

# Frequently Asked Questions About EMFs

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## General Topics

**Q: Why do some people think that using mobile phone is dangerous?**

**A:** Some users of mobile phones claim they have experienced symptoms such as headaches, fatigue, memory loss, etc. when using the phone. Numerous scientific studies support these claims, and a possible link between mobile phone emissions and adverse conditions such as cancer has been reported.

**Q: What kind of radiation do mobile phones produce and emit?**

**A:** Mobile phones emit microwave radiation from the antenna and ELF from the circuitry of the handset.

**Q: We are surrounded by EMFs, many of them naturally occurring, so why should mobile phones be a problem?**

**A:** The levels of microwave and ELF emitted from cell phones into the heads of users are millions of times above the levels of corresponding, naturally occurring background EMFs. Furthermore, the emissions from cell phones are totally different in their structure from natural background EMFs. Cell phones emit constant bursts of microwave and constant pulses of ELF; fields in nature have totally random properties.

In conclusion, cell phone EMF emissions are totally distinct in their properties as well as their intensity, as compared to natural background EMFs.

**Q: Is non-ionizing radiation (radio waves) from cell phones similar to X-rays?**

**A:** Non-ionizing radiation is different from X-rays in terms of the frequency and energy content per "unit" of radiation, the so-called photon-energy. Non-ionizing radiation contains much less photon-energy than X-rays and has a much lower frequency. X-rays have such high photon-energy that it can directly damage bio-molecules, non-ionizing radiation does not have this capability. However, research has shown that non-ionizing radiation can have indirect effects with biological consequences similar to those caused by X-rays.

**Q: What is the difference between EMF emissions and radiation?**

**A:** EMF emissions in general mean EMFs emitted from non-natural sources, such as power lines, hair dryers and mobile phones. Radiation usually means EMFs which are not of ELF type, i.e., radiofrequencies and microwaves.

**Q: What are the safety standards for cell phone emissions?**

**A:** Safety standards for cell phones vary from country to country. The scientific basis for the standards is that they should make sure that brain tissue is not "significantly" heated by the radiation, since heating believed by some scientists to be the only potential health hazard associated with cell phone emissions.

**Q: If there are safety standards, what is the problem?**

**A:** The problem is that a substantial, growing body of scientific evidence has demonstrated that there are significant, potentially adverse biological effects associated with EMFs such as those emitted from cell phones, which are much lower in energy than the safety standards. Therefore, many scientists believe that the current safety standards are inadequate.

**Q: What is the scientific evidence that mobile phones cause biological effects?**

**A:** There is a substantial body of scientific evidence showing that mobile phone radiation cause significant biological effects. Some of the latest studies:

- The Wireless Technology Research (WTR), a research body sponsored by the cell phone industry, announced in May 1999 that a study performed at Integrated Laboratory Systems in Triangle Park, North Carolina, on human blood cells showed a tripling in chromosome damage caused by cell phone radiation. According to Dr. Carlo, the chairman of WTR, this is a strong link to cancer.
- An Australian study, headed by Dr. Repacholi, published in 1997, showed that mice exposed to cell phone radiation for 18 months for two times half an hour per day had a two times higher risk of developing cancer than unexposed mice.
- In 1997, Dr. Miguel Penafiel and his team of the Catholic University of America in Washington, DC, found that cell phone radiation increased the activity of a cancer related enzyme called ornithine decarboxylase (ODC).
- Scientists at Aarhus University in Denmark have in 1997 shown that cell phone radiation accelerates proliferation rate of human cells.
- Dr. Henry Lai of University of Seattle, Washington, has consistently shown that microwaves change the function of the brain and the secretion of critical brain substances. One of the effects is that learning and short term memory are impaired. Another effect consistently found by Dr. Lai is DNA damage to rat brains caused by the radiation.
- Scientists at the Department of Life Sciences, University of Nottingham, UK, have shown that transgenic nematodes, used to monitor toxic pollutants, become stressed by cell phone EMFs in the same way as they do by toxic chemicals.

Cell phones also emit ELF fields from the circuitry of the phone body. There is a very substantial body of scientific evidence showing that ELF fields cause significant biological effects. All this evidence also applies to cell phones.

**Q: Has the research appeared in peer revised journals/replicated?**

**A:** Yes, the research has appeared in peer revised journals. Very few scientists are interested in doing replication under identical circumstances as the research conducted by other scientists. They prefer to vary the conditions and study slightly different markers. This is not necessarily a drawback, since with biological material it is very difficult to do an exact replication. The large amount of research at slightly varied conditions, and with different markers, make up a very substantial body of evidence.

**Q: What are the possible health implications of the research into bioeffects?**

A: The possible health implications relate to impaired brain function and behavioral disorders, symptoms like headaches and fatigue, and an increased risk of cancer, degenerative diseases like Alzheimer's and Parkinson's.

**Q: Is there any evidence that cell phones can cause cancer, Alzheimer's, Parkinson's, memory loss, etc.?**

A: Dr. Lennart Hardell, a Swedish cancer specialist, has recently announced the results of a yet unpublished study showing that right-handed cell phone users have a two-and-a-half times increased risk of brain cancer in the right-hand side of the head where they hold their phones. Left-handed cell phone users have the same risk elevation of a brain cancer in the left-hand side of the brain.

There is a substantial body of epidemiological studies reporting an association between ELF fields and cancer. This caused a 28 member scientific panel, convened by the US National Institute of Health Sciences (NIEHS), to conclude in July 1998 that "extremely low frequency (ELF) electromagnetic fields should be regarded as possible carcinogens". As cell phones, in addition to the microwaves from the antenna, also emit ELF fields from the internal circuitry of the handset body, the research relating to ELF effects also applies to cell phones.

Regarding Alzheimer's and Parkinson's, epidemiological data are scarcer; there have been studies conducted by Dr. Sobel, UCLA, in Finland and Los Angeles, reporting a consistent and significant increase in the risk of Alzheimer's for occupationally exposed individuals (ELF-type fields) such as seamstresses, power station operators, TV-repairmen, etc. In addition, laboratory studies on cell and tissue cultures report that EMFs induce effects similar to the biological mechanisms believed to be involved in the development of these diseases.

Many users of cell phones have claimed that they feel the radiation from the handsets makes them confused and more forgetful. There is substantial laboratory evidence from studies of animals supporting these claims. Maze experiments with rats have shown that the animals have difficulties locating food in the maze when they have been exposed to cell phone radiation. In addition, scientific studies have revealed that EMF exposures change the production of neurochemicals in the brain and central nervous system, indicating a potential induced change in brain function.

**Q: Why has more research not been done? And is there more research being conducted?**

A: In the past there has been a severe lack of funds for research into the effects of EMFs. There is more research being done today; however, a large part of research is funded by the cell phone industry and may therefore be biased.

**Q: How do all the studies on animals (flies, mice, rats, chick embryos, etc.) relate to human health?**

A: Animals are widely used to study the effects of chemicals, drugs, additives, radiation, etc. Even though humans are different from animals, the basic biochemical processes taking place in

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## Cell Phone Usage

**Q: I have been a heavy user of mobile phones for years and I feel fine, why should I feel concerned? How do I know if there is a problem?**

**A:** Some people feel a specific or an unspecific symptom when they use a mobile phone, others don't. It is highly individual. It has been reported in scientific papers that EMFs such as those emitted from mobile phones may significantly increase the risk of conditions such as cancer. Individuals developing such conditions rarely feel anything before it's too late. Therefore, even if you "feel nothing", it is no guarantee that you are safe.

**Q: Does using an ear piece help? (How far away should I keep my handset from the head?)**

**A:** Nobody knows for certain, since scientific studies have reported biological effects induced by radiation intensities thousands of times below the level emitted from mobile phones. This means that even the reduction in head exposure intensity obtained by using an ear piece may not bring the level of radiation below the threshold where biological effects occur. In general, any reduction in the intensity of radiation emitted into the head of the user is of course desirable; however, if the user is carrying the handset in his belt, s/he will be exposing important blood cell producing tissues in the pelvic bones, as well as his/her reproductive organs to radiation.

Additionally, studies and tests of many of the hands-free kits by scientists and consumer groups in Europe found that the earpieces themselves serve as antennae that direct more electromagnetic radiation into the ears. Phone models may differ in the degree to which their internal wires conduct electricity. But these studies find that the kits intensify radiation exposure to the ear canal, and may actually raise the amount of radiation being directed into the head by three times.

**Q: Is there any risk from keeping my phone on standby in my pocket?**

**A:** Your cell phone, even when not in use (but turned on), does still emit harmful waves that can potentially effect the body.

**Q: Why haven't more human laboratory studies been made?**

**A:** Laboratory studies on humans are difficult and costly to conduct. Therefore, the research has been focused on cell and humane animal laboratory studies and epidemiological studies on humans. However, some studies have been made on humans showing an increased blood pressure, changed EEG readings (brain waves) and changed EKG readings (heart beats) as a result of mobile phone radiation.

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