



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 12, December 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118

 9940 572 462

 6381 907 438

 ijirset@gmail.com

 www.ijirset.com



Brief Review of Biological Effects of Electromagnetic Pollution(RF and 5G Waves) on Humans, Animals, and Vegetation

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ABSTRACT:All devices using electrical energy emit electromagnetic fields and radiation as a side effect while performing their normal functions. This causes thermal and non-thermal harmful effects on humans, plants, animals, and devices. The effect on humans is not much different from the effects on plants or animals since they are dielectric material and 70-80% of them all consist of water. Other than that, some damages such as cancer appear after 20-30 years medically.

Health studies conducted on animals reveal that radiofrequency (RF) waves, as well as the millimeter waves used in the 5G system cause changes in the body, manifested in structural alteration, disturbance in various functions of the organism, including the nervous, cardiovascular, immune, blood and other systems. **While microwaves used in 4G cause thermal effects, millimetric waves used in 5G cause non-thermal effects only due to low wave penetration.** Based on evidence obtained from various studies carried out by the USA National Toxicology Program, the Italian Ramazzini study, and the EU Reflex study, a growing number of scientists say that electromagnetic (EM) waves are “human carcinogens”.

As is known that all processes in the human body involve electromagnetic waves. Brain activity, heartbeat, cell division, and neuronal communication always use electrical energy. The activities of hormones and enzymes are regulated electrically. Millimeter wave used in the 5G system have a weak penetrating ability and are easily absorbed by humans, animals, and trees. Therefore, 5G base stations need to be installed approximately every 10 meters. This will result in millions of new base stations in addition to the present ones and increase electromagnetic pollution and health risks by leased by a factor of 100. This study will discuss the biological effects of EM Pollution on humans, animals, and vegetation.

KEYWORDS:Thermal and non-thermal effects, RF, 5G, IoT Millimeter waves, EM Pollution

I. INTRODUCTION

The increasing use of EM devices in our life for a variety of purposes has caused growing concern about possible health hazards to human beings, damage to birds and insects, to the earth's environment in general, as well as interference produced by EM fields or radiation. Pointing out and discussing this problem is not meant to cause alarm but to demonstrate the dangers involved so that the public can decide how much risk they are willing to take. This study will focus on the sources of radiation, and the hazards caused by them [1-11].Extremely Low Frequency (ELF) fields, Radiofrequency (RF), and millimeter waves have very similar biological effects such as genetic effects, cancerogenesis, modification of cellular and molecular processes, effects on electrophysiology, behavioural changes, effects on the nervous system, alteration of the characteristics of the blood-brain barrier, modification of Calcium transport dynamics, effects on the cardiovascular system, generation of warm sensation at different parts of the body, modification of hormonal dynamics, effects on the immune system, changes in the metabolic rate, impacts on reproduction and growth, stress, etc [10,19].

EM radiation effects depend on, Frequency, Fields and power intensities, size of the victim, electrical properties of the victim, distance from sources, and duration of exposure. On April 24, 2019, American health insurance association Blue Cross Blu Shield [1] released a report titled “The Health of Millennials”, which showed a sharp decline in health in the



millennials. One of the probable reasons behind this alarming health decline from the millennial generation onward is the fact that they are the first generation exposed to EM radiation during their entire lives.

The biological effects of cell phone radiation prevent the body from repairing the damage in the DNA and reduce its disease resistance. This could profoundly affect metabolic and reproductive functions. According to the Swedish oncologist Lennart Hardell, studies with surveys conducted on several thousand cell phone users have “proven that high-frequency electromagnetic radiation increases the risk of brain tumours” [4,6-9,12-27].

II. BRIEF SUMMARY OF STUDIES ON BIOLOGICAL EFFECTS OF RF RADIATION

1) It was announced by WHO / IARC that the radiation emitted by RF Areas and therefore by cell phones and base stations were included in category 2B (Possibly Carcinogenic) on the cancer-causing list, with a press release no.208 on 31 May 2011. [21,22]. The warning associated with the ELF range of the electromagnetic spectrum has been classified by WHO already by 2001.

2) Standard values are the values determined by the International Non-ionizing Radiation Protection Committee (ICNIRP), which is accepted by the World Health Organization (WHO) [11]. Information obtained from lifeless, dead phantom models is used as a basis for the standard. Such a standard cannot protect living people! There are standards prepared for adult men and there are no special standards for women, the elderly, and children. Standards are to protect against short-term damages considering the current knowledge. Even if the measured values are below the standards, nothing can be said about the long-term effects. It is unscientific to claim that these standards will protect people.

3) According to the news in TIME magazine on 24.2.2003: The study by Prof. L. Salford from Lund University of Sweden concluded that:

- * Even at intensity levels 1000 times below the standard, neurons (brain cells) die after 2 hours of exposure.
- * Cell phone EM radiation relaxes the blood-brain barrier of mice and allows harmful substances to enter the brain.
- * Cell phone harms nearby people even if they don't use the phone themselves (“passive usage”)

4) Some of the "non-thermal" effects of non-ionizing radiation that are not taken into account in the ICNIRP standard include leakage of the Blood Brain Barrier, death of neurons and damage in brain cells, Calcium flux attenuation, heart rhythm disturbance and cardiac arrest, formation of malignant and non-malignant brain tumours, damage to and death of sperm cells, effects on growth, defective birth and infertility, acoustic neuroma, dementia, leukemia and lymphoma, permanent genetic effects passed on to future generations[22-33].

5) The EU REFLEX Research Report published in 2004 was made in 12 institutes of 7 EU countries with a 3 million Euro fund. According to this study, radiation in the frequency region used by mobile phones and base stations can cause DNA breaks and gene changes.

6) In the Bio initiative Report the first published in the USA in 2007 [34], the biological effects of mobile phone frequencies and EM fields on different frequencies and the insufficiency of standards have been revealed as a result of research and the non-thermal effects of a new understanding in the world have brought to the agenda. According to the report of the Bio Initiative working group, which was newly published in 2012 and prepared by 29 authors from 10 countries, since 2007, the radiation in EM fields and radio frequencies has increased significantly. The report examined more than 1800 new studies (between 2006-2011).

Some important results from this report can be summarized as follows;

Professor at Orebro University, Sweden. Lennart Hardell MD, “Epidemiological evidence has said that radio-frequency radiation should be classified as carcinogenic in humans, and current ICNIRP, FCC / IEE standards cannot adequately protect the population. The Blood Brain Barrier suffers under 1000 times the limits set by the USA and ICNIRP. The usage of wireless devices such as mobile phones, and laptops by pregnant women, alter the brain development of the fetus. This issue is linked to hyperactivity, learning, and behavioural disorders in studies on animals and humans. The use of mobile phones and wireless laptops in standby mode can cause damage to the genetic material as shown in the



studies. Certainly, exposure to radiation even at very low-intensity levels of electromagnetic fields and radio frequencies will have biological effects. Biological effects begin from the first minutes of exposure, whatever the source, Cell Phone, base station, WIFI, etc.

7) Dr. George Carlo, a researcher working for US Cell phone companies, presented in his book [3] some important findings about mobile as follows: Even at sub-standard SAR values;

- * Cell phone usage doubles the risk of brain cancer
- * Acoustic neuroma formation can emerge in cell phone users from 6 years of usage onward.
- * Evidence of genetic damage due to exposure to mobile phones has been found in human blood.

8) Although cell phones emit only low levels of radiation, they affect the electrically charged chemical substances that carry messages in the human brain and nerve cells. Electromagnetic fields cause movement, work, and structural changes in molecules, cells, and tissues [5,12].

9) The cell phone user book of Motorola, the inventor of the mobile phone, contains the following information added in October 2010. All the works mentioned in Motorola's book are more than 10 years old.

- * "Use earphones". Keep your mobile phone away from your body, especially the belly of pregnant women and young people.
- * A few animal studies have shown in laboratory animals that RF can accelerate the development of cancer even at low levels. In one study, the mouse exposed to RF changed genetically and developed 2 times more tendency for some kind of cancer formation than the non-exposed mouse.
- * Considering 20 types of tumors separately, a connection with the use of mobile phones and rare glioma, neuroepithelium tumors have been found.
- * Changes have been observed in cells after exposure to cell phone radiation.
- * Some people who use cell phones have been diagnosed with brain cancer.
- * Tumors are more likely to occur on the used side of the cell phone head.
- * Make long calls with a wired phone or make calls with a mobile phone only if no wired phone is available.

10) Cell phones are the most hazardous among all radiation sources because of the following reasons:

- * They are used extensively by almost everybody, including children. More than 6 billion people around the world use it 24 hours a day.
- * They are kept very close to the human body, particularly to the brain.
- * There is no other radiation source the usage time of which has been increasing day by day.
- * The body has time to repair the damages caused by radiation-generating devices that are used for short durations, the body can compensate for possible damages. However, when the mobile phone is used for long durations and very often the body is not given enough time to repair the damages.
- * Damages caused by RF radiation are permanent and cumulative.
- * Cell phones can be potentially more harmful than smoking. Not everybody smokes, but nowadays almost everyone, from young to old, uses cell phones. However, there is only very limited research (if at all) on the effects of cell phone radiation, for example, on the genesis of liver cancer. This is mainly because of the conflict of interest between the Telecom industry and all other sectors benefitting from the widespread wireless communication. This situation manifests itself as a lack of funding and even active suppression of research on the impacts of electromagnetic waves on living beings. Therefore, such topics can mostly be published only in popular magazines rather than in scientific journals. In the 13.1.2015 issue of FORBES magazine, an article was published on the fact that exposure to Wi-Fi is more dangerous, especially to children than it is thought [12,14,15].

11) The Italian Constitutional Court has ruled that long-term use of cell phones causes brain tumor risk and cancer. According to the report of Interference Technology magazine in 2005, Vatican Radio officials were asked to pay 10 days in prison for polluting the atmosphere with very strong electromagnetic waves and they were asked to compensate for the damage they caused. (<https://www.reuters.com/article/us-italy-phones-idCABRE8910V320121019>).



12) A demonstration of how serious risks electromagnetic pollution constitute is the fact that prevent the accidental firing of intercontinental missiles, the USA and the Soviet Union have decided to build a very special red telephone line between their presidents that is not affected by EM pollution.

13) There are various reasons why children are more easily affected by RF fields from mobile phones than adults. Children typically spend a longer time with their mobile phones. Children are physiologically more severely affected by the RF fields because their nervous and peripheral systems are still under development, and because their brain tissues have higher water and ion concentrations than adults such that they are more RF-conductive. Due to these reasons, the results of RF studies on adults do not applicable to children [14-15,23,25,27]. According to some researchers [2], the increasing violence in society has some correlation with the increase of EM fields in the environment at various frequencies.

14) Proofs of long-time effects of EM radiation on human beings have been presented for the first time in 2010 in Dr. Devra Davis's book "Disconnect" [20].

15) A very extensive study has been conducted by researchers for more than ten years on behalf of the US Department of Health, the results of which were published in November 2018. Within the realm of this study, scientists from the "National Toxicology Program" made nearly 7,000 rats and mice subject to life-long mobile phone radiation exposure for 9 hours per day. To the surprise of the researchers, the outcomes demonstrated not only damage in the DNA strands of the brain cells of irradiated mice, but also significantly more malignant tumors on the nerve cells of the heart muscle in irradiated male rats as compared to their non-irradiated conspecifics. The number of brain tumors was found to be 3% higher than in the control group.

16) The Italian Ramazzini Institute announced on 22.3.2018 that they have found the same results as in the study carried out on behalf of the US Ministry of Health.

III. BIOLOGICAL EFFECTS OF MOBILE 5G COMMUNICATION

The EM waves used in 5G are in the 20-60 GHz frequency range and are called millimetric waves because their wavelengths are around 1-10 mm. One of the most important drawbacks of millimetric waves is that they cannot easily pass-through buildings or obstacles, and are easily absorbed by plants and rain, etc. Therefore, 5G base stations have a shorter propagation range than the lower generation communication systems. This implies that the 5G cellular network needs to use smaller cells and install base stations more densely. Due to their small size, these base stations can be easily mounted on lighting poles or the roofs of buildings[22,33,40]. Since 5G is newly developed, the human species, as well as the whole planet, will be exposed to millimeter waves at such a scale for the first time. The health effects of 5G will be non-thermal because the millimetric waves radiated by 5G systems do not sufficiently penetrate the body to cause thermal effects. Let us remember that the EM standards are prepared only for thermal effects. Since a SAR value above 10 GHz is meaningless, evaluations are based on power density, alone.

Current smartphones emit a maximum of 2 Watts and normally operate at less than 1 Watts of power. On the other hand, a 5G phone contains dozens of tiny antennas, all working together to track and aim at a narrowly focused beam radiated by the nearest cell tower. The US Federal Communications Commission (FCC) has adopted rules permitting the effective power of those beams to be as much as 20 Watts, that is, ten times more powerful than the levels permitted for current phones.

Just like in the present-day experimental applications, each 5G base station will contain hundreds or thousands of antennas emitting multiple laser-like beams simultaneously at all cell phones and user devices in its service area. This technology is called "multiple input multiple outputs" (MIMO). FCC rules permit the effective radiated power of a 5G base station beam to be as much as 30,000 Watts per 100 MHz of spectrum (or equivalently 300,000 Watts per GHz of the spectrum), which is tens to hundreds of times more powerful than permitted for the current base stations. Imagine 20-Watt FCC standard power passing through the human body! To prevent this, 5G phones place metal shielding between the faceplate on one side and the antenna and circuits on the other side.

Think of an operational microwave oven and what it does to a bowl of water: it boils the water by loosening the connections between the water molecules. But a 60 GHz wave, which is within the frequency spectrum of 5G, takes it one step further by exciting the oxygen bonds within the water molecules at their resonance frequency and eventually



breaking them. This has severe implications for all living beings with a respiratory system. So, 5G not only distorts the original structure of water, which constitutes 60-65% of the human body, but its 60 GHz component polarizes and radically alters the oxygen, which has a most critical role in our organism. Now that the system is active in Bath / UK, breathing difficulties, heart palpitations, and confused thinking are already being reported, just like in Wuhan, China.

A 2019 European Parliament Report notes:

- * “The 5G radio emission fields are quite different to those of previous generations because of their complex beam-formed transmissions in both directions. Although fields are highly focused by beams, they vary rapidly with time and movement and so are unpredictable.” Because of this, the report concludes that “It is not possible to accurately simulate or measure 5G emissions in the real world.”
- * 5G will massively increase the exposure to radio frequency (RF) radiation in addition to the radiation from the presently existing 2G, 3G, and 4G telecommunication networks. RF radiation has been proven harmful to humans and the environment. The deployment of 5G constitutes an experiment on humanity and the environment that is defined as a crime under international law.
- * The planned density of radio frequency transmitters is impossible to envisage. It is estimated that, in addition to millions of new 5G base stations on Earth and 20,000 new satellites in space, 200 billion of transmitting objects will be part of the Internet of Things (IoT). [13]

If the telecommunications industry’s plans for 5G come to fruition, no person, no animal, no bird, no insect, and no plant on Earth will be able to avoid full-time exposure, to levels of radiation that are tens to hundreds of times greater than what exists today, without any possibility of escape anywhere on the planet. These plans for 5G threaten to provoke severe and irreversible effects on humans and permanent damage to all the Earth’s ecosystems.

There are at least five companies are proposing to provide 5G from space with a combination of 20,000 satellites in low- and medium-earth orbit that will blanket the Earth with powerful, focused, steerable beams. Although the amount of satellite-emitted energy that will reach the ground will be less than that emitted from ground-based antennas, the former will irradiate regions of Earth not reached by other transmitters and will be added on top of the ground-based 5G transmissions from billions of IoT devices. Even more importantly, the satellites will be located in Earth’s magnetosphere, which exerts a significant influence on the electrical properties of the atmosphere. The alteration of Earth’s electromagnetic environment may constitute an even greater threat to life than the radiation from ground-based antennas.

The Earth, the ionosphere, and the lower atmosphere form the global electric circuit in which we live. It is well established that the biological rhythms of living beings (as has been shown for humans, birds, hamsters, and spiders) are controlled by Earth’s natural electromagnetic environment and that the well-being of all organisms depends on the stability of this environment, including the electrical properties of the atmosphere. Ionospheric disturbances can alter blood pressure and melatonin and cause “cancer, reproductive, cardiac and neurological disease, and death” [2,16,18-19].

Some effects of 5G frequencies that do not exist at the other frequencies:

- * Betzalal and his colleagues [Betzalal et al. 2018] have shown that there exists a coil-like structure on the surface of the skin, which behaves like a receiver antenna in 5G and THz bands. Exposure to millimeter waves increases the Specific Absorption Rate (SAR) of the sweat glands on the skin. This alters perspiration and causes stress.
- * Le Quement [Le Quement 2012] has shown that millimeter waves used by 5G affect the genes.
- * Feldman and his colleagues [Feldman et al. 2008] have shown that human skin behaves at smaller millimeters of wavelengths like an array of helical antennas.
- * The power of the base station is shared by the connected customers at any given time. When fewer customers are connected, much more power will be directed to each customer. Consequently, for example, people connected to 5G at midnight (when there are fewer customers) will be exposed to much higher powers.
- * When electromagnetic waves enter the body, they typically force electrical charges to move and thus induce electrical currents. But when small pulses from phased array antennas enter the body, moving charges start acting like antennas and re-radiate the pulses, thus sending the radiation even deeper into the body. These re-



emitted waves are called Brillouin precursors. They are important when the power or phase of the wave changes rapidly, as is the case in 5G. Therefore, the claim that millimetric waves cannot enter the body because their wavelengths are very small is wrong.

- * There are more than 400 nuclear power plants all over the world, providing 17% of the electricity needed worldwide. In Australia and England, scientists have made social research about how much energy will be needed for 5G and IoT. The actual energy and data cost of IoT is still not clear. According to a study, the greenhouse emissions (approximately 2% of all emissions) produced by data servers are as high as those generated by the whole aircraft industry. The electricity demand for servers will significantly increase in the future. Requirements such as heating, and cooling systems and backup power systems will increase the need for power. According to one estimate, by 2020, the number of devices connected to the system will reach 30-50 billion, thus increasing the demand for electricity approximately by 20%. This means at least 400 new nuclear power plants.
- * The particles in clouds in the atmosphere have sizes close to the wavelengths of millimeter waves, which induce these particle electrical charges and lead to the formation of artificial clouds. This phenomenon disturbs and disrupts the natural dynamics.
- * Dr. Ben-Diarrhea from the Hebrew University of Israel says that the sweat ducts act like an array of helical antennas at millimeter wavelengths. This means people become more conductive.
- * The foundation cost of the 5G / IoT market is estimated at 7 trillion USD.
- * Modern EM weapons use millimeter frequencies.
- * While there are now around 3 thousand satellites in space, 20,000 low-orbit satellites for 5G will expose even the smallest area of the Earth to radiation. A typical communication satellite needs 1-1.5 kWatts for operation. We can easily calculate the power above us.
- * 5G will not only take the current mobile system to a much higher level but also control machines, devices, and objects (IoT), as well as human-to-human communication. 5G is a unified platform and does much more than 4G.
- * 5G threatens weather prediction: According to a recent paper in the journal NATURE [20,30ref], widespread 5G coverage will prevent satellites from detecting changes a water vapor, which is used by meteorologists to predict weather changes and storms [15,22,24].

Important information about 5G and small cells:

- * The overall radiation that will be emitted from millions of small cells will result in a huge amount.
- * The millimeter waves have a propagation range of 3-100 meters, requiring the base stations to be launched much more densely than conventional mobile communication bases.
- * According to the estimation of the FCC of the USA, millions of small cells and base stations will be built in front of homes, streetlights, bus stops, and trash boxes.
- * 5G will bring an additional mobile radiation load to our environment, while the existing 2G, 3G, and 4G mobile communication systems will be maintained.
- * The 5G antennas and base stations are arbitrarily installed on lighting poles, buildings, etc., and can hinder the services of municipalities and utility providers. Non-governmental organizations and citizens are not given the right to criticize and object to 5G. Objections of owners and inhabitants of buildings and facilities where antennas and base stations are installed are taken into consideration, while automatic approval is given to companies.
- * The petitions by scientists from all over the world to the United Nations and the European Parliament remained futile.
- * Cumulatively, everyday exposures pose a very severe public health risk. Research has established the risk of cancer increases, altering brain development and damages to sperm. 5G mobile technology has not been tested for its long-term effects. Children are more at risk than adults in this regard.
- * A safe alternative to most 5G applications is available. Instead of antennas in front of their homes, houses in many parts of the world are connected to fiber-optic cables. Fiber-optic cabling is safe, very fast, secure, reliable, more private, has high capacity, produces no radiation and health effects, is more energy efficient than 5G, does not require antennas and cell towers, and causes no harm to the environment.



Why 5G cell towers are more dangerous than older cell towers:

- * 5G emits “ultra-high frequencies”. The higher the frequency, the shorter the wavelength, which means that more waves hit our bodies in the same amount of time. Previous cellular generations emit waves at 1-6 GHz frequency range. 5G cell towers may emit frequencies as high as 300 GHz.
- * 5G technology requires “ultra-high intensity”. Since the shorter length millimeter waves (MMV) used in 5G do not travel as far (or through objects), the current number of cell towers cannot provide a reliable cell signal. It is estimated that for 5G a mini cell tower will be needed every 2 to 8 houses. All these will be combined greatly increase our Radiation exposure.
- * In RF radiation, the closeness of the source to the body is a more important factor than the power level of the radiation. Radiation dissipates with distance. In other words, exposure to a low-powered source right next to someone is more dangerous than exposure to a more powerful source at a long distance.
- * The threat also increases with the duration of the exposure.
- * 5G is the worst in both ways: we will have more sources around us, and closer to us.
- * Effects on cell growth rate and affect the normal activities of humans.
- * Increase in the resistance of bacteria to antibiotics.
- * Effects on the health of plants. Plants are more affected by 5G than humans.
- * Effects on the atmosphere.
- * Effects on the ecosystem. Extinction of insects, bees, birds, etc.
- * 5G is potentially the most dangerous among known cellular communication technologies because it uses pulsed waves, as opposed to the continuous waves used by earlier technologies.
- * It is planned to send 5G millimeter radiation with high penetration capacity from space. In this case, no radiation-free place will be left on earth where one can live safely.
- * 5G radiation damages the sperm.

5G and the Internet of Things:

The internet of Things (IoT) consists of communication networks and computer systems that connect objects to each other. Many experts say these are time bombs in terms of security because malevolent people who may hack this system can take control of a house, a building, or even a whole city.

With the arrival of inexpensive IoT devices, with the connection of billions of new machines, sensors, security cameras, devices and even our brains, attacks on systems will increase and cyber-security will be almost impossible. Hundreds of new IoT products such as driverless cars, coffee machines, dresses, smart meters, smart toothbrushes, and smart diapers are being added to the list every day. These devices emit environmentally harmful electromagnetic radiation all day every day. The global Risks Report 2018 has declared IOT as the world's third largest risk after cybersecurity and natural disasters/extreme weather conditions. The report warns the world. With the growth of the IoT market, attacks on targets will increase exponentially. Attacks before IoT involve the stealing of personal information such as credit cards etc. With IoT, attacks can become much more effective and destructive. For example, they can crash aircraft, stop, or run cars, change election results, manipulate medical devices, etc. There are endless possibilities for murdering from a distance. IoT allows attacks that could not have been imagined before.

On 9/13/2017, 180 scientists and doctors from 35 countries requested 5G technologies be stopped, especially until they are proven to be safe for children and pregnant women. 5G and IoT will greatly increase the electromagnetic fields around us. The USA's national toxicology program has proven the correlation between brain cancer and mobile phone. Millions of scientific studies since 1960 have demonstrated the harmful effects of low and high frequencies. Nature cannot protect itself against pulsed and modulated radiation that changes billions of times per second.

The harms that 5G and IoT can cause to humans, the environment, and the whole world can be summarized as follows:

- * Health damages
- * Loss of privacy of the private life
- * An astronomical amount of electronic communication
- * Cyber-security risks
- * Disturbance of natural dynamics
- * Boost in the energy requirement
- * Materials needed for IoT and 5G technologies will require new resources and can give rise to international problems
- * The emergence of ethical problems associated with overconnectivity and loss of privacy



- * Huge increase in electromagnetic pollution.
- * Severe alterations in the grey matter of the brain and brain functioning due to increased usage of 5G communication devices.
- * Increased addiction to online activities
- * Loss of real-life social skills due to the boosted presence in virtual reality
- * Increased suicide rates as a result of increased isolation due to mobile communication technologies

IV. I-PADS AND WI-FI

Recently, iPads have become adults' best friends and children's caregivers. iPads with Wi-Fi, and 3G have 5 antennas. The perimeter of the LCD screen is also a large antenna. Safety and health information is written very small and can only be read with a magnifying glass. According to the report of the journal literature, exposure to radiation emitted by a standard laptop computer using Wi-Fi for 4 hours a day damages the DNA of human sperm.

Most parents keep their children away from toxic chemicals such as mercury, exhaust fumes, and pesticides. This is because they are one of the 250 substances on the World Health Organization's list of 'cancer-causing substances' (Class 2B Carcinogens). However, the same list includes radio and electromagnetic waves (RF/EMF) emitted by TV, radio, microwave oven, mobile phone, and wireless internet connections (Wi-Fi); but they don't get that much attention. However, according to the latest research, it is imperative that we protect children from these waves as much as possible.

According to the latest scientific study published in the journal, for people who are exposed to electromagnetic waves for a long time; The risk of cancer increases, the sperm count decreases, and the door is opened for other diseases. The duration of exposure to electromagnetic waves to turn into cancer is calculated as 20-30 years or more. It is stated that cigarettes were once said to be 'harmless' and years later, awareness was raised with the explosion of cancer, and it is stated that a similar situation may occur 30-40 years from now on electromagnetic waves. "Is Wi-Fi slowly killing us?" According to Mark Gibbs, who wrote the article, when we look back 50-100 years later, we may be surprised how mobile phones and wireless internet caused the biggest health crisis in human history.

The striking results of the research are as follows:

- * Children's brain tissues are much thinner than adults. Therefore, electromagnetic waves can penetrate much further. This can adversely affect brain tissues and cells.
- * The period when the risk is highest is when the baby is still in the womb. It is strictly not recommended to use a Wi-Fi connection in the home of pregnant women and to always keep the mobile phone close.
- * Cell phones carried close to the chest increase the risk of breast cancer.

Wi-Fi, Bluetooth, and wireless devices expose students to RFR. Wireless RFR is an invisible environmental exposure in classrooms. Wi-Fi modems are generally used at 2 GHz. This means 2 billion processing power per second. These disrupt the DNA balance of the body. The frequency of the new devices went up to 5 GHz. The human body cannot handle this electromagnetic movement. That's why it should be banned in schools in the first place. The main disadvantage of these devices is that they cause DNA damage. If you exceed the values that the human body can handle because I will share big data, you are preparing an environment for biological damage. Developed countries, especially the USA, realized this danger and began to ban the use of wireless modems in schools and similar institutions.

V. EFFECTS OF EM FIELDS ON LIVING BEINGS IN NATURE AND SOME RESULTS OF THE PRELIMINARY STUDY

Hundreds of scientific articles in the literature describe the physical and biochemical effects of EMAs on living organisms [37-47].

On the environment, the European Environmental Protection Agency (EEA), Europe's highest scientific authority, warned of the possibility of environmental disaster due to the increase in EMA density. In addition, European REFLEX project coordinator Prof. FrausAdlofer informed the public about the damage of the high rate of UMTS (3G) to genes.

Producing artificial EMAs, technology products made by humans are replacing the EMAs that control the world's natural millions of years of biological development.



The natural areas of the world are very important. Local geographic coordinates, time of day, intensity, and direction are found from the variation of the electric field. Each place has a unique recognition pattern along with other physical information. The sensitive receptors of animals use magnetic field information for location and travel. Animals and plants are exposed to areas 10 times more than natural areas. EMFs, on which animals depend on for positioning and traveling in the Earth's atmosphere, are affected by much stronger and constantly changing artificial fields, causing birds to be unable to return to their living environment. The most important of these are honeybees.

The mysterious disappearance of bees continues, which, according to Newsweek, fertilizes 87 of 115 essential crops. The British beekeepers' association is of the opinion that not a single bee may remain in the UK for up to 10 years. Einstein said, "If the bees disappear, the human will have only 4 years to live. If there is no bee, there would be no fertilization, no plants, animals, and humans."

Some effects of EMF in the natural areas of the world are listed:

1. Magnetic Bacteria living at the bottom of the ocean use the earth's magnetic field to navigate. Magnetite crystals (Fe_3O_4) form a chain like a compass needle in its body, creating a magnetic moment opposite to the thermal motion of water molecules.
2. Fish use the earth's magnetic field to find their way. As the shark navigates through the earth's magnetic field, a variable electric field is created in its body. The value of the field is a function of the direction of change, the direction of the magnetic field. The local physical water current also creates a perceptible electric field. The sensitivity of the electric field sensor organ is very high.
3. The ant builds its mounds (mounds) of several meters in the north-south direction. The feeding activities of ants depend on natural constant and variable magnetic fields.
4. Bees benefit from locating and communicating by using the magnetic field of the earth and its daily changes. They also obtain information about the weather thanks to the variable magnetic field.
5. Whales sense the earth's magnetic field and use it to find direction and place while swimming.
6. The messenger pigeons determine the direction and location by being affected by the magnetic field levels of the nanotesla level.
7. a natural mechanism in some animals can act like a compass.
8. It has been reported in the literature that the change in the magnetic field of the earth affects sleep, cardiac rhythm, hormone production, vitamin, and iron level in blood serum, skin temperature, and field of vision.

The Extinction of Bees and Birds

85% of about 200000 various plants in the world are pollinated by bees. We can give fruits, agricultural products, vegetables, and all kinds of plants as examples. According to the New York Times, the benefits of bees in Central Europe are estimated to be 4 billion Euros per year and 15 billion dollars in the USA. The estimates were made by Cornell University in New York. The annual worldwide honey production is 25000 tons. Therefore, if the bees go, humanity will be badly affected.

The places where the most bees disappear are the northern states of the USA and the Canadian border. In the 2007 news of New Scientist magazine, a bee colony loss of 25-50% was written. According to the news, 50-90% of the bees have disappeared in the last 6 months. It was also broadcast on CNN that the remaining colonies were too weak to produce honey. High losses (between 25-80%) were also reported in Germany, Switzerland, Europe, Spain, Poland, and New Zealand. The bees should be in or around the hive even if they have died from extreme weakness or disease. However, this phenomenon has not been found in studies. The sensitivity of each breed of bird to radiation differs. This makes the interpretation of the research very difficult.

Electromagnetic waves of low-pulse waves are used in the literature, especially in mobile communication. There are thousands of publications supporting the concern of Radiation (Electromagnetic Radiation EMR) harms living creatures. The most important reason is that 900 and 1800 MHz pulsed waves cause interference in the nervous systems of living creatures.

In November 1999, Scottish local planners reported that sparrows were reappearing 2 years after they kept EMR transmitters out of schools and residential areas. (Paul Kelbie 10/11/2001, The Independent).



Alfonso Balmori in his study conducted by Martine in February 2003, attributed the decrease in pigeons, sparrows, and similar birds on the main streets in the city centers in England to the pollution of the regions by EMR and the placement of base stations near their nests. In addition, the insects that the birds ate were also killed by radiation, causing the birds' food to decrease. Migratory birds, on the other hand, have been found dead in cities due to EMR effects that cause loss of navigational features.

Even in summer, it was observed that spiders, flies, and insects were not around the base station, and this was confirmed by the engineers responsible there. High voltage lines and AM/FM radio towers cause bees and insects to decline and birds, especially newborns, cannot find food.

Some bird varieties have also disappeared. Sparrows are greatly reduced in England and some European countries. A study conducted in Valladolid, Spain, between 10.2002 and 5.2006, found high statistical confidence that the disappearance of sparrows was due to the EMAs in the environment exceeding a certain value. In another study conducted in Belgium, the relationship between 900 and 1800 MHz bands and disappearing birds has been proven. It has been found that storks that previously nested within a radius of 200 m from the base station did not breed, but in settlements further away (more than 300 meters), storks did not have a problem. The field level at 200 m is 2.36 ± 0.82 V/m and at 300 m 0.53 ± 0.82 V/m. As a result of the research, EM fields emitted by base stations harm the reproduction of white storks.

Direction Finding Mechanism:

Biological magnetite material, which acts as a compass for finding direction, is found in all animals. It is also in the brains of people; but the magnetite concentration is higher in birds, bees, fish, and whales.

5 million magnetite crystals per gram in many areas of our brain, and there are 100 million in the cerebral cortex. Magnetic EMAs have an important role in transport and cell connection channels in the body. There is a high probability of interference with oscillations.

Magnetic compasses of bees and birds are effective in magnetic fields at certain levels. These levels are compatible with the earth's magnetic field strength; however, the interaction of artificial areas with these areas and the effect of animals have bad results.

In one experiment, it was observed that the bees exposed to DECT frequencies for 5 days did not return. The sensitivity limit of bees to changes in the earth's magnetic field is 26 nT at the most. If the magnetic field of the ground is increased 10 times, the colony cluster moves away from the hive.

EMAs assist in the orientation and navigation of birds and are used to locate a single animal in a flock. However, these features can be eliminated by artificial low-frequency and MHz-level interference produced by the EMA. Birds and bees can be disoriented by the combined effects of artificial and natural areas.

1. Effects of EMAs on Trees and Plants of Fields:

EMAs are changing our world in ways we cannot understand. The effect of microwaves on plants, soil, and water is like the effect of a microwave oven; but it acts more slowly. Microwaves have the effect of breaking down the structures of all organic compounds. Today, all life cycles of nature have been badly affected by artificial EM radiation. Deforestation causes increased flooding and landslides. Affecting the internal structure of the soil has a detrimental effect on the growth of young forests. Earthworks cannot be the same as before. The relationship with natural EM fields is the basis of all cycles in nature. This condition is damaged by radiation from artificial sources [1].

Microwaves cause cell destruction, thermal effects, and detrimental effects by mixing normal cell processes. Trees and other biological systems today are exposed to billions more than the natural value of EM radiation. If we think of the tree as a wood-producing factory, the surrounding radar devices or antenna towers confuse the work of the factory. The tree cannot protect or heal itself.

All biological information systems use EM waves at frequencies from zero Hz to the frequency of light. Since light regulates the biological rhythm, it is necessary for all living things. With recent studies, we understand a little better how information is transmitted through the human nervous system. In recent years, plants have been found to have a nervous system similar to that of humans. A group of scientists from the University of Heidelberg, Germany, have found the substance "turgorines", which sends chemically labile signals like neuron transmitters in the human brain. Mission; water distribution in the plant, preparation for sleep, and curling the leaves up or down according to the sun. [one]



Here are a few examples of the effects of EM fields on Nature:

- 1) The effects on wheat production in the vicinity of the high-voltage line between Austria and the Czech Republic were investigated for 5 years. The result was a 7% decrease in wheat production. (Soya et al 2003)
- 2) Cytogenetic changes were observed in wheat exposed to microwaves. They concluded that the effects were non-thermal effects (Pavel et.al1998).
- 3) In Latvia, Skrunda, the radial growth of pine trees decreased in the area that received radiation from the radio station. Before the radio, there was no such problem (Balodis, 1996).
- 4) Kiernan's 1995 study found that some trees near the antenna tower in Michigan were growing very quickly. Each type of plant reacts differently, but this event shows that EMAs have a significant impact on the forest.
- 5) In Quruhia, New Zealand, trees that received the main beam of the radio station's antenna died. When the roots of trees are in the nearby river or water, they are more affected.
- 6) During the Cold War, many radars were placed on the border between France and Germany for espionage purposes. Damage has been observed on forest surfaces exposed to microwaves. Similar events were seen in forests exposed to radar beams in Canada and Switzerland. Today, trees and biological systems are exposed to high microwave radiation billion times more than natural areas. Microwaves cause the cell membranes of the trees to resonate and interrupt water circulation. They upset the balance of electrically charged particles.
- 7) In Valladolid, Spain, trees in the main beam were pale, weak, slowed in growth, and susceptible to diseases.

EM waves distort and damage the shape of the cell nucleus. This has been proven by experimental studies. Cell nuclei naturally mutate. The changes made by the effects of EM waves are available in the literature.

Damages to plants:

Electromagnetic waves have negative effects on plants. In 1981, the negative effects of electromagnetic fields on plants were detected for the first time. Not only forest botanists but also engineers with experience and knowledge in electrical and telecommunications engineering, electrophysiology, and ferromagnetism began to look for reasons; because in a short time at that time severe wildfires occurred, often occurring simultaneously and far from sources of pollution.

From the observed changes in conductivity as a function of frequency, field strength, and season, they concluded the electrical properties of the membranes. Landscape architect and tree and nature conservationist Aloys Bernatzky observed and documented the damage of the donor side, disturbances in the growth of coniferous trees above the crown, and the juxtaposition of damaged and protected healthy trees exposed to high frequency. It has been observed that the trees standing in front of the building are dying due to being irradiated with electromagnetic waves by the emitter on the right. In the shade of the house, the tree can grow without damage; however, branches that grow outside the protected area by the house die. Apart from the ones mentioned above, there were other experiments at that time that proved the damage of electromagnetic fields to plants.

Beginning in 2004, a rapid spread of unexplained tree damage in almost all species has been reported in Europe: Brown discoloration of leaves, premature defoliation, ridges on the stem, very rapid growth, tearing and shedding of bark, discoloration of bark, severe fungus, thorns and moss proliferation, fruit change, low durability. In the following years, the first observations that electromagnetic fields damage plants could be proven again by many different scientists. Meanwhile, although the effect of electromagnetic fields on flora is a known problem, little action has been taken to protect plants.

VI. CONCLUSIONS

It has been experimentally found that while bees are flying, they can detect the weak induction of the very low frequency (ELF) magnetic field fluctuations in the magnetic field against the earth's magnetic field. The levels of the artificial fields in the ELF and RF regions are much higher than the threshold values of the sensitivity of the bees to detect magnetic field changes. When the main beam of the antennas of mobile phones reaches over trees and bushes, the surfaces become dry, pale, and unhealthy, growth decreases, and the risk of catching diseases increases. Frequent deaths were observed among ornamental animals such as birds and mice, which were close to the base station.



Carl Blackman (1990), areas that are too weak to create a temperature effect remove calcium ions from the cell. The power of systems such as mobile telephones, radio, TV, and satellite communication is much higher than natural radiation. Produces signals for biological communication through the functional oscillations of our molecules. These signals are used for the internal organization of the body without interference from the outside. DNA and all enzymes can perform all their functions only under natural conditions.

A study was conducted in 6 residential areas of Brussels to investigate the long-term effects of low-intensity EM radiation of 900 and 1800 MHz mobile telephone (GSM) base stations on sparrow breeding time. High places, where the radiation levels emitted by base stations are high, are important for research as they choose roof spaces as sparrows' breeding places and nests. In the study, it was found that the level of EM radiation affects the number, reproduction, and behaviour of sparrows. This is a non-thermal effect since it is at EMAs that are too low to have a thermal effect. This study also showed that the EMR emitted by the long-term low-intensity (pulse) GSM base station also significantly affects birds and insects. Based on the scientific findings summarized above, the following conclusions can be drawn about 5G and the technologies that it will facilitate:

- * Humanity, as well as the whole planet, is being made subject to an unprecedented experiment without any right to object or to resist.
- * Legal decisions on these technologies are trusted to those who benefit from them, while the victims are deprived of their most natural right to protect their lives.
- * The public is systematically misinformed about the related issues, and those who dare to criticize are presented as narrow-minded and paranoid people.
- * These technologies are presented as the one-and-only direction of "progress", while safer and environmentally friendly alternatives are being hidden or diluted.
- * If no, immediate precautions are taken, 5G can trigger a disastrous chain reaction in all aspects of life and lead humanity to a dystopic future.

ACKNOWLEDGMENTS

The authors thank Y. Denizhan for her help.

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