

5G may produce effects like those we already see produced from lower frequency EMFs (like 4G) but much more severe. Our current safety guidelines are allowing us to be exposed to EMFs that are approximately 7.2 million times too strong. There has been very little research published on the safety of 5G in humans.ⁱ

5G (5th Generation) transmission of electromagnetic radiation by the telecommunications industry is predicted to be particularly dangerous for each of four different reasons:

1. The extraordinarily high numbers of antennae that will be required.
2. The very high energy outputs which will be used to ensure penetration through building structures.
3. The extraordinarily high pulsation levels.
4. The apparent high level interactions of the 5G frequency on charged groups within cell membranes (of animals, insects and plants) presumably including the voltage sensor charged groups.

What are the effects produced by non-thermal exposures to microwave frequency EMFs, where we have an extensive scientific literature?ⁱⁱ

1. Three types of cellular DNA attacks, producing single and double strand breaks in the cellular DNA, double strand breaks in the cellular DNA. Each of these DNA changes have roles in cancer causation. (21 different scientific reviews documenting these types of cellular DNA damage).

2. A wide variety of changes leading to lowered male fertility, lowered female fertility, increased spontaneous abortion, lowered levels of estrogen, progesterone and testosterone, lowered libido (18 reviews).

3. Neurological/neuropsychiatric effects (25 reviews). Namely: sleep disturbance/insomnia; fatigue/tiredness; headache; depression/depressive symptoms;lack of concentration/attention/cognitive dysfunction; dizziness/vertigo; memory changes, restlessness,tension,anxiety,stress, agitation and irritability.

4. Apoptosis/cell death (13 reviews). The two most important consequences of large increases in apoptosis (programmed cell death) are in causation of the neurodegenerative diseases and lowered reproduction although there are others.

5. Oxidative stress/free radical damage (19 reviews). Oxidative stress has roles in all or almost all chronic diseases.

6 Widespread endocrine (that is hormonal) effects (12 reviews). The steroid hormone levels drop with EMF exposure, whereas other hormone levels increase with initial exposure. The neuroendocrine hormones and insulin levels often drop with prolonged EMF exposure, possibly due to endocrine exhaustion.

7. Increases in intracellular calcium ($[Ca^{2+}]_i$) levels following EMF exposure (15 reviews). Calcium signaling also increases following EMF exposure.

8. Cancer causation (35 reviews). Brain cancer, salivary cancer, acoustic neuromas and two other types of cancer go up with cell phone use. People living near cell phone towers have increased cancer rates. Other types of EMFs are each implicated. Short wave radio, radio ham operators and people exposed to radar all are reported to have increased cancer incidence. Perhaps most telling, heavy long term cell phone users have the highest incidence of brain cancer and have predominantly cancer increases on the ipsilateral side of the head (the side they use their cell phones), as opposed to the contralateral side.

ⁱ Simkó M, Mattsson MO, 5G Wireless Communication and Health Effects-A Pragmatic Review Based on Available Studies Regarding 6 to 100 GHz. *Int J Environ Res Public Health*. 2019 Sep 13;16(18). pii: E3406. doi: 10.3390/ijerph16183406. Review. PMID:31540320

ⁱⁱ 5G Risk: The Scientific Perspective - Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them. Written and Compiled by **Martin L. Pall, PhD** Professor Emeritus of Biochemistry and Basic Medical Sciences, Washington State University. BA degree in Physics, Phi Beta Kappa, with honors, Johns Hopkins University; PhD in Biochemistry & Genetics, Caltech.martin_pall@wsu.edu. 503-232-3883

42 Electromagnetic Hypersensitivity and Implications for Metabolism

*John C. Cline, M.D., B.Sc., and
Beth Ellen DiLuglio, M.S., R.D., C.C.N.*

INTRODUCTION

Over the past century, great discoveries in the biomolecular and biochemical nature and design of cells have led us to new understandings of how cells and systems of cells, such as the human being, work and exist [1]. Of equal importance, but less recognized, is that organisms are bioelectromagnetic beings. The human body can be visualized as an electromagnetic semiconductor matrix that allows for instantaneous communication among all cells within the system [2]. This living matrix is defined as “the continuous molecular fabric of the organism, consisting of fascia, the other connective tissues, extracellular matrices, integrins, cytoskeletons, nuclear matrices and DNA.” Within the living matrix, extracellular, cellular, and nuclear biopolymers or ground substances constitute a body-wide reservoir of charge that can maintain electrical homeostasis and “inflammatory preparedness” throughout the organism [3]. Master control mechanisms such as the autonomic nervous system exist within the living matrix, with minute shifts in the established electrochemical gradients resulting in evoked changes within cells, tissues, and organs. Understanding that the body is bioelectromagnetic is important when considering the influence of external electromagnetic radiation (EMR), which has the potential to damage or threaten the health of the body as well as the potential to heal the body [2].

Electromagnetism and biochemistry are intertwined. Nutrition can reduce radiation exposure, block tissue uptake, provide antioxidant protection, and support repair, detoxification, and immune mechanisms. This chapter describes: the diverse types and sources of EMR, electromagnetic hypersensitivity (EHS) syndrome, implications for the impact on metabolic processes, and clinical approaches to mitigate and treat the effects of adverse EMR exposure.

BACKGROUND ON ELECTROMAGNETIC RADIATION AND IRRADIATED FOOD

Exposure to EMR comes in the form of high-frequency ionizing radiation and lower frequency non-ionizing radiation. The frequency of electromagnetic energy determines its properties and physiologic effects on the human body (Figure 42.1).

IONIZING RADIATION

Ionizing radiation (IR) is a known carcinogen, and its penetrative properties contribute to cell and organ damage (Figure 42.2). Sources of ionizing radiation include background radiation (solar,



Edited by
Ingrid Kohlstadt

Advancing Medicine with Food and Nutrients

Second Edition



 **CRC Press**
Taylor & Francis Group