

Do cellular phones represent a health risk?

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A major study carried out by scientists in Finland suggests that radiation from mobile phones causes changes to the brain. Professor Dariusz Leszczynski headed up the two-year program at Finland's Radiation and Nuclear Safety Authority.

The researchers discovered that radiation from cellular phones can cause activity in hundreds of proteins in human cells grown in a laboratory. It is the first time that scientists have looked at the effects of mobile phone radiation on human cells rather than those of rats.

The scientists found that changes in cells that line blood vessels could weaken the functioning of the brain's protective shield against harmful substances. These changes damaged the blood-brain barrier—a safety barrier that stops harmful substances in the blood from entering the brain.

The study found that exposure caused increased activity in a protein called hsp27 linked to the functioning of the blood-brain barrier. “[Increased protein activity] might cause cells to shrink—not the blood vessels but the cells themselves—and then tiny gaps come between those cells through which some molecules could pass,” said Professor Leszczynski.

Speaking to *BBC News Online*, he stated: “The blood-brain barrier has been shown to be affected by radiation in animal studies. There is a lot of uncertainty about whether this happens in humans. We have shown some biological effects. If it did happen it could lead to disturbances, such as headaches, feeling tired or problems with sleeping. A study by a Swedish research group even suggested it could lead to Alzheimer's disease.” He also stated that a study by French scientists found similar results in rats.

An abstract of the Finnish study was published in the May 2002 issue of *Differentiation*. The authors concluded: “Based on the known functions of hsp27, we put forward the hypothesis that mobile phone radiation-induced activation of hsp27 may (1) facilitate the development of brain cancer by inhibiting the cytochrome c/caspase-3 apoptotic pathway and (2) cause an increase in blood-brain barrier permeability through stabilization of endothelial cell stress fibers. We postulate that these events, when occurring repeatedly over a long period of time, might become a health hazard because of the possible accumulation of brain tissue damage. Furthermore, our hypothesis suggests that other brain damaging factors may co-participate in mobile phone radiation-induced effects.”

An article published by Earthpulse Press, entitled *Cell Phone Convenience or 21st Century Plague* by Dr. Nick Begich and James Roderick, postulates that cell phones “have been one of the fastest growing industries in modern history,” with cell phone usage estimated to climb to 1.3 billion users by the year 2005.

The article is a compilation of much of the research and reporting produced over the last 10 years in the cell phone area.

Among the article's many citations is the demand by British scientists that mobile phones carry a health warning. “Amid an

explosive growth of mobile communications, concerns are mounting about cellular telephones potential links to health problems ranging from headaches to brain tumors. ... Mobile telephones are arguably the most radiative appliance we have ever invented apart from the microwave oven and people are putting them by their heads—arguably the most sensitive part of the body,” said bioelectromagnetics scientist Roger Coghill, as reported by *Reuters* in January 1998. “Cell phones emanate microwave radiation, and human brains may absorb up to 60 percent of that energy.”

The Begich/Roderick article continues: “Researchers have shown that low intensity microwave exposure opens up the blood/brain barrier, a biological effect which can allow the release of dangerous chemicals into the brain.” The article goes on to quote from the September 15, 1999 issue of *Svenska Dagbladet*: “New Swedish research shows that the radiation from mobile phones might make it easier for poison to penetrate the brain. The findings could explain the diseases that American soldiers who have participated in high-tech warfare are suffering from. The unexplained symptoms of American soldiers of the Kuwait war are suspected to link to the medication they took against nerve gas. The microwaves surrounding soldiers in high-tech warfare could have opened the blood-brain barrier, and the medication penetrated into the brain. The possibility is now being investigated by the US Air Force in co-operation with the Lund [Swedish] scientists.”

The authors report that a group of German scientists found that exposure to electromagnetic fields during mobile phone use may increase resting blood pressure and that Colorado University researchers have shown that frequent mobile users had significantly depressed melatonin—a vital cancer-preventing hormone. Also mentioned is an Australian study that has linked cell phones to a higher rate of brain cancer, while a Swedish study suggests that using a mobile phone for more than 15 minutes could lead to headaches and fatigue.

The article makes reference to a study by Dr. Lennart Hardel showing that mobile phone use increases the risk of a brain tumor by almost two and a half times.

According to Begich and Roderick, cell-phone companies like Motorola attempt to influence the results of research studies. Mentioned in this context was the work of biologists Ross Adey and Dr. Henry Lai. The latter, “who has been studying the biological effects of electromagnetic fields for 20 years, was asked three times [by Motorola] to change findings on how they caused DNA breaks in rats.”

Another biochemist, Jerry Phillips, who worked with Ross Adey on Motorola-funded research beginning in 1991, commented: “Motorola was adamant that Adey never mention DNA damage and radiofrequency (RF) radiation in the same breath.” Said Adey: “Motorola has been manipulative of research that we and others have

reported to them. Essentially they cut us off because we were too inquisitive.” Begich and Roderick report that “Phillips, Adey, and other said they see a strong parallel between what’s happening now and the decades of denial by the tobacco industry...”

Other bioeffects that have been reported to result from RF exposure include changes in cell membrane function, metabolism, cellular signal communication, activation of proto-oncogenes and cell death. Resulting effects which have been reported in scientific literature “include DNA breaks and chromosome aberrations, increased free radical production, cell stress and premature aging, changes in cell membrane function including memory loss, learning impairment, headaches and fatigue, sleep disorders, neurodegenerative conditions, reductions in melatonin secretion, and cancer.”

Dr. George Carlo, a health scientist and epidemiologist, ran a \$28 million cell phone surveillance and research program from 1993 through 2001. Wireless Technology Research, which was established to conduct the study, was chaired by Dr. Carlo and, significantly, was funded by the cell phone industry. The industry-sponsored research suggested a possible mobile phone-cancer link. Said Dr. Carlo: “You would come to the [possible] conclusion that RF [radio frequencies] causes genetic damage.”

On October 7, 1999, Dr. Carlo, in his capacity as chairman of Wireless Technology Research, sent a letter to C. Michael Armstrong, chairman and chief executive officer of AT&T Corporation.

He wrote that hand-held phone users had a higher rate of brain cancer than those who used non-hand-held phones that were away from their heads; that the risk of rare neuro epithelial tumors on the outside of the brain more than doubled in cell phone users as compared to those who did not use cell phones; and that there appeared to be a correlation between brain tumors occurring on the right side of the head and the use of the phone on the right side of the head.

“The companies are now spending millions trying to discredit me because, basically, they didn’t like what I told them.... They have shown total disregard for mobile phone users,” Dr. Carlo stated in an October 1999 interview with the British newspaper, *The Express*.

The Begich/Roderick article mentions that the industry has largely put forward studies that “looked at the effects of radio waves outside the cellular frequency, or at exposure levels that are different from those experienced by cellular phone users....Very limited information has been available to the public about the risks of cell phones or various electromagnetic fields outside of some obscure research and academic circles. The fact is that increasing evidence has been mounting and the true risks of these energy fields are becoming well known.”

The authors criticize the Federal Drug Administration and the United States government for being reluctant to take action against the risks of cell phone usage and blame this reluctance on “lobby efforts, public relations gimmicks and the manipulation of the facts.”

But as the cell phone industry and US government agencies are downplaying these risks, Begich and Roderick write that “[t]he risks associated with cell phones are being considered too risky even by the biggest risk takers in the insurance industry.” Underwriters from big insurers like Lloyd’s and Stirling have refused “to cover manufacturers against the risk of being sued if mobiles turn out to cause long-term damage,” according to the April 11, 1999 issue of *The Observer*.

The Begich/Roderick article concludes: “The research continues and the health effects mount. With over 1.3 billion people projected to be

using these devices in the year 2005 the risks must be understood and addressed. Perhaps we will see the litigation of the 21st century overtake the incredible tobacco settlements as the record holder for ‘damage by industry when its head’s in the sand.’”

Another indication of the possible dangers in cell phone usage involves the cell phone industry itself. Patents taken out by the industry contain revelations of health hazards connected to their products. Baltimore attorney Joanne Suder has recently filed a high-profile lawsuit against the cell phone industry and is considering 36 more suits. Her contention that cell phone are dangerous is based on the “dozens and dozens” of patents filed by the industry to create radiation-shielding technology.

For example, a Nokia patent for a shield layer between the antenna and the user to reduce the electromagnetic irradiation of the user, received on July 28, 1998, states: “[I]t has been suggested that modulated radio-frequency radiation induces changes in the electrical status, i.e., in the ion balance of nerves. A continuous localized exposure to radio-frequency irradiation has been suggested to weaken myelin sheets of cells and to eventually lead to an impairment of hearing capability, vertigo, etc. It has been suggested that radio-frequency irradiation may stimulate extra growth among supportive cells in the nerve system, which in the worst case it has been suggested could [lead] to a development of malignant tumors, e.g., glioma.... Although the consequences described above have not been scientifically verified, the uncertainty has some effects by reducing the speed of growth of the market of radiophones.”

Motorola, Ericsson and other handset manufacturers own similar patents, Suder said.

The degree and magnitude of the health risks involved in cell phone usage have yet to be determined in a comprehensive manner. It is not clear whether the risk is comparable to that posed by smoking (potentially fatal), for example, or by passing through a metal detector in an airport (minor, with an offsetting benefit). A factor making it more difficult to ascertain the potential hazards has clearly been the influence of the firms with enormous amounts of money invested in cell phone production. Can anyone doubt that without this big business influence the true facts about cellular phone usage could be established by a coordinated scientific effort in relatively short order?

However, the cell phone manufacturers, telecommunications companies and those who profit enormously from this new and booming industry, would apparently rather use 1.3 billion people as human guinea pigs in a radiological experiment than investigate any potentially life-threatening “consequence.”



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