), computers (1970s), mobile phones (1980s), and wireless technologies and compact fluorescent lighting (2000s), artificially created EMR is the most likely environmental stress.

Artificially created EMR may also be the underlying menace in the tobacco smoking and asbestos crises. Hallberg and Johansson reported that exposure to radiowaves (artificially created EMR) appears to be *as big a factor in causing lung cancer as cigarette smoking*, and that deaths due to asbestosis were not known until after the 1960s despite the fact that asbestos had been used as a building material since the end of the 19th century.³⁷

We cannot afford to be unsuspecting recipients of this artificial electromagnetic radiation which has been newly introduced in such a short period of our history. Associate Professor Olle Johansson, of the Department of Neuroscience at the Karolinska Institute in Sweden, commented that today no one would consider having a radioactive wristwatch with glowing digits (as you could in the 1950s), having your children's shoes fitted in a strong X-ray machine (as you could in the 1940s), keeping radium in open trays on your desk (as scientists did in the

1930s) or X-raying each other at garden parties (as physicians did in the 1920s).³⁸

These examples relate to *ionising* radiation; apart from nuclear fallout, we have a choice whether to expose ourselves to it or not.

Many different types of artificially created radiation have been woven into our daily lives. It is awareness that will bring understanding of the different types of radiation so we can make our own informed choices on what we are willing to be exposed to and what we must avoid. School teachers and principals alike must be educated on this most important health issue so that measures can be put into place to ensure that they and our children are not at risk in a dirty electrical environment, for dirty electricity has been found to be especially prevalent in environments with concentrated fluorescent lights and computers. Employers and employees alike must understand that their workplace must also be protected. People in their own homes must also protect themselves from modern equipment that also generates dirty electricity.

Finally, Dr Cedric Garland, the epidemiologist currently investigating the breast cancer cluster on the campus of the University of California, San Diego, is focusing on the possible role of EMFs, especially transients.³⁹ Dr Garland advised that the female employees should be informed about tamoxifen research—that ELF EMFs have been found to partially block this drug's action in preventing breast cancer spreading or a recurrence of breast cancer—and recommended that those taking the drug should be transferred to a lower-current area if they so desired.

Transients cause cancer. Just as we filter our water to remove contaminants so we have cleaner water, now we must filter our electricity to remove this contaminant so we have cleaner electricity. °°

About the Author:

Donna Fisher, based in Brisbane, Queensland, Australia, is the chair of Donna Fisher Silent Fields Inc., a non-profit organisation that is working towards the implementation of legislation against "dirty electricity" with the aim of protecting people in the workplace.

Her model is now being incorporated across the globe, especially in the European Union. She is also CEO of the Donna Fisher Breast Health Initiative, which is committed to *noninvasive* technologies for prevention, detection and cure of breast cancer and supports eliminating the environmental causes of breast cancer with particular focus on chemicals and radiation. Donna Fisher is the author of *Silent Fields: The Crowning Cancer Cluster Story - When Electricity Kills...* (Lindlahr Book Publishing, Queensland, 2008; reviewed in NEXUS vol. 15, no. 6) and the forthcoming *More Silent Fields: Cancer and the Dirty Electricity Plague - The Missing Link...* (Joshua Books, Queensland, 2009; see review in our next edition).

Donna Fisher can be contacted by email at donnafisher@silentfields.com and via her website <http://www.silentfields.com>.

Editor's Note:

This article comprises edited extracts from Donna Fisher's two books, *Silent Fields: The Growing Cancer Cluster Story* (chapters 3,5, 6 and 9) and *More Silent Fields: Cancer and the Dirty Electricity Plague* (chapters 2,4 and 8).

Endnotes

1. Genuis SI, "Fielding a current idea: exploring the public health impact of electromagnetic radiation", *Public Health* 2007, doi:10.1016/j.puhe.2007.04.008
2. Wertheimer N and Leeper E, "Electrical Wiring Configurations and Childhood Cancer", *Am J Epidemiol* 1979; 109(3):273-284
3. Savitz D et al., "Case-control Study of Childhood Cancer and Exposure to 60-Hz Magnetic Fields", *Am J Epidemiol* 1988; 128(1)21-38
4. Milham S and Ossiander EM, "Historical evidence that residential electrification caused the emergence of the childhood leukemia peak", *Medical Hypotheses* 2001; 56(3): 1-6
5. Kundi, Michael, "Section 11: Evidence for Childhood Cancers (Leukemia)", p. 12, in: D Carpenter, MD, and C Sage, MA, (eds), "BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF)", August 31, 2007, <http://www.bioinitiative.org/report/index.htm>
6. Milham and Ossiander, op. cit.
7. SageC, MA, "Section 1: Summary for the Public", p. 8, in: Carpenter and C Sage (eds), "BioInitiative Report", op. cit.
8. Wertheimer N and Leeper E, "Adult cancer related to electrical wires near the home", *UI Epidemiol* 1982; 11:345-355
9. Loscher W and Mevissen M, "Magnetic Fields and Breast Cancer: Experimental Studies on the Melatonin Hypothesis", in: RG Stevens, BW Wilson and LE Anderson (eds), *The Melatonin Hypothesis-. Breast Cancer and the Use of Electric Power*, Battelle Press, Columbus, 1997, p. 578
10. Slesin L, News & Comment, *Microwave News*, July 22, 2004, <http://www.microwavenews.com/ncja2004.html> also see Milham S, MD, MPH, "A cluster of male breast cancer in office workers", *Am J Indust Med* 2004 Jun10;46(1):86-87

11. Erren T, MD, MPH, "Epidemiological Studies of EMF and Breast Cancer Risk: A Biologically Based Overview", in: Stevens, Wilson and Anderson, *The Melatonin Hypothesis*, op. cit., p. 731
12. Discovery document passed on to the author by defendants against Powerlink; see D Fisher, *More Silent Fields: Cancer and the Dirty Electricity Plague-The Missing Link...*, Joshua Books, 2009, p. 117
13. Erren, in: Stevens, Wilson and Anderson, *The Melatonin Hypothesis*, op. cit., p. 729
14. [uutilainen J et al., "Do extremely low frequency magnetic fields enhance the effects of environmental carcinogens? A meta-analysis of experimental studies", *Int J Radiat Bio*/ 2006 Jan; 82(1):1-12
15. World Health Organization, *Extremely Low Frequency Fields*, Environmental Health Criteria Monograph No. 238, 2007, http://www.who.int/peh-emf/publications/elf_ehc/en/index.html, chapter 1, p. 13
16. EMC Technologies, "Electromagnetic Radiation Survey Conducted for Australian Broadcasting Corporation", 2 May 2005; available at <http://www.silentfields.com/reports.php>
17. Australian Radiation Protection and Nuclear Safety Agency, "Assessment of Exposure to Power Frequency Magnetic Fields in the ABC TV Building at Toowong, Brisbane", February 2007; at <http://www.silentfields.com/reports/ph>
18. Professor Bruce Armstrong, interviewed on 9am *with David & Kim*, Channel 10, Australia, August 7, 2007
19. Genuis, "Fielding a current idea", op. cit.
20. *ibid.*
21. *ibid.*
22. Dr Milham quoted in: Rees C and Havas M, *Public Health SOS: The Shadow Side of the 'Wireless Revolution'- 110 Questions on Electromagnetic Pollution from a Forum at the Commonwealth Club of California* (e-book), Wide Angle Health, 2008, p. 7; available at <http://electromagnetichealth.org/public-health-sos-ebook/>
23. Armstrong B et al., 'Association between Exposure to Pulsed Electromagnetic Fields and Cancer in Electric Utility Workers in Quebec, Canada, and France", *Am J Epidemiol* 1994; 140(9):805-820
24. Further credentials are available at <http://www.silentfields.com/reports.php>
25. Milham/S, MD, MPH, and Morgan LL, BS, 'A New Electromagnetic Exposure Metric: High Frequency Voltage Transients Associated with Increased Cancer

Incidence in Teachers in a California School", *Am J Ind Med* 2008 May 29; 51 (8)579-586; at <http://www.silentfields.com/reports.php>

26. Genuis, "Fielding a current idea", op. cit.

27. Leading researchers include AA Letavet, MG Shandala, LA Iljin, Iu D Dumansky, ZV Gordon, AG Subbota, IG

Akoev, BI Davydov, Ju G Grigoriev.

28. Leading researchers include: Emeritus Professor M Graham; Electrical Engineer D Stetzer; Associate Professor M Havas, Dr Valentina Nikitina; Professors of Medicine V Kozlovsky, E Zharkinov, V Reznik, Ju D Dumansky.

29. Kazakhstan Health Department, "Permissible levels of high-frequency electromagnetic pollutions voltage in wires of industrial frequency alternating current", confirmed by order of the Head State Sanitary Physician of the Republic of Kazakhstan, 28 November 2003, No. 69.

30. Rees and Havas, *Public Health SOS*, op. cit., p. 46

31. Fisher D, *More Silent Fields-. Cancer and the Dirty Electricity Plague - The Missing Link*, op. cit., p. 37

32. Havas, M, Presentation to the Electrical Pollution Taskforce, Markham, 2005, February 23, 2005 (Dr Magda Havas's graph is shown in D Fisher, *More Silent Fields-. Cancer and the Dirty Electricity Plague-The Missing Link...*, op. cit., p. 44)

33. Rees and Havas, *Public Health SOS*, op. cit., p. 16

34. Sage C, MA, "Section 1: Summary for the Public", p. 9, in: Carpenter and Sage (eds), *BioInitiative Report*, op. cit.

35. Lichtenstein P, Holm NV, Verkasalo PK, Iliadou A, Kaprio J, Koskenvuo M et al., "Environmental and heritable factors in the causation of cancer: Analyses of cohorts of twins from Sweden, Denmark, and Finland", *N Engl J Med* 2000; 343:78-85

36. Hallberg O and Johansson O, "Cancer Trends During the 20th Century", *journal of the Australasian College of Nutritional & Environmental Medicine* 2002 Apr; 21(1):3-8

37. *ibid.*

38. Johansson O, "Section 8: Evidence for Effects on the Immune System", in: Carpenter and Sage (eds), *BioInitiative Report*, op. cit.

39. Slesin L, "Cancer Cluster at UCSD; EPRI's Kheifets to Investigate", *Microwave News*, Vol. XXIX, No. 3, January-March 2009, pp. 4-5, [http://www.microwavenews.com/docs/mwn.l\(3\)-09.pdf](http://www.microwavenews.com/docs/mwn.l(3)-09.pdf)

Why did the Russians Ban an Appliance Found in 90% of American Homes?

Posted By [Dr. Mercola](#) | May 18 2010 | 512,568 views

<http://articles.mercola.com/sites/articles/archive/2010/05/18/microwave-hazards.aspx>



By now, you probably know that what you eat has a profound impact on your health. The mantra, “You are what you eat” is really true.

But you need to consider not only WHAT you buy, but *how you cook it*.

Eating most of your food raw is ideal. But most of us are not going to be able to accomplish a completely raw diet, and we’ll end up cooking some percentage of our food.

Smart food preparation starts with high quality foods and food preparation and that means saying sayonara to your microwave oven. [Need to sterilize a dishcloth?](#) Use your microwave. But zapping your casserole is a BAD idea if you are interested in preparing healthy food.

Why the no nukes policy?

When it comes to microwave ovens, the price for convenience is to compromise your health. In this article, I will review what we know about the effects microwaves on your food and on your body.

Sad State of Our Soils

Over the past century, the quality of fresh food has declined due to soil depletion, unsustainable farming practices, overproduction of crops, and the use of pesticides and herbicides. You can no longer assume you’re getting all of the vitamins, minerals, enzymes, and phytonutrients you need by eating a multitude of fresh produce—even if you’re eating organically.

Not surprisingly, a calorie today will provide you less nutrition than a calorie from 100, or even 50 years ago.

Three recent studies of historical food composition have shown 5 to 40 percent declines in some of the minerals in fresh produce, and another study found a similar decline in our protein sources.[\[1\]](#)

So now, more than ever, you must be careful to maximize the “bang for your buck” when it comes to the foods you eat.

Research shows that your microwave oven will NOT help you in these efforts—and in fact will threaten your health by violently ripping the molecules in your food apart, rendering some nutrients inert, at best, and carcinogenic at its worst.

Convenience Comes at Significant Toxic Threat to You and Your Family

Microwaves heat food by causing water molecules in it to resonate at very high frequencies and eventually turn to steam which heats your food. While this can rapidly heat your food, what most people fail to realize is that it also causes a change in your food’s chemical structure.

There are numerous issues that have emerged since microwave ovens were first introduced to consumers more than 40 years ago, besides depleting your food’s nutritional value, which will be addressed a bit later.

The first thing you probably noticed when you began microwaving food was how uneven the heating is.

“Hot spots” in microwaved food can be hot enough to cause burns—or build up to a “steam explosion.” This has resulted in admonitions to new mothers about NOT using the microwave to heat up baby bottles, since babies have been burned by super-heated formula that went undetected.

Another problem with microwave ovens is that carcinogenic toxins can leach out of your plastic and paper containers/covers, and into your food.

The January/February 1990 issue of *Nutrition Action Newsletter* reported the leakage of numerous toxic chemicals from the packaging of common microwavable foods, including pizzas, chips and popcorn. Chemicals included polyethylene terphthalate (PET), benzene, toluene, and xylene. Microwaving fatty foods in plastic containers leads to the release of dioxins (known carcinogens) and other toxins into your food. [\[8\]](#) [\[2\]](#)

One of the worst contaminants is BPA, or [bisphenol A](#), an estrogen-like compound used widely in plastic products. In fact, dishes made specifically for the microwave often contain BPA, but many other plastic products contain it as well.

Microwaving distorts and deforms the molecules of whatever food or other substance you subject to it. An example of this is blood products.

Blood is normally warmed before being transfused into a person. Now we know that microwaving blood products damages the blood components. In fact, [one woman died after receiving a transfusion of microwaved blood in 1991](#), which resulted in a well-publicized lawsuit.

Microwave Radiation Leakage

You may have heard that there is some danger of microwaves escaping from your microwave while it's operating. This was more of a risk with earlier models than with recent ones, which undergo more rigorous testing.

Theoretically, there are very small amounts of radiation leakage through the viewing glass, but the FDA reports these levels are "insignificant" and "well below the level known to harm people."

The FDA has been regulating microwave ovens since 1971 through its electronic product radiation control program, which is mandated by the Electronic Product Radiation Control provisions of the Food Drug and Cosmetic Act^[3].

The FDA limits the amount of microwaves that can leak from an oven throughout its lifetime to 5 milliwatts (mW) per square centimeter at approximately 2 inches from the oven surface. Because microwave energy decreases dramatically as you move away from the source of the radiation, a measurement made 20 inches from your oven would be approximately one-hundredth of the value measured at 2 inches.^[2]

The federal standard also requires all ovens to have "two independent interlock systems that stop the production of microwaves the moment the latch is released or the door is opened."

And a monitoring system is also required, which stops the operation if one or both interlock systems fail.

You would think, with all these tests and regulations, that you'd be safe. However, according to Powerwatch, a non-profit independent organization with a central role in the microwave radiation debate:

"Even when the microwave oven is working correctly, the microwave levels within the kitchen are likely to be significantly higher than those from any nearby cellular phone base-stations. Remember also that microwaves will travel through walls if the microwave oven is against an inside wall."

Powerwatch also states that we don't really know if the current regulations about leakage are truly safe and recommends ovens be checked at least annually, since microwave emissions can change with normal use.

You might also consider purchasing a \$20 testing device that allows you to check the radiation in your home.

Make sure that, if you are going to use your microwave for cleaning sponges or for any use at all, regularly examine the door and hinges to make sure they are sealing properly. If the door doesn't close correctly, or if it's warped, bent, or otherwise damaged, don't use it at all!

Since your eyes are known to be particularly susceptible to microwave radiation (high microwave exposures are known to cause cataracts), I recommend stepping away from your microwave while it's in use.

New Study Confirms Microwaves Affect Your Heart

A recent study examining the effects 2.4 GHz radiation (which is the frequency of radiation emitted by Wifi routers and microwave ovens) on the heart was just completed. The study found "unequivocal evidence" that microwave frequency radiation affects the heart at non-thermal levels that are well below federal safety guidelines, according to Dr. Magda Havas of Trent University^[4].

Dr. Havas says:

"This is the first study that documents immediate and dramatic changes in both heart rate and heart rate variability caused by an approved device that generates microwaves at levels well below (0.3 percent) federal guidelines in both Canada and the United States."

No longer can skeptics claim that microwaves produce no immediate biological effects at ordinary household levels!

The study will be appearing in a peer-reviewed journal sometime during the summer of 2010. If you are experiencing rapid or irregular heartbeat, pain or pressure in your chest, you will want to visit your physician and share [this video](#) with him or her (second video on this page).

There is also evidence that this same frequency of radiation causes blood sugar to spike in susceptible individuals and may actually be the cause of one type of diabetes. For details about this, watch the [first video](#) below.

Microwaving Also Zaps the Nutrients Right Out of Your Food

There has been surprisingly little research on how microwaves affect organic molecules, or how the human body responds to consuming microwaved food.

Wouldn't you expect that a product that sits in more than 90 percent of kitchens, as well as practically every break room in the country, would have been thoroughly investigated for safety?

The handful of studies that have been done generally agree, for the most part, that microwaving food damages its nutritional value. Your microwave turns your

beautiful, organic veggies, for which you've paid such a premium in money or labor, into "dead" food that can cause disease!

Heating food, in and of itself, can result in some nutrient loss, but using microwaves to heat food introduces the additional problem of the "microwave effect," a phenomenon that will be discussed in detail later.

The majority of studies on microwaves and nutrition were conducted prior to 2000, I suspect because the focus of radiation research of late has shifted toward a more ominous threat: *environmental radiation from electromagnetic devices*, such as [cell phones](#) and computers, which has mushroomed into a gigantic cloud of [electrosmog worldwide](#) over the past decade.

Nevertheless, some excellent scientific data has been gathered regarding the detrimental effects of microwaves on the nutrients in your food:

- A study published in the November 2003 issue of *The Journal of the Science of Food and Agriculture*[\[5\]](#) found that broccoli "zapped" in the microwave with a little water lost up to 97 percent of its beneficial antioxidants. By comparison, steamed broccoli lost 11 percent or fewer of its antioxidants. There were also reductions in phenolic compounds and glucosinolates, but mineral levels remained intact.
- A 1999 Scandinavian study of the cooking of asparagus spears found that microwaving caused a reduction in vitamin C[\[6\]](#).
- In a study of garlic, as little as 60 seconds of microwave heating was enough to inactivate its allinase, garlic's principle active ingredient against cancer[\[7\]](#).
- A Japanese study by Watanabe showed that just 6 minutes of microwave heating turned 30-40 percent of the B12 in milk into an inert (dead) form[\[8\]](#). This study has been cited by Dr. Andrew Weil as evidence supporting his concerns about the effects of microwaving. Dr. Weil wrote:
- *"There may be dangers associated with microwaving food... there is a question as to whether microwaving alters protein chemistry in ways that might be harmful."*
- A recent Australian study[\[9\]](#) showed that microwaves cause a higher degree of "protein unfolding" than conventional heating.
- Microwaving can destroy the essential disease-fighting agents in breast milk that offer protection for your baby. In 1992, Quan found that microwaved breast milk lost lysozyme activity, antibodies, and fostered the growth of more potentially pathogenic bacteria[\[10\]](#).

Quan stated that more damage was done to the milk by microwaving than by other methods of heating, concluding: *"Microwaving appears to be contraindicated at high-temperatures, and questions regarding its safety exist even at low temperatures."*

- Another study about breast milk/infant formula by Lee in 1989[\[11\]](#) found vitamin content becomes depleted by microwaving, and certain amino acids are converted into other substances that are biologically inactive. Some altered amino acids are poisons to the nervous system and kidneys.

(Numerous authors mention this study, yet I was unable to find the original article/study, so I cannot personally validate.)

Although many of the above studies are not new, there is certainly ample evidence that microwaving is NOT good for your food.

How Your Microwave Actually Heats Your Food

Microwaves are a form of electromagnetic radiation—waves of electrical and magnetic energy moving together through space. EM radiation ranges from very high energy (gamma rays and x-rays) on one end of the spectrum to very low energy (radio waves) on the other end of the spectrum.

Microwaves are on the low energy end of the spectrum, second only to radio waves. They have a wavelength of about 4.8 inches—about the width of your head.

Microwaves are generated by something called a magnetron (a term derived from the words “magnet” and “electron”), which is also what enabled airborne radar use during WWII. Hence the early name for microwave ovens: *radar ranges*.

A magnetron is a tube in which electrons are subjected to both magnetic and electrical fields, producing an electromagnetic field with a microwave frequency of about 2,450 megaHertz (MHz), which is 2.4 gigaHertz (GHz).

Microwaves cause dielectric heating. They bounce around the inside of your oven and are absorbed by the food you put in it. Since water molecules are bipolar, having a positive end and negative end, they rotate rapidly in the alternating electric field. The water molecules in the food vibrate violently at extremely high frequencies—like millions of times per second—creating molecular friction, which heats up the food.

If the food or object placed in the microwave had no water it would not be able to have this resonance heating type effect and would remain cool. Or, as investigative journalist William Thomas [\[12\]](#) calls it, “electrical whiplash.”

Structures of the water molecules are torn apart and forcefully deformed. This is different than conventional heating of food, whereby heat is transferred convectionally from the outside, inward. Microwave cooking begins within the molecules where water is present.

Contrary to popular belief, microwaved foods don’t cook “from the inside out.” When thicker foods are cooked, microwaves heat the outer layers, and the inner layers are cooked mostly by the conduction of heat from the hot outer layers, inward.

Since not all areas contain the same amount of water, the heating is uneven.

Additionally, microwaving creates new compounds that are not found in humans or in nature, called radiolytic compounds. We don't yet know what these compounds are doing to your body.

In addition to the violent frictional heat effects, called *thermic effects*, there are also *athermic effects*, which are poorly understood because they are not as easily measured. It is these athermic effects that are suspected to be responsible for much of the deformation and degradation of cells and molecules. [\[13\]](#)

As an example, microwaves are used in the field of gene altering technology to weaken cell membranes. Scientists use microwaves to actually break cells apart. Impaired cells then become easy prey for viruses, fungi and other microorganisms.⁸

Another word for these athermic effects is the "microwave effect," a subject of controversy that I'll get into a bit later.

Microwave Sickness

When your tissues are directly exposed to microwaves, the same violent deformations occur and can cause "[microwave sickness](#)."

People who have been exposed to high levels of microwave radiation experience a variety of symptoms, including:

- Insomnia, night sweats, and various sleep disturbances
- Headaches and dizziness
- Swollen lymph nodes and a weakened immune system
- Impaired cognition
- Depression and irritability
- Nausea and appetite loss
- Vision and eye problems
- Frequent urination and extreme thirst

There is a good amount of data emerging that people are suffering, to various degrees, these kinds of symptoms from living next to cell phone towers and other high-frequency radiation emitting antennas, which emit microwaves around the clock.

According to Professor Franz Adelkofer, a leading scientist in the area of [biological effects of EMF fields](#):

"There is real evidence that hyperfrequency electromagnetic fields can have geno-toxic effects. And this damaged DNA is always the cause of cancer.

We've found these damaging effects on the genes at levels well below the safety limits. That's why we think it's urgent to base our safety limits on the biological effects, not the thermic ones.

They should be based on biology, not on physics."

Twenty Years of Russian Research Supports Microwave Concerns

The Nazis are credited with inventing the first microwave-cooking device to provide mobile food support to their troops during their invasion of the Soviet Union in World War II^[14]. These first microwave ovens were experimental. After the war, the US War Department was assigned the task of researching the safety of microwave ovens.

But it was the Russians who really took the bull by the horns.

After the war, the Russians had retrieved some of these microwave ovens and conducted thorough research on their biological effects. Alarmed by what they learned, the Russians banned microwave ovens in 1976, later lifting the ban during Perestroika.

Twenty years of Russian research (and German studies as far back as 1942 Berlin) make a strong argument against the safety of microwave cooking.

Their findings led the Russian government to issue an international warning about possible biological and environmental damage associated with the use of microwave ovens and other similar frequency electronic devices (e.g. mobile phones).

I was not able to personally evaluate any of these older bodies of research, since those documents are now difficult to track down, so I can't attest to their methodology or conclusions. All you can do is weigh their findings appropriately, as best you can.

The Powerwatch article cited above summarizes the Russian research quite well, which I will duplicate below.

- Russian investigators found that carcinogens were formed from the microwaving of nearly all foods tested.
- The microwaving of milk and grains converted some of the amino acids into carcinogenic substances.
- Microwaving prepared meats caused the formation of the cancer-causing agents d-Nitrosodienthanolamines.
- Thawing frozen fruits by microwave converted their glucoside and galactoside fractions into carcinogenic substances.
- Extremely short exposure of raw, cooked or frozen vegetables converted their plant alkaloids into carcinogens.
- Carcinogenic free radicals were formed in microwaved plants—especially root vegetables.
- Structural degradation leading to decreased food value was found to be 60 to 90 percent overall for all foods tested, with significant decreases in bioavailability of B complex vitamins, vitamins C and E, essential minerals, and lipotropics (substances that prevent abnormal accumulation of fat).

I might add that this finding is supported by the 1998 Japanese study by Watanabe⁷ about vitamin B12 in milk, cited above.

The Swiss Clinical Study: Hans Hertel

Some fairly compelling evidence supporting the destructive effects of microwaves comes from a highly cited study by a Swiss food scientist named Hans Hertel. Dr. Hertel was the first scientist to study the effects of microwaved foods on the blood and physiology of human beings.

His small study, coauthored by Dr. Bernard Blanc of the Swiss Federal Institute of Technology and the University Institute for Biochemistry, revealed the degenerative forces produced by microwave ovens on the foods they cooked.

Dr. Hertel concluded that microwave cooking changed the nutrients in the food, and that changes took place in the blood that could cause negative health effects.

Hertel's conclusions were that microwaving food resulted in:

- Increased cholesterol levels
- Decreased numbers of leukocytes (white blood cells), which can suggest poisoning
- Decreased numbers of red blood cells
- Production of radiolytic compounds
- Decreased hemoglobin levels, which could indicate anemia

Not surprisingly, Dr. Hertel's study was met with great resistance from those with much to lose.

A gag order against Dr. Hertel was issued by a Swiss trade organization in 1992, which was later removed in 1998. But an American journalist, Tom Valentine, published the results of Hertel's study in *Search for Health* in the spring of 1992^[15].

The study was not without its shortcomings. It involved only eight participants, of which Hertel was one. As compelling as his findings were, his methodology did not stand up to the scientific rigors of the field.

In spite of Hertel's methodological shortcomings, his findings do raise concerns about what this form of radiation is doing to your food and should be taken as a launching point to larger, more robust studies in the future.

Hertel wrote:

"There are no atoms, molecules, or cells of any organic system able to withstand such a violent, destructive power for any period of time. This will happen even given the microwave oven's low power range of milliwatts."

And then there is the issue of biophotons.

Possible Microwave Effects on Your Biophotons

[Biophotonics](#) is the study, research, and applications of photons in their interactions within and on biological systems. Much of the work in the area of biophotons was done in Germany. [Dr. Dietrich Klinghardt discusses biophotons](#) in our 2008 interview.

Biophotons are the smallest physical units of light that are stored in and used by all biological organisms—including you. Vital sun energy finds its way into your cells via the food you eat, in the form of these biophotons.

Biophotons contain important bio-information and are very important to many vital processes in your body. They are partly responsible for your feeling of vitality and well-being. You gain biophotons by eating foods rich in them, such as naturally grown fresh vegetables and sun-ripened fruits, which are rich in light energy.

[The more light energy a food is able to store, the more nutritious it is.](#)

If the “microwave effect” exists (as you shall see, there is a huge amount of evidence that it does), then microwaves can potentially destroy biophotons in the same way that it alters other structures, rendering your food dead and lifeless.

It seems quite plausible that microwaves could disrupt or destroy biophotons, since they are capable of breaking apart DNA bonds!

As far as I can find, there haven't been any studies of the direct effects of microwave radiation on biophotons, but it seems like an important angle of investigation for the future.

Long-Term Effects of Exposure to Non-Ionizing Radiation

One of the basic controversies about the effects of microwaves centers on whether or not microwaves exert some sort of force beyond heat, commonly called “microwave effect” or “athermic effect.”

It is first necessary that you understand the difference between ionizing radiation and non-ionizing radiation.

There are two basic forms of radiation: ionizing and non-ionizing^[16]:

1. **Ionizing Radiation:** Creates charged ions by displacing electrons in atoms, even without heat. Examples are radiation emitted from radioactive substances in rocks and soil, cosmic rays of the sun, and radiation from man-made technology such as x-rays machines, power stations, and nuclear reactors.
2. **Non-ionizing Radiation:** Can change the position of atoms but not alter their structure, composition, and properties. Examples are visible light, ultraviolet and infrared waves, waves from radio or television, cellular phones, *microwaves*, and electric blankets.

Despite not being able to break atoms apart, non-ionizing radiation (such as microwaves) CAN cause physical alterations.

For example, sunlight can damage your skin and eyes. Overexposure to radiation can affect tissues by causing molecular damage, DNA mutations, and other changes that can lead to cancer.

The serious concern is, with all of this radiation surrounding us from cell and cordless phones, radio towers, satellites, broadcast antennas, military and aviation radar, home electronic devices, computers and Internet, we are all part of an involuntary mass epidemiological experiment, on a scale never before seen in the history of the human race.

And the truth is that we don't really KNOW what long term, low-level (but persistent) radiation does to us—even the non-ionizing type.

But here are some of the things we DO KNOW:[\[17\]](#)

- **Effects at low levels can be more noticeable than at higher levels.** There is something called a “window effect,” meaning an effect occurring only at specific frequencies or power densities, but not occurring just above or below them. A number of studies demonstrate effects of microwave radiation on blood cells via this phenomenon.
- For a complete discussion of this, you can read *Microwaving Our Planet*, written by Arthur Firstenberg, president of the Cellular Phone Taskforce.
- Cindy Sage of Sage Associates, an environmental consulting firm, has compiled a comprehensive list of studies[\[18\]](#) showing biological effects at radiofrequency exposure levels far below what would be explainable as “thermic effects” and well within the range you are commonly exposed to every day.
- **Resonance intensifies biological effect.** Resonance occurs when a form of radiation has a similar frequency as a body part. For example, microwave frequencies are similar to the frequencies of your brain!
- **Studies are typically done for short exposure periods, at higher intensities.** Scientists claim that duration of exposure is equally important to intensity of exposure, but is often NOT studied, and that long-term, low-level exposure can have effects equivalent to short-term, more intense exposure.
- **The effects of radiation are cumulative.** Your body becomes more sensitive to it over time.
- **There are no longer any control groups, since human beings are all now exposed to such pervasive radiation.** Lack of a control group makes it even more challenging to conduct meaningful studies.

The point is, standing in your kitchen while your microwave is zapping your dinner, night after night, will not make you glow in the dark. *But over the months and years, what is the cumulative effect on your body and health?*

Why expose yourself to these potential dangers when there are safer alternatives for cooking available?

Is Microwaving Food Any More Dangerous than Heating it with a Conventional Oven?

Some experts claim that the effects microwaves have on molecules can all be explained simply as the “thermic effect” of heating—in other words, microwave cooking is no more detrimental to food than conventional heating.

They argue that, since microwaves are non-ionizing radiation, then it’s impossible for them to damage your blood cells, or eradicate the folic acid in your spinach.

Others have proposed there is some sort of “microwave effect” that causes changes in the molecules in a way that conventional heating does not. For many years, the party line was that “*microwave effect*” is a *myth*.

However, study after study has resulted in evidence to the contrary, showing effects that cannot be explained away as simple thermal effects.

In a letter entitled “DNA and the Microwave Effect”[\[19\]](#) (sourced as Penn State University, 2001), the author reviews the history of the controversy surrounding the microwave effect and the research findings to date. He explains that, although fundamentals of thermodynamics and physics would tell you the microwave effect is impossible, studies keep turning up evidence of its existence.

Some of the main points made in the letter are the following:

- Microwave heating and conventional heating may appear identical on a “macro” level, but the two appear very different on a *molecular level*.
- Microwaves are effective for sterilization, which has been studied for several decades. There is controversy, however, is about whether it’s the heat they generate or if it’s something else altogether.
- One scientist (Kakita 1995[\[20\]](#)) was successful in demonstrating that microwaves are capable of *extensively fragmenting and destroying viral DNA*, something that cannot be accomplished by heating alone.
- Multiple studies offer evidence that there are *multiple mechanisms for breaking apart DNA without ionizing radiation*, but no theory currently exists to explain this phenomenon.

Some scientists are taking advantage of the microwave effect and using microwaves in the laboratory to greatly accelerate chemical reactions, sometimes by a factor of a thousand, resulting in the completion of reactions in minutes that formerly took days or months and a lot of toxic chemicals[\[21\]](#).

This newly found interest in “microwave chemistry” has spurred skeptic scientists into taking another look at what microwaves actually do and how they do it.

Sometimes common sense trumps empirical evidence.

The Penn State letter/article said it best:

"...It would seem there is reason to believe that the microwave effect does indeed exist, even if it cannot yet be adequately explained. What we know at present is somewhat limited, but there may be enough information already available to form a viable hypothesis.

The possibility that electromagnetic radiation in the non-ionizing frequency range can cause genetic damage may have profound implications on the current controversy involving EM antennae, power lines, and cell phones."

Breaking Free of Your Microwave: A Few Basic Tips

Am I asking you to toss your microwave oven into the nearest dumpster?

Not necessarily. It can be a useful tool for cleaning. But if real estate in your kitchen is at a premium, it should probably be the first thing to go.

You really CAN survive sans microwave—people are living quite happily without one, believe it or not. You just have to make a few small lifestyle adjustments, such as:

- Plan ahead. Take your dinner out of the freezer that morning or the night before so you don't end up having to scramble to defrost a 5-pound chunk of beef two hours before dinnertime.
- Make soups and stews in bulk, and then freeze them in gallon-sized freezer bags or other containers. An hour before meal time, just take one out and defrost it in a sink of water until it's thawed enough to slip into a pot, then reheat it on the stove.
- A toaster oven makes a GREAT faux-microwave for heating up leftovers! Keep it at a low temperature — like 200-250 degrees F — and gently warm a plate of food over the course of 20-30 minutes. Another great alternative is a convection oven. They can be built in [or purchased](#) as a relatively inexpensive and quick safe way to heat foods
- Prepare your meals in advance so that you always have a good meal available on those days when you're too busy or too tired to cook.
- Try eating more organic [raw foods](#). This is the best way to and improve your health over the long run.

References:

[\[1\] Davis D R. \(February 1, 2009\) "Declining fruit and vegetable nutrient composition: What is the evidence?" American Society of Horticultural Science](#)

[\[2\] Rust S and Kissinger M. \(November 15, 2008\) "BPA leaches from 'safe' products" *Journal Sentinel Online*](#)

[\[3\] "Microwave oven radiation," Food and Drug Administration](#)

[\[4\] Havas M. "DECT phone affects the heart!"](#)

[\[5\] Vallejo F, Tomas-Barberan F A, and Garcia-Viguera C. "Phenolic compound contents in edible parts of broccoli inflorescences after domestic cooking" Journal of the Science of Food and Agriculture \(15 Oct 2003\) 83\(14\):1511-1516](#)

[\[6\] Kidmose U and Kaack K. Acta Agriculturae Scandinavica B 1999;49\(2\):110-117](#)

[\[7\] Song K and Milner J A. "The influence of heating on the anticancer properties of garlic," *Journal of Nutrition* 2001;131\(3S\):1054S-57S](#)

[\[8\] Watanabe F, Takenaka S, Abe K, Tamura Y, and Nakano Y. *J. Agric. Food Chem.* Feb 26 1998;46\(4\):1433-1436](#)

[\[9\] George D F, Bilek M M, and McKenzie D R. "Non-thermal effects in the microwave induced unfolding of proteins observed by chaperone binding," *Bioelectromagnetics* 2008 May;29\(4\):324-30](#)

[\[10\] Quan R \(et al\) "Effects of microwave radiation on anti-infective factors in human milk," *Pediatrics* 89\(4 part I\):667-669.](#)

[\[11\] Lee L. "Health effects of microwave radiation-microwave ovens," *Lancet* December 9, 1989 \(Article\)](#)

[\[12\] Thomas W. "Cooked" Alive.com](#)

[\[13\] "Microwave oven and microwave cooking overview," Powerwatch](#)

[\[14\] "History of microwave ovens" Green Health Watch](#)

[\[15\] "Microwave ovens: A danger to your health?" \(January 26, 2010\) Nutritional and Physical Regeneration](#)

[\[16\] Villablanca E \(December 19, 2007\) "Ionizing and non-ionizing radiation: Their difference and possible health consequences"](#)

[\[17\] "Health effects of microwave radiation \(Western view\)"](#)

[\[18\] Sage C. "Reported biological effects from radiofrequency non-ionizing radiation" Wave-Guide.org](#)

[\[19\] Penn State University. "DNA and the microwave effect" posted from MailBag \(April 8, 2002\)](#)

[\[20\] Kakita Y, Kashige N, Murata K, Kuroiwa A, Funatsu M and Watanabe K. "Inactivation of Lactobacillus bacteriophage PL-1 by microwave irradiation" *Microbiol. Immunol.* 1995;39:571-576.](#)

[\[21\] Adams C. \(May 6, 2005\) "Does microwaving kill nutrients in food? Is microwaving safe?" The Straight D](#)

The Proven Dangers of Microwaves

Extracted from NEXUS Magazine, Volume 2, #25 (April-May '95).

<http://www.mercola.com/article/microwave/hazards2.htm>

Originally printed from the April 1994 edition of Acres, USA.

Back in May of 1989, after Tom Valentine first moved to St Paul, Minnesota, he heard on the car radio a short announcement that bolted him upright in the driver's seat. The announcement was sponsored by Young Families, the Minnesota Extension Service of the University of Minnesota: "Although microwaves heat food quickly, they are not recommended for heating a baby's bottle," the announcement said.

he bottle may seem cool to the touch, but the liquid inside may become extremely hot and could burn the baby's mouth and throat. Also, the buildup of steam in a closed container such as a baby's bottle could cause it to explode. "Heating the bottle in a microwave can cause slight changes in the milk. In infant formulas, there may be a loss of some vitamins. In expressed breast milk, some protective properties may be destroyed."

The report went on. "Warming a bottle by holding it under tap water or by setting it in a bowl of warm water, then testing it on your wrist before feeding, may take a few minutes longer, but it is much safer." Valentine asked himself: If an established institution like the University of Minnesota can warn about the loss of particular nutrient qualities in microwaved baby formula or mother's milk, then somebody must know something about microwaving they are not telling everybody.

A LAW SUIT

In early 1991, word leaked out about a lawsuit in Oklahoma. A woman named Norma Levitt had hip surgery, only to be killed by a simple blood transfusion when a nurse "warmed the blood for the transfusion in a microwave oven"! Logic suggests that if heating or cooking is all there is to it, then it doesn't matter what mode of heating technology one uses. However, it is quite apparent that there is more to 'heating' with microwaves than we've been led to believe.

Blood for transfusions is routinely warmed-but not in microwave ovens! In the case of Mrs Levitt, the microwaving altered the blood and it killed her. Does it not therefore follow that this form of heating does, indeed, do 'something different' to the substances being heated? Is it not prudent to determine what that 'something different' might do? A funny thing happened on the way to the bank with all that microwave oven revenue: nobody thought about the obvious. Only 'health nuts' who are constantly aware of the value of quality nutrition discerned a problem with the widespread 'denaturing' of our food. Enter Hans Hertel.

HANS HERTEL

In the tiny town of Wattenwil, near Basel in Switzerland, there lives a scientist who is alarmed at the lack of purity and naturalness in the many pursuits of modern mankind. He worked as a food scientist for several years with one of the many major Swiss food companies that do business on a global scale. A few years ago, he was fired from his job for questioning procedures in processing food because they denatured it. "The world needs our help,"

Hans Hertel told Tom Valentine as they shared a fine meal at a resort hotel in Todtmoss, Germany. "We, the scientists, carry the main responsibility for the present unacceptable conditions. It is therefore our job to correct the situation and bring the remedy to the world. I am striving to bring man and techniques back into harmony with nature. We can have wonderful technologies without violating nature." Hans is an intense man, driven by personal knowledge of violations of nature by corporate man and his state-supported monopolies in science, technology and education.

At the same time, as the two talked, his intensity shattered into a warm smile and he spoke of the way things could be if mankind's immense talent were to work with nature and not against her. Hans Hertel is the first scientist to conceive of and carry out a quality study on the effects of microwaved nutrients on the blood and physiology of human beings. This small but well-controlled study pointed the firm finger at a degenerative force of microwave ovens and the food produced in them.

The conclusion was clear: microwave cooking changed the nutrients so that changes took place in the participants' blood; these were not healthy changes but were changes that could cause deterioration in the human systems. Working with Bernard H. Blanc of the Swiss Federal Institute of Technology and the University Institute for Biochemistry, Hertel not only conceived of the study and carried it out, he was one of eight participants. "To control as many variables as possible, we selected eight individuals who were strict macrobiotic diet participants from the Macrobiotic Institute at Kientel, Switzerland," Hertel explained. "We were all housed in the same hotel environment for eight weeks. There was no smoking, no alcohol and no sex." One can readily see that this protocol makes sense.

After all, how could you tell about subtle changes in a human's blood from eating microwaved food if smoking, booze, junk food, pollution, pesticides, hormones, antibiotics and everything else in the common environment were also present? "We had one American, one Canadian and six Europeans in the group. I was the oldest at 64 years, the others were in their 20s and 30s," Hertel added.

Valentine published the results of this study in *Search for Health* in the Spring of 1992. But the follow-up information is available only in a later edition, and also in *Acres*, USA. In intervals of two to five days, the volunteers in the study received one of the food variants on an empty stomach. The food variants were:

- raw milk from a biofarm
- the same milk conventionally cooked

- pasteurized milk from Intermilk Berne
- the same raw milk cooked in a microwave oven
- raw vegetables from an organic farm
- the same vegetables cooked conventionally
- the same vegetables frozen and defrosted in the microwave oven
- and the same vegetables cooked in the microwave oven

The overall experiment had some of the earmarks of the Pottenger cat studies, except that now human beings were test objects, the experiment's time-frame was shorter, and a new heat form was tested. Once the volunteers were isolated at the resort hotel, the test began. Blood samples were taken from every volunteer immediately before eating.

Then blood samples were taken at defined intervals after eating from the above-numbered milk or vegetable preparations. Significant changes were discovered in the blood of the volunteers who consumed foods cooked in the microwave oven. These changes included a decrease in all hemoglobin values and cholesterol values, especially the HDL (good cholesterol) and LDL (bad cholesterol) values and ratio.

Lymphocytes (white blood cells) showed a more distinct short-term decrease following the intake of microwaved food than after the intake of all the other variants. Each of these indicators point in a direction away from robust health and toward degeneration. Additionally, there was a highly significant association between the amount of microwave energy in the test foods and the luminous power of luminescent bacteria exposed to serum from test persons who ate that food.

This led Hertel to the conclusion that such technically derived energies may, indeed, be passed along to man inductively via consumption of microwaved food. "This process is based on physical principles and has already been confirmed in the literature," Hertel explained. The apparent additional energy exhibited by the luminescent bacteria was merely extra confirmation.

"There is extensive scientific literature concerning the hazardous effects of direct microwave radiation on living systems," Hertel continued. "It is astonishing, therefore, to realise how little effort has been made to replace this detrimental technique of microwaves with technology more in accordance with nature. "Technically produced microwaves are based on the principle of alternating current.

Atoms, molecules and cells hit by this hard electromagnetic radiation are forced to reverse polarity 1 to 100 billion times a second. There are no atoms, molecules or cells of any organic system able to withstand such a violent, destructive power for any extended period of time, not even in the low energy range of milliwatts."Of all the natural substances-which are polar-the oxygen of water molecules reacts most sensitively. This is how microwave cooking heat is generated-friction from this violence in water molecules. Structures of molecules are torn apart, molecules are forcefully deformed (called structural isomerism) and thus become impaired in quality.

HEATING FOOD

"This is contrary to conventional heating of food, in which heat transfers convectionally from without to within. Cooking by microwaves begins within the cells and molecules where water is present and where the energy is transformed into frictional heat." The question naturally arises: What about microwaves from the sun? Aren't they harmful? Hertel responded: "The microwaves from the Sun are based on principles of pulsed direct current.

These rays create no frictional heat in organic substance." In addition to violent frictional heat effects (called thermic effects), there are also athermic effects which have hardly ever been taken into account, Hertel added. "These athermic effects are not presently measurable, but they can also deform the structures of molecules and have qualitative consequences.

For example, the weakening of cell membranes by microwaves is used in the field of gene altering technology. Because of the force involved, the cells are actually broken, thereby neutralizing the electrical potentials-the very life of the cells-between the outer and inner sides of the cell membranes. Impaired cells become easy prey for viruses, fungi and other micro-organisms.

The natural repair mechanisms are suppressed, and cells are forced to adapt to a state of energy emergency: they switch from aerobic to anaerobic respiration. Instead of water and carbon dioxide, hydrogen peroxide and carbon monoxide are produced." It has long been pointed out in the literature that any reversal of healthy cell processes may occur because of a number of reasons, and our cells then revert from a "robust oxidation" to an unhealthy "fermentation".

The same violent friction and athermic deformations that can occur in our bodies when we are subjected to radar or microwaves, happens to the molecules in the food cooked in a microwave oven. In fact, when anyone microwaves food, the oven exerts a power input of about 1,000 watts or more. This radiation results in destruction and deformation of molecules of food, and in the formation of new compounds (called radiolytic compounds) unknown to man and nature.

Today's established science and technology argues forcefully that microwaved food and irradiated foods do not have any significantly higher "radiolytic compounds" than do broiled, baked or other conventionally cooked foods-but microwaving does produce more of these critters. Curiously, neither established science nor our ever-protective government has conducted tests-on the blood of the eaters-of the effects of eating various kinds of cooked foods. Hertel and his group did test it, and the indication is clear that something is amiss and that larger studies should be funded.

The apparently toxic effects of microwave cooking is another in a long list of unnatural additives in our daily diets. However, the establishment has not taken kindly to this work. "The first drawing of blood samples took place on an empty stomach at 7.45 each morning," Hertel explained. "The second drawing of blood took place 15 minutes after the food intake. The third drawing was two hours later." >From each sample, 50 ml of blood was used for the chemistry and five

millimetres for the hematology and the luminescence. The hematological examinations took place immediately after drawing the samples.

Erythrocytes, hemoglobin, mean hemoglobin concentration, mean hemoglobin content, leukocytes and lymphocytes were measured. The chemical analysis consisted of iron, total cholesterol, HDL cholesterol and LDL cholesterol. The results of erythrocyte, hemoglobin, hematocrit and leukocyte determinations were at the "lower limits of normal" in those tested following the eating of the microwaved samples. "These results show anaemic tendencies. The situation became even more pronounced during the second month of the study," Hertel added.

"And with those decreasing values, there was a corresponding increase of cholesterol values." Hertel admits that stress factors, from getting punctured for the blood samples so often each day, for example, cannot be ruled out, but the established baseline for each individual became the "zero values" marker, and only changes from the zero values were statistically determined. With only one round of test substances completed, the different effects between conventionally prepared food and microwaved food were marginal-although noticed as definite "tendencies".

As the test continued, the differences in the blood markers became "statistically significant". The changes are generally considered to be signs of stress on the body. For example, erythrocytes tended to increase after eating vegetables from the microwave oven. Haemoglobin and both of the mean concentration and content haemoglobin markers also tended to decrease significantly after eating the microwaved substances.

LEUKOCYTOSIS

"Leukocytosis (an increase in white blood cells)," Hertel explained, "which cannot be accounted for by normal daily deviations such as following the intake of food, is taken seriously by haematologists. Leukocyte response is especially sensitive to stress. They are often signs of pathogenic effects on the living system, such as poisoning and cell damage. The increase of leukocytes with the microwaved foods was more pronounced than with all the other variants.

It appears that these marked increases were caused entirely by ingesting the microwaved substances." The cholesterol markers were very interesting, Hertel stressed: "Common scientific belief states that cholesterol values usually alter slowly over longer periods of time. In this study, the markers increased rapidly after the consumption of the microwaved vegetables. However, with milk, the cholesterol values remained the same and even decreased with the raw milk significantly."

Hertel believes his study tends to confirm newer scientific data that suggest cholesterol may rapidly increase in the blood secondary to acute stress. "Also," he added, "blood cholesterol levels are less influenced by cholesterol content of food than by stress factors. Such stress-causing factors can apparently consist of foods which contain virtually no cholesterol-the microwaved vegetables."

It is plain to see that this individually financed and conducted study has enough meat in it to make anyone with a modicum of common sense sit up and take notice. Food from the microwave oven caused abnormal changes, representing stress, to occur in the blood of all the test individuals. Biological individuality, a key variable that makes a mockery of many allegedly scientific studies, was well accounted for by the established baselines. So, how has the brilliant world of modern technology, medicine and 'protect the public' government reacted to this impressive effort?

A GAG ORDER

As soon as Hertel and Blanc announced their results, the hammer of authority slammed down on them. A powerful trade organization, the Swiss Association of Dealers for Electroapparatuses for Households and Industry, known simply as FEA, struck swiftly. They forced the President of the Court of Seftigen, Kanton Bern, to issue a 'gag order' against Hertel and Blanc.

The attack was so ferocious that Blanc quickly recanted his support-but it was too late. He had already put into writing his views on the validity of the studies where he concurred with the opinion that microwaved food caused the blood abnormalities. Hertel stood his ground, and today is steadfastly demanding his rights to a trial. Preliminary hearings on the matter have been appealed to higher courts, and it's quite obvious the powers that be do not want a 'show trial' to erupt on this issue. In March 1993, the court handed down this decision based upon the complaint of the FEA:"Consideration.

1. Request from the plaintiff (FEA) to prohibit the defendant (Dr Ing. Hans Hertel) from declaring that food prepared in the microwave oven shall be dangerous to health and lead to changes in the blood of consumers, giving reference to pathologic troubles as also indicative for the beginning of a cancerous process. The defendant shall be prohibited from repeating such a statement in publications and in public talks by punishment laid down in the law.
2. The jurisdiction of the judge is given according to law.
3. The active legitimacy of the plaintiff is given according to the law.
4. The passive legitimacy of the defendant is given by the fact that he is the author of the polemic [published study] in question, especially since the present new and revised law allows to exclude the necessity of a competitive situation, therefore delinquents may also be persons who are not co-competitors, but may damage the competing position of others by mere declarations.[Apparently, Swiss corporations have lobbied in a law that nails "delinquents" who disparage products and might do damage to commerce by such remarks. So far, the US Constitution still preserves freedom of the press.]
5. Considering the relevant situation it is referred to three publications: the public renunciation [sic] of the so-called co-author Professor Bernard Blanc, the expertise of Professor Teuber [expert witness from the FEA] about the above-mentioned publication, the opinion of the public health authorities with regard to

the present stage of research with microwave ovens as well as to repeated statements from the side of the defendant about the danger of such ovens.

6. It is not considered of importance whether or not the polemic of the defendant meets the approval of the public, because all that is necessary is that a possibility exists that such a statement could find approval with people not being experts themselves. Also, advertising involving fear is not allowed and is always disqualified by the law. The necessity for a fast interference is in no case more advised than in the processes of competition. Basically, the defendant has the right to defend himself against such accusations. This right, however, in cases of pressing danger with regard to impairing the rights of the plaintiff when this is requested.

Conclusion

On grounds of this pending request of the plaintiff, the court arrives at the conclusion that because of special presuppositions as in this case, a definite disadvantage for the plaintiff does exist, which may not easily be repaired, and therefore must be considered to be of immediate danger. The case thus warrants the request of the plaintiff to be justified, even without hearing the defendant.

Also, because it is not known when the defendant will bring further statements into the public. The judge is also of the opinion that because the publications are made up to appear as scientific, and therefore especially reliable-looking, they may cause additional bad disadvantages. It must be added that there does obviously not exist a just reason for this publication because there is no public interest for pseudo-scientific unproved declarations. Finally, these ordered measures do not prove to be disproportionate.

he defendant is prohibited, under punishment of up to F5,000, or up to one year in prison, to declare that food prepared in microwave ovens is dangerous to health and leads to pathologic troubles as also indicative for the beginning of a cancerous process. The plaintiff pays the costs. (Signed) President of the Court of Seftigen Kraemer." If you cannot imagine this kind of decision coming from a court in the United States, you have not been paying attention to the advances of administrative law.

Hertel defied the court and has loudly demanded a fair hearing on the truth of his claims. The court has continued to delay, dodge, appeal and avoid any media-catching confrontation. As of this writing, Hans is still waiting for a hearing with media coverage-and he's still talking and publishing his findings. "They have not been able to intimidate me into silence, and I will not accept their conditions," Hertel declared.

"I have appeared at large seminars in Germany, and the study results have been well-received. Also, I think the authorities are aware that scientists at Ciba-Geigy [the world's largest pharmaceutical company, headquartered in Switzerland] have vowed to support me in court." As those powerful special interests in Switzerland who desire to sell microwave ovens by the millions continued to suppress open

debate on this vital issue for modern civilisation, new microwave developments blossomed in the United States.

INFANT DANGER

In the journal *Pediatrics* (vol. 89, no. 4, April 1992), there appeared an article titled, "Effects of Microwave Radiation on Anti-infective Factors in Human Milk". Richard Quan, M.D. from Dallas, Texas, was the lead name of the study team. John A. Kerner, M.D., from Stanford University, was also on the research team, and he was quoted in a summary article on the research that appeared in the 25 April 1992 issue of *Science News*.

To get the full flavour of what may lie ahead for microwaving, here is that summary article: "Women who work outside the home can express and store breast milk for feedings when they are away. But parents and caregivers should be careful how they warm this milk. A new study shows that microwaving human milk-even at a low setting-can destroy some of its important disease-fighting capabilities.

"Breast milk can be refrigerated safely for a few days or frozen for up to a month; however, studies have shown that heating the milk well above body temperature-37°ree;C-can break down not only its antibodies to infectious agents, but also its lysozymes or bacteria-digesting enzymes.

So, when paediatrician John A. Kerner, Jr, witnessed neonatal nurses routinely thawing or reheating breast milk with the microwave oven in their lounge, he became concerned. "In the April 1992 issue of *Pediatrics* (Part I), he and his Stanford University co-workers reported finding that unheated breast milk that was microwaved lost lysozyme activity, antibodies and fostered the growth of more potentially pathogenic bacteria.

Milk heated at a high setting (72 degree;C to 98 degree;C) lost 96 per cent of its immunoglobulin-A antibodies, agents that fend off invading microbes. "What really surprised him, Kerner said, was finding some loss of anti-infective properties in the milk microwaved at a low setting-and to a mean of just 33.5degree;C.

Adverse changes at such low temperatures suggest 'microwaving itself may in fact cause some injury to the milk above and beyond the heating'. "But Randall M. Goldblum of the University of Texas Medical Branch in Galveston disagrees, saying: 'I don't see any compelling evidence that the microwaves did any harm.

It was the heating.' Lysozyme and antibody degradation in the coolest samples may simply reflect the development of small hot spots-potentially 60°ree;C or above-during microwaving, noted Madeleine Sigman-Grant of Pennsylvania State University, University Park. And that's to be expected, she said, because microwave heating is inherently uneven-and quite unpredictable when volumes less than four millilitres are involved, as was the case in the Kerner's study.

"Goldblum considers use of a microwave to thaw milk an especially bad idea, since it is likely to boil some of the milk before all has even liquefied. Stanford University Medical Center no longer microwaves breast milk, Kerner notes. And that's appropriate, Sigman-Grant believes, because of the small volumes of milk that hospitals typically serve newborns-especially premature infants."

CHASING A STORY

Journalist Tom Valentine, after chasing this story, found it interesting that 'scientists' have so many 'beliefs' to express rather than prove fact. Yet facts eventually snuff out credential-based conjecture. Researcher Quan, in a phone interview, said that he believed the results of research so far warranted further detailed study of the effects of microwave cooking on nutrients.

The summary sentence in an abstract of the research paper is very clear: "Microwaving appears to be contra-indicated at high temperatures, and questions regarding its safety exist even at low temperatures." The final statement of the study conclusion reads:"This preliminary study suggests that microwaving human milk could be detrimental. Further studies are needed to determine whether and how microwaving could safely be done."

Unfortunately, further studies are not scheduled at this time. If there are so many indications that the effects of microwaves on foods can degrade the foods far above the known breakdowns of standard cooking, is it not reasonable to conduct exhaustive studies on living, breathing human beings to determine if it's possible that eating microwaved foods continuously, as many people do, can be significantly detrimental to individual health? If you wanted to introduce a herbal supplement into the American mainstream and make any health claims for it, you would be subjected to exhaustive documentation and costly research.

Yet the microwave-oven industry had only to prove that the dangerous microwaves could, indeed, be contained within the oven and not escape into the surrounding area where the radiation could do damage to people. The industry must admit that some microwaves escape even in the best-made ovens. So far, not one thought has been given by the industry to the possibility that the nutrients could be so altered as to be deleterious to health.

Well, this makes sense in a land that encourages farmers to poison crops and soils with massive amounts of synthesised chemicals, and encourages food processors to use additives that enhance shelf-life of foods regardless of the potential for degrading the health of the consumer. How many hundreds of pounds of microwaved food per capita is consumed in America each year? Are we going to continue to take it from established authority, without question, on the premise that they know best?