

To: Brookfield Board of Selectmen

The Scientific Evidence To Support Restrictions on Cell Towers On Or Near School Property

February 11, 2024

Dear Brookfield Board of Selectmen,

Today, we are writing to advise you of the scientific grounds for policy to mitigate student, teacher and staff exposures to the non-ionizing electromagnetic field emissions from cell towers. Wireless radio frequency (RF) electromagnetic (EMF) radiation is a relatively new and rapidly increasing environmental exposure in classrooms today. Significant sources include cell towers, cell boosters and 5G/4G networks on and near school property.

Extensive published scientific evidence indicates that radiofrequency radiation at levels compliant with federal government limits can cause [cancer](#), [increased oxidative stress](#), [genetic damage](#), structural and functional changes of the [reproductive system](#), [memory deficits](#), [behavioral problems](#), and [neurological impacts](#). We consider radiofrequency radiation (RFR) to be a human carcinogen based on the [current body](#) of evidence. Many of these effects could be irreversible with grave consequences for our children's future.

The European Parliament Study Service "[Health Impact of 5G](#)" report concludes that the electromagnetic field emission frequencies of 450 to 6,000 MHz "are probably carcinogenic for humans, in particular related to gliomas and acoustic neuromas" and in regards to reproductive developmental effects "these frequencies clearly affect male fertility and possibly female fertility too. They may have possible adverse effects on the development of embryos, fetuses and newborns."

The [American Academy of Pediatrics states](#) children are more vulnerable to wireless radiation. Children receive [proportionately higher exposures](#) into their more sensitive brain tissue and organs.

We recommend policies to reduce human exposure to RF, especially in schools. We note that schools are now taking measures to reduce cell tower radiation from nearby cell towers.

- The Desert Sage High School in central Tucson, a public charter school has [installed shielding along the wall facing the cell tower](#) to reduce the cell tower radiation exposures in the classroom.
- The Los Angeles Unified School District has [3 resolutions opposing cell towers on school property](#) and the District Office of Health and Safety developed a "[cautionary level](#)" for radiofrequency radiation [10,000 times lower than FCC regulations](#) because, "it

is believed that a more conservative level is necessary to protect children, who represent a potentially vulnerable and sensitive population."

- Several school boards have passed resolutions or taken actions to restrict cell towers at schools including the [Temecula Valley Unified \(CA\)](#), [Palo Alto Unified \(CA\)](#), and [West Linn-Wilsonville Oregon](#).
- The [EPA School Siting Guidelines](#) lists exposure to electromagnetic fields and the fall distance as "potential hazards" from cell towers. The EPA guidelines [recommend schools "identify and evaluate cell towers within ~200 feet of prospective school locations."](#)

Compliance with outdated 1996 FCC limits does not ensure safety.

Schools cannot rely on U.S. government Federal Communications Commission (FCC) limits for cell tower radiation exposure to protect the health of students and staff. These regulations are outdated and unchanged since 1996. As the [EPA has repeatedly stated](#), U.S. FCC RF radiation limits do not address risk from long-term, nonthermal exposures. They are designed to protect against injury from short term high intensity exposure only. Yet, cell towers create nonstop full body exposure to radiofrequency (RF) for hours a day.

The lack of protection for long term effects in FCC regulations is why the [New Hampshire State Commission on 5G](#) and [Santa Clara Medical Association](#) recommend restricting cell towers near schools.

On August 13, 2021, the United States Court of Appeals for the District of Columbia Circuit [ruled in our case](#) against the FCC that its refusal to update its human exposure limits (which includes cell tower emissions) was "arbitrary and capricious." One of the most important aspects of the court decision was that the court found the FCC did not adequately explain why it ignored scientific evidence on impacts from long term wireless radiation exposure, especially in regards to children. The court ordered the FCC to examine the record evidence regarding long term exposure to children. So far, the FCC has not responded. Thus, this landmark [ruling](#) highlights how no federal health agency has reviewed the full body of current research to ensure current safety standards are protective.

In 2000, the [Ecolog Institute Report](#), commissioned by T-Mobile, reviewed the existing science (over two decades ago) and recommended a wireless radiation exposure limit 1000 times lower than the FCC's current power density limit.

The scientific research indicating serious safety issues has significantly increased. A literature review on people living near cell towers entitled ["Evidence for a health risk by RF on humans living around mobile phone base stations: From radiofrequency sickness to cancer"](#) by Balmori (2022) found associations between exposure and radiofrequency sickness, cancer and changes in biochemical parameters. We have attached this study for your review.

Studies on people living near cell antennas have found increases in molecular markers in the blood that predict cancer. [Zothansjama et al, 2017](#) evaluated effects in the human blood of individuals living near mobile phone base stations (within 80 meters) compared with healthy controls living more than 300 meters from a base station. The study measured higher RFR levels in the homes of people living in homes within 80 meters from the cell antennas (documenting the impact of increased RFR radiation from the antenna installations) and found statistically significant differences in their blood. The group living closer to the antennas had statistically significant higher frequency of micronuclei and a rise in lipid peroxidation in their blood; these changes are considered biomarkers predictive of cancer.

Please note the following scientific publications regarding cell towers and cell phone radiation:

- In 2011, radiofrequency radiation was [classified](#) as a Class 2B possible carcinogen by the World Health Organization's International Agency for Research on Cancer. Between then and now, the published peer-reviewed scientific evidence has significantly increased. Now, many scientists are of the opinion that the weight of current peer-reviewed evidence supports the conclusion that radiofrequency radiation should be regarded as a human carcinogen ([Hardell and Carlberg 2017](#), [Peleg et al, 2018](#), [Miller et al 2018](#)).
- The U.S. National Toxicology Program \$25 million animal study on long-term exposure to radiofrequency radiation found [DNA Damage, heart damage, increased brain tumors, and increased heart tumors](#) deemed "clear evidence of cancer." Researchers with the renowned Ramazzini Institute in Italy then published [findings](#) that lab animals exposed to levels of RFR comparable to cell tower base stations' networks developed the same types of cancers as the [US National Toxicology Program](#) found in its large-scale animal study.
- An Australian [study](#) looked at RFR levels to which kindergarten children were exposed, depending on how close their school was to base stations/cell towers. Researchers equipped the children with RFR measuring devices. Researchers found that kindergartens located nearby base stations/cell towers (closer than 300 meters or approximately 330 yards) had total exposure to radiofrequency radiation (RFR or RF-EMF) more than 3 times higher than children at schools where base stations were further away than 300 meters.
- A review by [Yakymenko 2015](#) found that in 93 out of 100 studies, RFR exposure caused oxidative stress. Many well-known carcinogens (such as asbestos and arsenic) are understood to induce oxidative stress. [Schuermann et al., 2021](#) again confirmed non-ionizing radiation has oxidative effects in the majority of animal and cell studies.
- The International Association of Firefighters has officially opposed cell towers on their stations since 2004 after a [study found neurological damage](#) in firefighters with antennas on their fire station. In 2017, when 5G "small cells" were coming to California via a 5G streamlining bill (SB 649), firefighter organizations came out in strong opposition to the

bill and requested that towers not be installed on firehouses. They were successful and SB649 was [amended](#) to [exempt](#) their stations from the deployment due to their health concerns.

- A study by [Meo et al., 2019](#) of students in schools near cell towers found their higher RF exposure was associated with impacts on motor skills, memory, and attention. Examples of other health issues associated with cell towers in research studies include [neuropsychiatric problems](#), [diabetes](#), [headaches](#), [sleep problems](#), [altered hormones](#) and [genetic damage](#). Such research continues to accumulate after the 2010 landmark [review study](#) on 56 studies that reported biological effects found at very low intensities of wireless radiation, including impacts on reproduction, permeability of the blood-brain barrier, behavior, cellular changes and metabolic changes, and increases in cancer risk ([Lai and Levitt 2010](#)).
- The [International EMF Scientist Appeal](#) was submitted to the United Nations urging immediate protective policy action in light of the scientific evidence that has found adverse biological effects from electromagnetic radiation, including radiofrequency radiation, and, as of July 2023, this Appeal is signed by 259 scientists from 44 nations; these are scientists who have published peer-reviewed articles about electromagnetic fields. They state, “numerous recent scientific publications have shown that EMF affects living organisms at levels well below most international and national guidelines. Effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of the reproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being.”

Cell towers on or near school properties present serious liability issues.

A review paper by [Pearce 2020](#) titled “[Limiting liability with positioning to minimize negative health effects of cellular phone towers](#)” reviewed the “large and growing body of evidence that human exposure to RFR from cellular phone base stations causes negative health effects.” The authors recommend restricting antennas near homes and within 500 meters of schools and hospitals to protect companies from future liability.

- Insurers [rank](#) 5G and electromagnetic radiation as a “high” risk, [comparing the issue](#) to lead and asbestos. A 2019 Report by [Swiss Re Institute](#), a world leading provider of insurance, classifies 5G mobile networks as a “high”, “off-the-leash” risk stating, “Existing concerns regarding potential negative health effects from electromagnetic fields (EMF) are only likely to increase. An uptick in liability claims could be a potential long-term consequence” and “as the biological effects of EMF in general and 5G in particular are still being debated, potential claims for health impairments may come with a long latency.”
- Due to their understanding of the magnitude of this future financial risk [most insurance plans](#) have “electromagnetic field exclusions” applied as the [market standard](#). As an

example, [Portland Oregon Public School Insurance](#)⁴¹ (Pg 30) states, "Exclusions: This insurance does not apply to: Bodily injury, personal injury, advertising injury, or property damage arising directly or indirectly out of, resulting from, caused or contributed to by electromagnetic radiation, provided that such loss, cost or expense results from or is contributed to by the hazardous properties of electromagnetic radiation."

- U.S. mobile operators have been [unable to get insurance](#) to cover liabilities related to damages from long term exposure to radiofrequency emissions for over a decade.
- Wireless and non-ionizing electromagnetic radiation are defined as a type of "pollution" by wireless companies themselves. According to [pg. 10 of the Verizon Total Mobile Protection Plan](#), "Pollution" is defined as "The discharge, dispersal, seepage, migration or escape of pollutants. Pollutants means any solid, liquid, gaseous, or thermal irritant or contaminant including smoke, vapor, soot, fumes, acid, alkalis, chemicals, artificially produced electric fields, magnetic field, electromagnetic field, sound waves, microwaves, and all artificially produced ionizing or nonionizing radiation and/or waste." We found similar definitions for pollution in the product protection plans for [AT&T](#), [Sprint](#), [Verizon](#), [T-Mobile and Asuria](#).
- Wireless companies [warn their shareholders](#) of this potential future risk related to radiofrequency radiation exposure but they do not warn the users of these products, nor do they warn the people exposed to emissions from their products and infrastructure. Corporate investor [warnings](#) by companies such as [T-Mobile](#), [AT&T](#), [Verizon](#), [Vodafone](#) and [Crown Castle](#) are contained in their Annual Reports filed on Form 10-K (or Form 20-F or 40-F for foreign companies) with the Securities and Exchange Commission (SEC).

[Verizon stated in its 10-K for 2022](#) under the section "Legal and Regulatory Risks" that:

"We are subject to a substantial amount of litigation, which could require us to pay significant damages or settlements. We are subject to a substantial amount of litigation and claims in arbitration, including, but not limited to, shareholder derivative suits, patent infringement lawsuits, wage and hour class actions, contract and commercial claims, personal injury claims, property claims, environmental claims, and lawsuits relating to our advertising, sales, billing and collection practices. In addition, our wireless business also faces personal injury and wrongful death lawsuits relating to alleged health effects of wireless phones. or radio frequency transmitters. We may incur significant expenses in defending these lawsuits. In addition, we may be required to pay significant awards or settlements."

Companies clearly inform shareholders that companies may incur significant financial losses related to non-ionizing electromagnetic fields. Safety is not assured.

Please note that in several countries, governments have set policies to protect children, pregnant women and medically fragile persons by classifying areas with homes, hospitals and schools as "sensitive areas." These countries reduce exposure in "sensitive" areas and have strict oversight

and compliance measures in place. The U.S. has zero protections for children and zero RF compliance oversight programs.

Our position is that children require special protections from radiofrequency radiation and their exposures should be reduced to as low as possible. Teachers and staff should work in a healthy environment. We strongly recommend mitigating RFR exposure at schools.

EHT has been joined by other experts and organizations in writing to you and offering expertise to support the development of protective measures. Please see the attached resources with additional documentation. We are available to meet and present more about how to reduce and mitigate RF risks and answer any questions.

Thank you for your consideration and action on this important issue.

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References

Balmori, A. (2022). Evidence for a health risk by RF on humans living around mobile phone base stations: From radiofrequency sickness to cancer. *Environmental Research*, 214, 113851. <https://doi.org/10.1016/j.envres.2022.113851>

- Balmori, A. (2010). Mobile phone mast effects on common frog (*Rana temporaria*) tadpoles: The city turned into a laboratory. *Electromagnetic Biology and Medicine*, 29(1–2), 31–35.
<https://doi.org/10.3109/15368371003685363>.
- Blettner, M., Schlehofer, B., Breckenkamp, J., Kowall, B., Schmiedel, S., Reis, U., Potthoff, P., Schüz, J., & Berg-Beckhoff, G. (2009). Mobile phone base stations and adverse health effects: Phase 1 of a population-based, cross-sectional study in Germany. *Occupational and Environmental Medicine*, 66(2), 118–123. <https://doi.org/10.1136/oem.2007.037721>.
- Bortkiewicz, A., Zmysłony, M., Szyjowska, A., & Gadzicka, E. (2004). [Subjective symptoms reported by people living in the vicinity of cellular phone base stations: Review]. *Medycyna Pracy*, 55(4), 345–351. <https://pubmed.ncbi.nlm.nih.gov/15620045/>.
- Broom, K. A., Findlay, R., Addison, D. S., Goiceanu, C., & Sienkiewicz, Z. (2019). Early-Life Exposure to Pulsed LTE Radiofrequency Fields Causes Persistent Changes in Activity and Behavior in C57BL/6 J Mice. *Bioelectromagnetics*, 40(7), 498–511.
<https://doi.org/10.1002/bem.22217>
- Buchner, K., & Eger, H. D. I. (2011). Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields A Long-term Study under Real-life Conditions.
<https://www.avaate.org/IMG/pdf/Rimbach-Study-20112.pdf>.
- Carlberg, M., Hedendahl, L., Koppel, T., & Hardell, L. (2019). High ambient radiofrequency radiation in Stockholm city, Sweden. *Oncology Letters*, 17(2), 1777–1783.
<https://doi.org/10.3892/ol.2018.9789>.
- Choi, J., Min, K., Jeon, S., Kim, N., Pack, J.-K., & Song, K. (2020). Continuous Exposure to 1.7 GHz LTE Electromagnetic Fields Increases Intracellular Reactive Oxygen Species to Decrease Human Cell Proliferation and Induce Senescence. *Scientific Reports*, 10(1), 9238.
<https://doi.org/10.1038/s41598-020-65732-4>
- Dode, A. C., Leão, M. M. D., Tejo, F. de A. F., Gomes, A. C. R., Dode, D. C., Dode, M. C., Moreira, C. W., Condessa, V. A., Albinatti, C., & Caiaffa, W. T. (2011). Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *The Science of the Total Environment*, 409(19), 3649–3665.
<https://doi.org/10.1016/j.scitotenv.2011.05.051>.
- Eger, et al., The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer (2004). Umwelt·Medizin·Gesellschaft.
<http://www.tetrawatch.net/papers/naila.pdf>.

Eskander, E. F., Estefan, S. F., & Abd-Rabou, A. A. (2012). How does long term exposure to base stations and mobile phones affect human hormone profiles? *Clinical Biochemistry*, 45(1–2), 157–161. <https://doi.org/10.1016/j.clinbiochem.2011.11.006>.

Eşmekaya, M. A., Seyhan, N., & Ömeroğlu, S. (2010). Pulse modulated 900 MHz radiation induces hypothyroidism and apoptosis in thyroid cells: A light, electron microscopy and immunohistochemical study. *International Journal of Radiation Biology*, 86(12), 1106–1116. <https://doi.org/10.3109/09553002.2010.502960>.

Falcioni, L., Bua, L., Tibaldi, E., Lauriola, M., De Angelis, L., Gnudi, F., Mandrioli, D., Manservigi, M., Manservigi, F., Manzoli, I., Menghetti, I., Montella, R., Panzacchi, S., Sgargi, D., Strollo, V., Vornoli, A., & Belpoggi, F. (2018). Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission. *Environmental Research*, 165, 496–503. <https://doi.org/10.1016/j.envres.2018.01.037>

Gandhi, G., Kaur, G., & Nisar, U. (2015). A cross-sectional case control study on genetic damage in individuals residing in the vicinity of a mobile phone base station. *Electromagnetic Biology and Medicine*, 34(4), 344–354. <https://doi.org/10.3109/15368378.2014.933349>.

Gandhi, G., Naru, J., Kaur, M., & Kaur, G. (2014). DNA and Chromosomal Damage in Residents Near a Mobile Phone Base Station. *International Journal of Human Genetics*, 14(3–4), 107–118. <https://doi.org/10.1080/09723757.2014.11886234>.

Gómez-Perretta, C., Navarro, E. A., Segura, J., & Portolés, M. (2013). Subjective symptoms related to GSM radiation from mobile phone base stations: A cross-sectional study. *BMJ Open*, 3(12), e003836. <https://doi.org/10.1136/bmjopen-2013-003836>.

Hardell, L., & Koppel, T. (2022). Electromagnetic hypersensitivity close to mobile phone base stations—A case study in Stockholm, Sweden. *Reviews on Environmental Health*. <https://doi.org/10.1515/reveh-2021-0169>.

Hardell, L., Carlberg, M., Hedendahl, L. K., Koppel, T., & Ahonen, M. (2019). Environmental radiofrequency radiation at the Järntorget Square in Stockholm Old Town, Sweden in May, 2018 compared with results on brain and heart tumour risks in rats exposed to 1.8 GHz base station environmental emissions. *World Academy of Sciences Journal*, 1(1), 47–54. <https://doi.org/10.3892/wasj.2018.5>.

Hardell, L., Carlberg, M., & Hedendahl, L. K. (2018). Radiofrequency radiation from nearby base stations gives high levels in an apartment in Stockholm, Sweden: A case report. *Oncology Letters*, 15(5), 7871–7883. <https://doi.org/10.3892/ol.2018.8285>.

Hardell, L., Carlberg, M., Koppel, T., & Hedendahl, L. (2017). High radiofrequency radiation at Stockholm Old Town: An exposimeter study including the Royal Castle, Supreme Court, three major squares and the Swedish Parliament. *Molecular and Clinical Oncology*, 6(4), 462–476. <https://doi.org/10.3892/mco.2017.1180>.

Hardell, L., Koppel, T., Carlberg, M., Ahonen, M., & Hedendahl, L. (2016). Radiofrequency radiation at Stockholm Central Railway Station in Sweden and some medical aspects on public exposure to RF fields. *International Journal of Oncology*, 49(4), 1315–1324. <https://doi.org/10.3892/ijo.2016.3657>.

Hardell, L., & Sage, C. (2008). Biological effects from electromagnetic field exposure and public exposure standards. *Biomedicine & Pharmacotherapy*, 62(2), 104–109. <https://doi.org/10.1016/j.biopha.2007.12.004>.

Hecht, K., Savoley, E.N., (2007). Overloading of Towns and Cities with Radio Transmitters (Cellular Transmitter): a hazard for the human health and a disturbance of eco-ethics, IRCHET – International Research Centre of Healthy and Ecological Technology, Berlin, Germany. <https://ecfsapi.fcc.gov/file/7521097890.pdf>.

Hutter, H.-P., Moshhammer, H., Wallner, P., & Kundi, M. (2006). Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations. *Occupational and Environmental Medicine*, 63(5), 307–313. <https://doi.org/10.1136/oem.2005.020784>.

Khurana, V. G., Hardell, L., Everaert, J., Bortkiewicz, A., Carlberg, M., & Ahonen, M. (2010). Epidemiological evidence for a health risk from mobile phone base stations. *International Journal of Occupational and Environmental Health*, 16(3), 263–267. <https://doi.org/10.1179/107735210799160192>.

Koppel, T., & Hardell, L. (2022). Measurements of radiofrequency electromagnetic fields, including 5G, in the city of Columbia, SC, USA. *World Academy of Sciences Journal*, 4(3), 1–12. <https://doi.org/10.3892/wasj.2022.157>

Koppel, T., Ahonen, M., Carlberg, M., & Hardell, L. (2022). Very high radiofrequency radiation at Skeppsbron in Stockholm, Sweden from mobile phone base station antennas positioned close to pedestrians' heads. *Environmental Research*, 208, 112627. <https://doi.org/10.1016/j.envres.2021.112627>.

Koppel, T., Ahonen, M., Carlberg, M., Hedendahl, L. K., & Hardell, L. (2019). Radiofrequency radiation from nearby mobile phone base stations-a case comparison of one low and one high exposure apartment. *Oncology Letters*, 18(5), 5383–5391. <https://doi.org/10.3892/ol.2019.10899>.

Kundi, M., & Hutter, H.-P. (2009). Mobile phone base stations-Effects on wellbeing and health. *Pathophysiology: The Official Journal of the International Society for Pathophysiology*, 16(2–3), 123–135. <https://doi.org/10.1016/j.pathophys.2009.01.008>.

Levitt, B., & Lai, H. (2010). Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays. *Environmental Reviews*, 18, 369–395. <https://doi.org/10.1139/a10-903>.

López, I., Félix, N., Rivera, M., Alonso, A., & Maestú, C. (2021). What is the radiation before 5G? A correlation study between measurements in situ and in real time and epidemiological indicators in Vallecas, Madrid. *Environmental Research*, 194, 110734. <https://doi.org/10.1016/j.envres.2021.110734>.

lv, B., Chen, Z., Wu, T., Shao, Q., Yan, D., Ma, L., Lu, K., & Xie, Y. (2014). The alteration of spontaneous low frequency oscillations caused by acute electromagnetic fields exposure. *Clinical Neurophysiology*, 125(2), 277–286. <https://doi.org/10.1016/j.clinph.2013.07.018>.

Marinescu, I. E., & Poparlan, C. (2016). Assessment of GSM HF-Radiation Impact Levels within the Residential Area of Craiova City. *Procedia Environmental Sciences*, 32, 177–183. <https://doi.org/10.1016/j.proenv.2016.03.022>.

Meo, S. A., Almahmoud, M., Alsultan, Q., Alotaibi, N., Alnajashi, I., & Hajjar, W. M. (2019). Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health. *American Journal of Men's Health*, 13(1), 1557988318816914. <https://doi.org/10.1177/1557988318816914>.

Meo, S. A., Alsubaie, Y., Almubarak, Z., Almutawa, H., AlQasem, Y., & Hasanato, R. M. (2015). Association of Exposure to Radio-Frequency Electromagnetic Field Radiation (RF-EMFR) Generated by Mobile Phone Base Stations with Glycated Hemoglobin (HbA1c) and Risk of Type 2 Diabetes Mellitus. *International journal of environmental research and public health*, 12(11), 14519–14528. <https://doi.org/10.3390/ijerph121114519>.

Miller, A. B., Morgan, L. L., Udasin, I., & Davis, D. L. (2018). Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102). *Environmental Research*, 167, 673–683. <https://doi.org/10.1016/j.envres.2018.06.043>.

Navarro, E. A., Segura, J., Portolés, M., & Gómez-Perretta de Mateo, C. (2003). The Microwave Syndrome: A Preliminary Study in Spain. *Electromagnetic Biology and Medicine*, 22(2–3), 161–169. <https://doi.org/10.1081/JBC-120024625>.

Oberfeld, G., Navarro, E., Portoles, M., Maestu, C., & Gómez-Perretta, C. (2002). THE MICROWAVE SYNDROME - FURTHER ASPECTS OF A SPANISH STUDY.

https://www.researchgate.net/publication/237410769_THE_MICROWAVE_SYNDROME_-_FURTHER_ASPECTS_OF_A_SPANISH_STUDY.

Özdemir, E., Çömelekoğlu, Ü., Degirmenci, E., Bayrak, G., Yildirim, M., Ergenoglu, T., Coşkun Yılmaz, B., Korunur Engiz, B., Yalin, S., Koyuncu, D. D., & Ozbay, E. (2021). The effect of 4.5 G (LTE Advanced-Pro network) mobile phone radiation on the optic nerve. *Cutaneous and Ocular Toxicology*, 40(3), 198–206. <https://doi.org/10.1080/15569527.2021.1895825>.

Pachau, Lalrinthara & Pachau, Zaithanzauva. (2014). Study of Cell Tower Radiation and its Health Hazards on human body. *IOSR Journal of Applied Physics (IOSR-JAP)* e-ISSN: 2278-4861. Volume 6, Issue 1 Ver. 1, PP 01–06. <https://www.iosrjournals.org/iosr-jap/papers/Vol6-issue1/Version-1/A06110106.pdf>.

Pachau, Lalrinthara & Pachau, Zaithanzauva. (2016). Health Effects of Mobile Tower Radiation on Human — Case Study. *International Journal of Applied Physics and Mathematics*. 6. 72–79. [10.17706/ijapm.2016.6.2.72-79](https://doi.org/10.17706/ijapm.2016.6.2.72-79).

Pearce, J. M. (2020). Limiting liability with positioning to minimize negative health effects of cellular phone towers. *Environmental Research*, 181, 108845. <https://doi.org/10.1016/j.envres.2019.108845>.

Richter, E. D., Berman, T., & Levy, O. (2002). Brain cancer with induction periods of less than 10 years in young military radar workers. *Archives of Environmental Health*, 57(4), 270–272. <https://doi.org/10.1080/00039890209601409>.

Roda, C., & Perry, S. (2014). Mobile phone infrastructure regulation in Europe: Scientific challenges and human rights protection. *Environmental Science & Policy*, 37, 204–214. <https://doi.org/10.1016/j.envsci.2013.09.009>.

Rodrigues, N. C. P., Dode, A. C., de Noronha Andrade, M. K., O'Dwyer, G., Monteiro, D. L. M., Reis, I. N. C., Rodrigues, R. P., Frossard, V. C., & Lino, V. T. S. (2021). The Effect of Continuous Low-Intensity Exposure to Electromagnetic Fields from Radio Base Stations to Cancer Mortality in Brazil. *International Journal of Environmental Research and Public Health*, 18(3), 1229. <https://doi.org/10.3390/ijerph18031229>.

SA, M., Alsubaie, Y., Almubarak, Z., Almutawa, H., AlQasem, Y., & Hasanato, R. (2015). Association of Exposure to Radio-Frequency Electromagnetic Field Radiation (RF-EMFR) Generated by Mobile Phone Base Stations with Glycated Hemoglobin (HbA1c) and Risk of Type 2 Diabetes Mellitus. *International Journal of Environmental Research and Public Health*, 12, 14519–14528; <https://doi.org/10.3390/ijerph121114519>.

Santini, R., Santini, P., Le Ruz, P., Danze, J. M., & Seigne, M. (2003). Survey Study of People Living in the Vicinity of Cellular Phone Base Stations. *Electromagnetic Biology and Medicine*, 22(1), 41–49. <https://doi.org/10.1081/JBC-120020353>.

Santini, R., Santini, P., Danze, J. M., Le Ruz, P., & Seigne, M. (2002). Investigation on the health of people living near mobile telephone relay stations: I/Incidence according to distance and sex. *Pathologie-Biologie*, 50(6), 369–373. [https://doi.org/10.1016/s0369-8114\(02\)00311-5](https://doi.org/10.1016/s0369-8114(02)00311-5). [Article in French].

Shinjo, T. & Shinjo, A. (2014) Significant Decrease of Clinical Symptoms after Mobile Phone Base Station Removal – An Intervention Study, Tetsuharu Shinjo and Akemi Shinjo *UmweltMedizinGesellschaft*, 27(4), S. 294–301.

Souffi, S., Lameth, J., Gaucher, Q., Arnaud-Cormos, D., Lévêque, P., Edeline, J.-M., & Mallat, M. (2022). Exposure to 1800 MHz LTE electromagnetic fields under proinflammatory conditions decreases the response strength and increases the acoustic threshold of auditory cortical neurons. *Scientific Reports*, 12(1), 4063. <https://doi.org/10.1038/s41598-022-07923-9>

Vecsei, Z., Knakker, B., Juhász, P., Thuróczy, G., Trunk, A., & Hernádi, I. (2018). Short-term radiofrequency exposure from new generation mobile phones reduces EEG alpha power with no effects on cognitive performance. *Scientific Reports*, 8, 18010. <https://doi.org/10.1038/s41598-018-36353-9>

Wei, Y., Yang, J., Chen, Z., Wu, T., & Lv, B. (2019). Modulation of resting-state brain functional connectivity by exposure to acute fourth-generation long-term evolution electromagnetic field: An fMRI study. *Bioelectromagnetics*, 40(1), 42–51. <https://doi.org/10.1002/bem.22165>

Wolf, R., & Wolf, D. (2004). Increased incidence of cancer near a cell-phone transmitter station. *International Journal of Cancer*, 1(2), 123–128. [[Google Scholar](#)].

Yakymenko, I., Sidorik, E., Kyrylenko, S., & Chekhun, V. (2011). Long-term exposure to microwave radiation provokes cancer growth: Evidences from radars and mobile communication systems. *Experimental Oncology*, 33(2), 62–70. <https://pubmed.ncbi.nlm.nih.gov/21716201/>.

Yang, L., Chen, Q., Lv, B., & Wu, T. (2017). Long-Term Evolution Electromagnetic Fields Exposure Modulates the Resting State EEG on Alpha and Beta Bands. *Clinical EEG and Neuroscience*, 48(3), 168–175. <https://doi.org/10.1177/1550059416644887>.

Yu, G., Tang, Z., Chen, H., Chen, Z., Wang, L., Cao, H., Wang, G., Xing, J., Shen, H., Cheng, Q., Li, D., Wang, G., Xiang, Y., Guan, Y., Zhu, Y., Liu, Z., & Bai, Z. (2020). Long-term exposure to 4G smartphone radiofrequency electromagnetic radiation diminished male reproductive potential by directly disrupting Spock3–MMP2–BTB axis in the testes of adult rats. *Science of The Total Environment*, 698, 133860. <https://doi.org/10.1016/j.scitotenv.2019.133860>.

Zothansiam, Zosangzuali, M., Lalramdinpuii, M., & Jagetia, G. C. (2017). Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations. *Electromagnetic Biology and Medicine*, 36(3), 295–305. <https://doi.org/10.1080/15368378.2017.1350584>.