

BIOLOGICAL EFFECTS OF WEAK EMFS

- The *National Institutes of Health* (NIH) has fully redacted 2,500 pages of documents related to the sudden cessation of its decade-long, \$30 million study on the carcinogenic effects of cell phone radiation, leaving the public uninformed about the reasons behind this decision.
- The NIH's National Toxicology Program (NTP) completed a study in 2018 that found "clear evidence" of cancer and DNA damage in rats exposed to 2G and 3G cell phone radiation, highlighting alarming health risks associated with widespread cell phone use.
- The NIH's claim that the research was halted due to being "technically challenging and resource-intensive" has been met with skepticism by health advocates and scientists, who argue that the findings warranted further investigation rather than abandonment.
- Concerns about cell phone radiation have been historically downplayed, with industry-funded studies influencing safety guidelines that focus on thermal effects while ignoring non-thermal effects like DNA damage. The NTP's 2018 findings, being independent of industry influence, were a rare exception.
- The NIH's actions raise concerns about public health and government accountability, especially with the global rollout of 5G technology. Advocates demand the release of redacted documents and the resumption of research to ensure that public health is prioritized over potential industry interests.

Well-replicated studies have shown that weak electromagnetic fields remove calcium ions bound to the membranes of living cells, making them more likely to tear, develop temporary pores and leak. Calcium ions bound to the surfaces of cell membranes are important in maintaining their stability. They help hold together the phospholipid molecules that are an essential part of their make-up.

Without these ions, cell membranes are weakened and are more likely to tear under the stresses and strains imposed by the moving cell contents (these membranes are only two molecules thick!). Although the resulting holes are normally self-healing they still increase leakage while they are open and this can explain the bulk of the known biological effects of weak electromagnetic fields.

Exposing brain tissue to weak VHF radio signals modulated at 16Hz (16 cycles per second) released calcium ions (electrically charged calcium atoms) bound to the surfaces of its cells. Weak fields are often more effective than strong ones. Leaks in the membranes surrounding lysosomes (tiny particles in living cells that recycle waste) can release digestive enzymes, including *DNAase* (an enzyme that destroys DNA).

This explains the serious damage done to the DNA in cells by mobile phone signals. *DNAase* leaking through the membranes of lysosomes (small bodies in living cells packed with digestive enzymes) explains the fragmentation of DNA seen in cells exposed to mobile phone signals. When this occurs in the germ line (the cells that give rise to eggs and sperm), it reduces fertility and predicts genetic damage in future generations.

Exposing human cells for 24 hours to simulated mobile phone signals gave DNA fragmentation similar to that due to the gamma rays from a radioactive isotope! (Gamma rays also make lysosome membranes leak.) The biological effects of electromagnetically-induced DNA fragmentation may not be immediately obvious in the affected cells, since fragments of broken DNA can be rejoined and damaged chromosomes (elongated

protein structures that carry the DNA) can be reconstituted. However, there is no guarantee that they will be rejoined exactly as they were. Pieces may be left out (deletions) joined in backwards (inversions) swapped between different parts of the chromosome (translocations) or even attached to the wrong chromosome. In most cases, the new arrangement will work for a while if most of the genes are still present and any metabolic deficiencies can often be made good by the surrounding cells.

However, things go badly wrong when it comes to *meiosis*, which is the process that halves the number of chromosomes during the formation of eggs and sperm. During *meiosis*, the chromosomes line up in pairs (one from each original parent) along their entire length so that corresponding parts are adjacent and can be exchanged (this gives each of the daughter cells a unique combination of genes). However, if the arrangement of their genes has been altered by electromagnetic exposure, they cannot align properly, and the chromosomes may even tie themselves in knots in the attempt.

Such malformed pairs are usually torn apart unequally in the later stages of meiosis so that the eggs or sperm have an incomplete or unbalanced set of genes, may not function properly and so reduce fertility. There is evidence from several independent studies in Australia, Hungary and the United States that this is already occurring.

Leakage of calcium ions into the cytosol (the main part of the cell) acts as a metabolic stimulant, which accounts for reported accelerations of growth and healing, but it also promotes the growth of tumors. Leakage of calcium ions into neurons (brain cells) generates spurious action potentials (nerve impulses) accounting for pain and other neurological symptoms in electro-sensitive individuals. It also degrades the signal-to-noise ratio of the brain making it less likely to respond adequately to weak stimuli. This may be partially responsible for the increased accident rate of drivers using phones.

DNA DAMAGE MAY CAUSE CANCER

There have been many studies suggesting that exposure to weak electromagnetic fields is associated with a significant increase in the risk of getting cancer. This could be caused by gene mutations resulting from DNA damage. A *gene* is a section of DNA containing the information needed to make a particular protein or enzyme. There is also a section that can turn the gene on or off in response to outside signals.

The growth of an organism from a fertilized egg involves a hugely complex pattern of switching genes on and off that regulates growth, cell division and differentiation into specific tissues. DNA damage can sometimes give unregulated growth to form tumors. However, the effect may not be immediate.

Cancer following exposure to chemical carcinogens such as asbestos may take many years to become rampant. The affected cells seem to go through several stages of ever-increasing genetic and molecular anarchy before they finally reach the point of unstoppable growth and division. When assessing any carcinogenic effects of electromagnetic exposure, we must bear in mind that there may be a similar delay. It may be some years before we know the full carcinogenic effects of the recent explosive growth in the use of mobile phones.

A more detailed examination of the molecular mechanisms explains many of the seemingly weird characteristics of electromagnetic exposure, e.g. why *weak* fields are more effective than *strong* ones, why some frequencies such as 16 Hz are especially potent and why pulsed-fields do more damage. There have been many studies suggesting that exposure to weak electromagnetic fields is associated with a small but significant increase in the risk of getting cancer. This could be caused by gene mutations resulting from DNA damage.

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DNA DAMAGE REDUCES FERTILITY

If the arrangement of genes has been altered by electromagnetic exposure, they cannot align properly, and the chromosomes may even tie themselves in knots in the attempt. Such malformed pairs are usually torn apart unequally in the later stages of meiosis so that the eggs or sperm have an incomplete or unbalanced set of genes, may not function properly and so reduce fertility. This is already occurring.

Heavy mobile phone use appears to reduce both the quantity and viability of sperm. Human eggs may be similarly affected, but since they are formed in the embryo before the baby is born, the damage will be done during pregnancy but will not become apparent until the child reaches puberty.

It is not only humans that are affected. Well-researched responses in other organisms include the more rapid growth of higher plants, yeast and changes in the locomotion of diatoms. The last two are significant because they are both single cells, implying that the effects occur at the cellular level. Furthermore, we can explain virtually all of the electromagnetic effects on humans in terms of changes occurring at the cellular level that may then affect the whole body.

The electromagnetically induced loss of fertility is the good news, since it means that badly damaged embryos are less likely to be conceived. The bad news is that any damaged genes needed for embryo development but not for normal egg or sperm function will not be weeded out in this way. They can still find their way into the fetus and cause permanent genetic damage.

The effect may not be apparent in the first generation since a non-functioning gene from one parent can often be offset if the other parent provides a good version of the same gene. In fact, serious trouble may not arise for many generations until by chance two faulty versions of the same gene end up in the same fetus. What happens then depends on the gene concerned, but it is unlikely to be beneficial and may be lethal.

The overall conclusion is that the genetic damage from exposure to electromagnetic radiation can have an almost immediate effect on fertility, but damage to the offspring may take several generations to show up. If we do nothing to limit our exposure to electromagnetic radiation, we can anticipate a slow decline in the viability of the human genome for many generations to come. It is ironic that having only just discovered the human genome, we have already set about systematically destroying it.

EFFECTS ON METABOLISM

A major effect of electromagnetic radiation is the leakage of free calcium ions, either through the cells' external membranes or those surrounding internal 'calcium stores.' This can have dramatic effects on many aspects of metabolism and explains most of the mysterious but well-documented physiological effects of electromagnetic fields. These include stimulations of growth, an increased risk of cancer, symptoms suffered

by electrosensitive humans and why using a mobile phone while driving makes you four times more likely to have an accident.

Apart from its role in maintaining membrane stability, the calcium concentration inside cells controls the rate of many metabolic processes, including the activity of many enzyme systems and the expression of genes. The concentration of calcium ions in the cytosol (the main part of the cell) is normally kept about a thousand times lower than that outside by metabolically-driven ion pumps in its membranes. Many metabolic processes are then regulated by letting small amounts of calcium into the cytosol when needed.

This is normally under very close metabolic control so that everything works at the right time and speed. However, when electromagnetic exposure increases membrane leakiness, unregulated amounts of extra calcium can flood in. Just what happens then depends on how much gets in, and what the cells are currently programmed to do. If they are growing, the rate of growth may be increased. If they are repairing themselves after injury, the rate of healing may be increased, but if there is a mutant precancerous cell present, it may promote its growth into a tumor.

CALCIUM LEAKAGE AND BRAIN FUNCTION

Normal brain function in humans depends on the orderly transmission of signals through a mass of about 100 billion *neurons*. Neurons are typically highly branched nerve cells. They usually have one long branch (the *axon*), which carries electrical signals as *action potentials* (nerve impulses) to or from other parts of the body or between relatively distant parts of the brain (a nerve contains many axons bundled together).

The shorter branches communicate with other neurons where their ends are adjacent at synapses. They transmit information across the synapses using a range of neurotransmitters, which are chemicals secreted by one neuron and detected by the other. The exact patterns of transmission through this network of neurons are horrendously complex and determine our thoughts and virtually everything we do.

Calcium plays an essential role in this because a small amount of calcium must enter the neuron every time before it can release its neurotransmitters. Without it, the brain would be effectively dead. But what would happen if electromagnetically-induced membrane leakage let in too much calcium? One effect would be to increase the background level of calcium in the neurons so that they release their neurotransmitters sooner.

This improves our reaction time to simple stimuli. However, it can also trigger the spontaneous release of neurotransmitters to transmit spurious signals that have no right to be there. This feeds the brain false information. Similar spurious action potentials may also be triggered in other parts of the neuron if leaks in the membrane temporarily short-circuit the normal voltage between its inside and outside. These unprogrammed action potentials will degrade the signal-to-noise ratio of the brain and reduce its ability to make accurate judgements.

Exposing nerve and muscle cells to calcium concentration about 10–20% below normal makes them significantly more excitable. *Hypocalcemia* is a medical condition, in which the concentration of ionized calcium in the blood is abnormally low. Hypocalcemia is usually caused by *hypomagnesemia*. When magnesium is low, calcium will precipitate out of solution in the blood. By removing bound calcium from cell membranes, it should (and does) give similar effects to electromagnetism.

Symptoms of hypocalcemia include *skin disorders*, *paresthesias* (pins and needles, numbness, sensations of burning etc.) *fatigue*, *muscle cramps*, *cardiac arrhythmia*, *gastro-intestinal problems* and many others. The symptoms of hypocalcemia are remarkably similar to those of electro sensitivity.

If you have any of them, it may be worth having your blood checked for ionized calcium and start supplementing with magnesium oil and magnesium bath flakes.

It is likely that at least some forms of electro sensitivity could be due to the victims having their natural blood calcium levels bordering on *hypocalcemia* resulting from *hypomagnesemia*. Electromagnetic exposure would then remove even more calcium from their cell membranes to push them over the edge and give them symptoms of hypocalcemia. If this is correct, conventional treatment for hypocalcemia (often elevating the body's magnesium concentration) may relieve some if not all of these symptoms.