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Technical Electrosmog May be Dangerous

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Abstract- It is scientifically controversial so far whether EMF (non-ionizing electromagnetic fields) can have negative effects on the DNA of cell nuclei. In terms of their energy, they could not do so. However, there is clinical and molecular biological evidence that this can be. There exists a 3-stage mechanism of action, via peroxinitrite, which could lead to DNA damage. The sequence of these processes will be described. Therefore, there is a reasonable suspicion that EMF could also cause DNA damage. The organs with fast and high cell division rate are particularly affected. The general exposure to technical electrosmog (especially 5G) must therefore be marked with a question mark.

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I. Introduction

It is an accepted fact that ionizing radiation such as X-rays and gamma radiation is harmful to the body and significantly increases the risk of cancer.(1) This is explained by the fact that the wavelength of ionizing radiation is short and the energies and frequencies are high. Their energy is strong enough to directly break the electron pair bonds that hold DNA together.

However, contrary to popular belief, most of the damage occurs not because the ionizing radiation directly breaks the electron pair bonds of DNA, but because the radiation interacts with the cell water and, in particular, the cell nucleus. When the ionizing radiation hits the water in your cell nucleus, it forms dangerous hydroxyl radicals.(2) These cannot travel long distances. But because the radiation causes these free radicals to form in the cell nucleus right next to the nuclear DNA, they can cause damage to the DNA. This is called indirect ionization, and it is responsible for much of the damage that ionizing radiation does to DNA.

II. Also Non-ionizing Radiation Damages the DNA

While it is true that non-ionizing radiation, such as that emitted by cell phones, transmitters and WLAN, is of a lower frequency than ionizing radiation and does not have sufficient energy to create hydroxyl radicals, it is not true that non-ionizing radiation cannot damage DNA. It can, in fact, by producing peroxinitrite and, in the next step, carbonate radicals.(3) As it turns out, peroxinitrite production was the missing piece of the puzzle that explains why non-ionizing radiation can be just as damaging as ionizing radiation.

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III. Some Evidence

In 2008, researcher Franz Adlkofer (Franz Xaver Adlkofer (* 14. December 1935 at Attenzell/Germany; † 18. June 2022 at Paros/ Greece (4)) worked for a study using a comet assay, a highly sensitive test for DNA damage. The comet assay (also called single cell gel electrophoresis) is a technique of gel electrophoresis by which it is possible to detect DNA damage in single cells.(5) The assay was developed in 1984 by Östling and Johanson to detect DNA double-strand breaks.(6) With further development by Singh in 1988, DNA single-strand breaks could also be detected by using basic buffers. The principle of the Comet assay is based on lysing cells embedded in agarose and exposing them to an electric field, known as electrophoresis. During electrophoresis, the negatively charged DNA migrates to the positive pole and, thanks to the pores in the agarose, the fragments separate according to size, as the smaller fragments travel a further distance in a given time than the larger ones. Chromosomal DNA, however, is too large to travel as a whole in the electric field. Only damaged, fragmentary DNA is able to migrate out of the cell nucleus here. Under the UV microscope, the damaged cells, which were previously stained with fluorescent dyes such as ethidium bromide, now appear with a tail of DNA fragments that gives them the appearance of a comet. In the comet assay, all cells that have a nucleus can be used.

He found that very weak EMF exposure at 1.8 GHz produced DNA breaks in large quantities. From 2000 to 2004, Adlkofer led the REFLEX project, which resulted in the REFLEX study, an EU-funded investigation of the impact of cell phone radiation on human organisms conducted by the Foundation for Behavior and the Environment.(7,8)

IV. Peroxinitrite

We now know why EMF radiation can lead to exceptionally high peroxinitrite concentrations. The hydroxyl radical (OH radical, HO-) is a molecule composed of one hydrogen and one oxygen atom. As a radical, it has a single, unpaired electron and is therefore very reactive. The process occurs in three steps, and each leads to massive amplification. With three amplifying steps in succession, a very small output signal can lead to a large response: If the cells' voltage-gated calcium channels are open, they allow about a million calcium ions per second to flow into the cell.(9) The higher calcium concentration in the cells activates

the synthesis of nitric oxide and superoxide. Peroxinitrite forms in proportion to the result of nitric oxide concentration times superoxide concentration.

V. Especially Affected: Organs with a High Cell Division Rate

Among the most vulnerable tissues are the brain, heart, and reproductive organs - the very tissues that are most affected when we are exposed to EMF. This is probably why neuropsychiatric diseases and neurodegenerative diseases such as Alzheimer's have exploded over the past 2 decades, at the same time that fertility rates have declined. It is thus an illusion that EMF is not harmful. We are putting our future at risk with EMF, especially 5G – maybe in parallel with mRNA vaccination.(10)

VI. Conclusion

The question whether EMF are harmless can be answered in the negative with high probability. There are intranuclear processes that can cause a change in the DNA even at low energy of the EMF. The mechanisms were described by Adlkofer (4) and proven by scientifically accepted methods. It would be indicated to follow up and verify his experiments with a larger study.

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