



Effects of 5G, Internet of Things, and Small Cells on Birds, Bees, Trees and Climate (Video)

Description



By [B.N. Frank](#)

Since 2017, doctors and scientists have been asking for 5G moratoriums on Earth and in space (see [1](#), [2](#)). Since 2018 there have been reports of people and animals experiencing symptoms and illnesses after it was installed (see [1](#), [2](#), [3](#), [4](#)).

American opposition to 5G and small cells ([5G and 4G](#)) continues to increase due to concerns about reduced property value (see [1](#), [2](#), [3](#), [4](#)), public safety (see [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#), [8](#)), health (see [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#), [8](#), [9](#), [10](#)), cybersecurity (see [1](#), [2](#)), privacy (see [1](#), [2](#)), and environmental risks (see [1](#), [2](#), [3](#), [4](#)). Some have described 5G deployment as a form of [“environmental racism”](#). Seems appropriate.

Thanks to [Environmental Health Trust](#) for the non-profit’s new video and webpage devoted to the environmental consequences of small cell densification, [5G and IoT technology](#).

From [Environmental Health Trust](#):

5G and Small Cell Environmental Effects: Birds, Bees Trees and Climate

Watch EHT Executive Director Theodora Scarato review the environmental effects of 5G and cell network proliferation with a focus on trees, bees and birds. In addition, she documents the increased energy consumption and climate impacts of 5g and the internet of things.

FCC limits were not developed to protect our flora or fauna. Wireless radiation “safety” limits for trees, plants, birds and bees simply do not exist. No US agency nor international authority with expertise in science, biology or safety has ever acted to review research and set safety limits for birds, bees, trees and wildlife.

References to Research Cited in the Webinar on Environmental Effects of 5G and Radiation

A [2021 research review](#) by Levitt, Lai and Manville (2021) entitled “Effects of non-ionizing electromagnetic fields on flora and fauna, part 1. Rising ambient EMF levels in the environment” published in Reviews of Environmental Health found “exponential increases in nearly all environments.” The abstract states “biological effects have been seen broadly across all taxa and frequencies at vanishingly low intensities comparable to today’s ambient exposures. Broad wildlife effects have been seen on orientation and migration, food finding, reproduction, mating, nest and den building, territorial maintenance and defense, and longevity and survivorship. Cyto- and geno-toxic effects have been observed... It is time to recognize ambient EMF as a novel form of pollution and develop rules at regulatory agencies that designate air as ‘habitat’ so EMF can be regulated like other pollutants. Wildlife loss is often unseen and undocumented until tipping points are reached. Long-term chronic low-level EMF exposure standards, which do not now exist, should be set accordingly for wildlife, and environmental laws should be strictly enforced.”

This [paper](#), which is one of a three part series that addresses wireless frequencies now in use as well as the complex signals that will be deployed for 5G stating “serious concerns regarding phasing because it interacts with living cells in extremely complex ways that have nothing to do with traditional thermal thresholds. The wave form itself is the biologically active component” and “The reason that phasing may have a unique biological impact is because very fast peak radiation pulses generate bursts of energy that can give rise to what are called Sommerfeld and Brillouin precursors in living cells that can in turn penetrate and disperse much deeper than traditional models predict. Sommerfeld/Brillouin precursors most notably form with ultra wideband exposures as proposed with 5G.”

The [Department of Interior wrote a letter in 2014](#) detailing several published studies showing impacts

of wireless radiofrequency radiation (RFR) to birds stated that, “There is a growing level of anecdotal evidence linking effects of non-thermal, non-ionizing electromagnetic radiation from communication towers on nesting and roosting wild birds and other wildlife.... And “However, the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today. “ and “third-party peer-reviewed studies need to be conducted in the U.S. to begin examining the effects from radiation on migratory birds and other trust species.”

Albert Manville, former senior biologist of the US Fish and Wildlife Service wrote [“A BRIEFING MEMORANDUM: What We Know, Can Infer, and Don’t Yet Know about Impacts from Thermal and Non-thermal Non-ionizing Radiation to Birds and Other Wildlife”](#) published in Wildlife and Habitat Conservation Solutions, 2014 on the impacts of RFR to birds and bees. India dropped their RF limits by 1/10th after a [research review](#) documented the majority of research studies found adverse effects to wildlife, birds and bees.

Regarding bees and pollinators, the study [“Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz”](#) published in Scientific Reports found insects (including the Western honeybee) can absorb the higher frequencies that will be used in the 4G/5G rollout with absorbed power increases up to 370%. The researchers warn, “This could lead to changes in insect behaviour, physiology, and morphology over time....” Research also has found impacts to bees from wireless frequencies including inducing artificial worker piping ([Favre, 2011](#)), disrupting navigation abilities ([Sainudeen, 2011](#); [Kimmel et al., 2007](#)) reducing colony strength ([Harst et al., 2006](#)) impacts to honey bee physiology ([2011](#)).

Research on trees has found trees are harmed by RFR. A 9 year field study [Waldmann-Selsam, C., et al 2016](#), found significant impacts to trees near cell antennas and an investigation of 700 trees found [damage starts on the side of the tree with highest RF](#). A review on impacts to plants entitled [“Weak radiofrequency radiation exposure from mobile phone radiation on plants”](#) concluded, “a substantial amount of the studies on RF-EMFs from mobile phones show physiological and/or morphological effects.” A study on aspen seedlings found ambient RF in a Colorado setting were high enough to cause necrotic lesions on the leaves, decrease leader length and leaf area, and suppress fall anthocyanin production ([Haggarty 2010](#)).

Small Cell Regulations That Attempt to Protect Trees

Washington DC: Small [cells cannot be located](#) within 15 feet of a tree and trees can’t be pruned for the benefit of small cell infrastructure.

Small Cell Guidelines ([LINK page 14 on trees](#))

- standalone poles shall not be placed within fifteen feet (15?) of any open tree planting space, No street tree shall be removed, or have its protected root zone impacted, to accommodate installation of Small Cell infrastructure
- No tree shall be pruned related to the installation or functioning of small cell infrastructure.

Denver Colorado: ([LINK](#)) A minimum of 15-25 feet of separation to the tree trunk such that no proposed disturbance shall occur within 5 feet of the critical root zone (drip-line) of any tree...

Thornton Colorado: ([LINK](#)) Poles shall not be located... "less than 15 feet or within the drip line of an existing tree, whichever is greater in order to protect the health of the tree."

Reports and White Papers: 5G, Energy Consumption, and Climate

Data Center Forum White Paper, (2020) [Environmentally Sustainable 5G Deployment](https://www.datacenter-forum.com/datacenter-forum/5g-will-prompt-energy-consumption-to-grow-by-staggering-160-in-10-years)
<https://www.datacenter-forum.com/datacenter-forum/5g-will-prompt-energy-consumption-to-grow-by-staggering-160-in-10-years>

German Environment Agency and German Federal Environment Ministry (2020) ["Fibre optic video transmission is nearly 50 times more efficient than UMTS"](https://www.umweltbundesamt.de/en/press/pressinformation/video-streaming-data-transmission-technology)
<https://www.umweltbundesamt.de/en/press/pressinformation/video-streaming-data-transmission-technology>

High Council for the Climate Report (2020) ["Controlling the carbon impact of 5G"](https://www.hautconseilclimat.fr/publications/maitriser-limpact-carbone-de-la-5g/)
<https://www.hautconseilclimat.fr/publications/maitriser-limpact-carbone-de-la-5g/>

Huawei (2020) [5G Power: Creating a green grid that slashes costs, emissions & energy use](https://www.huawei.com/us/publications/communicate/89/5g-power-green-grid-slashes-costs-emissions-energy-use),
<https://www.huawei.com/us/publications/communicate/89/5g-power-green-grid-slashes-costs-emissions-energy-use>

Mills, Mark P., National Mining Association / American Coalition for Clean Coal Electricity (2013), ["The Cloud Begins with Coal – Big Data, Big Networks, Big Infrastructure, and Big Power. An overview of the electricity used by the global digital ecosystem."](https://www.tech-pundit.com/wp-content/uploads/2013/07/Cloud_Begins_With_Coal.pdf)
https://www.tech-pundit.com/wp-content/uploads/2013/07/Cloud_Begins_With_Coal.pdf

National Resources Defense Council, 2014 ["Data Center Efficiency Assessment"](https://www.nrdc.org/sites/default/files/data-center-efficiency-assessment-IP.pdf)
<https://www.nrdc.org/sites/default/files/data-center-efficiency-assessment-IP.pdf>

Shehabi et al., Berkeley Laboratory (2016) ["United States Data Center Energy Usage Report"](https://eta.lbl.gov/publications/united-states-data-center-energy)
<https://eta.lbl.gov/publications/united-states-data-center-energy> PDF

The Center for Energy Efficient Telecommunications (2013) ["The Power of Wireless Cloud: An analysis of the energy consumption of wireless cloud"](https://www.cesc.kth.se/polopoly_fs/1.647732.1600689929!/ceet_white_paper_wireless_cloud_v2%20(1).),
[https://www.cesc.kth.se/polopoly_fs/1.647732.1600689929!/ceet_white_paper_wireless_cloud_v2%20\(1\).](https://www.cesc.kth.se/polopoly_fs/1.647732.1600689929!/ceet_white_paper_wireless_cloud_v2%20(1).)

The Shift Project (2019) ["LEAN ICT: TOWARDS DIGITAL SOBRIETY": OUR NEW REPORT ON THE ENVIRONMENTAL IMPACT OF ICT"](https://theshiftproject.org/en/article/lean-ict-our-new-report/), PDF Summary <https://theshiftproject.org/en/article/lean-ict-our-new-report/>

Vertiv 5G (2019) [Telco Industry Hopes and Fears FROM ENERGY COSTS TO EDGE COMPUTING TRANSFORMATION](https://www.vertiv.com/globalassets/documents/white-papers/451-research-paper/10648_advisory_bw_vertiv_266274_0.pdf) https://www.vertiv.com/globalassets/documents/white-papers/451-research-paper/10648_advisory_bw_vertiv_266274_0.pdf

Citations on 5G, Energy Consumption, and Climate

Andrae, A.S.G.; Edler, T. [On Global Electricity Usage of Communication Technology: Trends to 2030 Challenges](#) 2015, 6, 117-157. <https://doi.org/10.3390/challe6010117>

Baliga, Jayant, Ayre, Robert, Hinton, Kerry, Tucker, Rodney S. "[Energy Consumption in Wired and Wireless Access Networks](#) in IEEE Communications Magazine, vol. 49, no. 6, pp. 70-77, June 2011, doi: 10.1109/MCOM.2011.5783987.

Belkhir, Lotfi and Elmeligi, Ahmed. [Assessing ICT global emissions footprint: Trends to 2040 & recommendations](#), Journal of Cleaner Production, Volume 177, 2018, Pages 448-463, ISSN 0959-6526, <https://doi.org/10.1016/j.jclepro.2017.12.239>.

Corcoran, Peter and Andrae, Anders. (2013).[Emerging Trends in Electricity Consumption for Consumer ICT](#), Global Forecasting of ICT footprints, https://aran.library.nuigalway.ie/bitstream/handle/10379/3563/CA_MainArticle14_all-v02.pdf?sequence=4

Li, C., Zhang, J., and Letaief, K. B. [Energy Efficiency Analysis of Small Cell Networks](#)," 2013 IEEE International Conference on Communications (ICC), 2013, pp. 4404-4408, doi: 10.1109/ICC.2013.6655259.

Morley, Janine, Widdicks, Kelly, Hazas, Mike. "[Digitalisation, energy and data demand: The impact of Internet traffic on overall and peak electricity consumption](#)" Energy Research & Social Science, Volume 38, 2018, Pages 128-137, ISSN 2214-6296, <https://doi.org/10.1016/j.erss.2018.01.018>.

Shehabi, Arman, Walker, Ben , Masanet Eric. (2014) "[The energy and greenhouse-gas implications of internet video streaming in the United States](#)" Environmental Research Letters <https://doi.org/10.1088/1748-9326/9/5/054007>

Sikdar, B. "[A study of the environmental impact of wired and wireless local area network access](#)," in IEEE Transactions on Consumer Electronics, vol. 59, no. 1, pp. 85-92, February 2013, doi: 10.1109/TCE.2013.6490245.

Xiaohu Ge, Jing Yang, Gharavi, Hamid. [Energy Efficiency Challenges of 5G Small Cell Networks](#). IEEE Commun Mag. 2017 May;55(5):184-191. doi: 10.1109/MCOM.2017.1600788. Epub 2017 May 12. PMID: 28757670; PMCID: PMC5528873.

Studies on Health Effects of Wireless

Adams, Jessica A., Tamara S. Galloway, Debapriya Mondal, Sandro C. Esteves and Fiona Mathews. "Effect of mobile telephones on sperm quality: A systematic review and meta-analysis." *Environment International* 70 (September 2014): 106-112. <https://doi.org/10.1016/j.envint.2014.04.015>.

Aldad, Tamir S., Geliang Gan, Xiao-Bing Gao, and Hugh S. Taylor. "Fetal Radiofrequency Radiation Exposure From 800-1900 Mhz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice." *Scientific Reports* 2, no. 312 (2012). [10.1038/srep00312](https://doi.org/10.1038/srep00312).

Asl, Jafar Fatahi, Bagher Larijani, Mehrnoosh Zakerkish, Fakher Rahim, Kiarash Shirbandi, and Rasoul Akbari. "The possible global hazard of cell phone radiation on thyroid cells and hormones: a systematic review of evidence." *Environmental Science and Pollution Research* 26, no. 18 (June 2019): 18017-18031. [10.1007/s11356-019-05096-z](https://doi.org/10.1007/s11356-019-05096-z).

Atasoy, Halil I., Mehmet Y. Gunal, Pinar Atasoy, Serenay Elgun, and Guler Bugdayci. "Immunohistopathologic Demonstration of Deleterious Effects on Growing Rat Testes of Radiofrequency Waves Emitted from Conventional Wi-Fi Devices." *Journal of Pediatric Urology* 9, no. 2 (April 2013): 223–229. [10.1016/j.jpuro.2012.02.015](https://doi.org/10.1016/j.jpuro.2012.02.015).

Avendaño, Conrado, Ariela Mata, César A. Sanchez Sarmiento, and Gustavo F. Doncel. "Use of Laptop Computers Connected to Internet through Wi-Fi Decreases Human Sperm Motility and Increases Sperm DNA Fragmentation." *Fertility and Sterility* 97, no. 1 (January 2012): 39-45. [10.1016/j.fertnstert.2011.10.012](https://doi.org/10.1016/j.fertnstert.2011.10.012).

Bandara, Priyanka, and David O. Carpenter. "Planetary electromagnetic pollution: it is time to assess its impact." *The Lancet Planetary Health* 2, no. 12 (December 2018): 512-514. [https://doi.org/10.1016/S2542-5196\(18\)30221-3](https://doi.org/10.1016/S2542-5196(18)30221-3).

Bandara, Priyanka, Damian Wojcik, Don Maisch, Susan Pockett, Julie Mcredden, Murray May, Victor Leach, Steve Weller, Robin Kelly, and Tracy Chandler. "Serious Safety Concerns about 5G Wireless Deployment in Australia and New Zealand." *Radiation Protection In Australasia* 37, no. 1 (April 2020): 47-54. https://www.researchgate.net/publication/342085409_Serious_Safety_Concerns_about_5G_Wireless_De

Bas, O., E. Odaci, H. Mollaoglu, K. Uçok, and S. Kaplan. "Chronic prenatal exposure to the 900 megahertz electromagnetic field induces pyramidal cell loss in the hippocampus of newborn rats." *Toxicology and Industrial Health* 25, no. 6 (July 2009): 377–384. [10.1177/0748233709106442](https://doi.org/10.1177/0748233709106442).

Belpomme, Dominique, Lennart Hardell, Igor Belyaev, Ernesto Burgio, and David O. Carpenter. "Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective." *Environmental Pollution* 242, part A (November 2018): 643-658. [10.1016/j.envpol.2018.07.019](https://doi.org/10.1016/j.envpol.2018.07.019).

Byun, Yoon-Hwan, Mina Ha, Ho-Jang Kwon, Yun-Chul Hong, Jong-Han Leem, Joon Sakong, Su Young Kim, et al. "Mobile Phone Use, Blood Lead Levels, and Attention Deficit Hyperactivity Symptoms in Children: A Longitudinal Study." *PLOS One* 8, no. 3 (March 2013). <https://doi.org/10.1371/journal.pone.0059742>.

Cardis, E., B.K. Armstrong, J.D. Bowman, G.G. Giles, M. Hours, D. Krewski, M. McBride, et al. "Risk of Brain Tumours in Relation to Estimated RF Dose from Mobile Phones: Results from Five Interphone Countries." *Occupational and Environmental Medicine* 68, no. 9 (June 2011): 631-640. <https://oem.bmj.com/content/68/9/631>

Carlberg, Michael, and Lennart Hardell. "Comments on the U.S. National Toxicology Program technical reports on toxicology and carcinogenesis study in rats exposed to whole-body radiofrequency radiation at 900 MHz and in mice exposed to whole-body radiofrequency radiation at 1,900 MHz." *International Journal of Oncology* 54, no. 1 (January 2019): 111-127. [10.3892/ijo.2018.4606](https://doi.org/10.3892/ijo.2018.4606).

Carlberg, Michael, and Lennart Hardell. "Evaluation of Mobile Phone and Cordless Phone Use and Glioma Risk Using the Bradford Hill Viewpoints from 1965 on Association or Causation." *BioMed Research International* 2017 (March 2017). <https://doi.org/10.1155/2017/9218486>.

Carlberg, Michael, and Lennart Hardell. "Decreased Survival of Glioma Patients with Astrocytoma Grade IV (Glioblastoma Multiforme) Associated with Long-Term Use of Mobile and Cordless Phones." *International Journal of Environmental Research and Public Health* 11, no. 10 (October 2014): 10790-10805. <https://doi.org/10.3390/ijerph111010790>.

Carlberg, Michael, and Lennart Hardell. "Mobile phone and cordless phone use and the risk for glioma—Analysis of pooled case-control studies in Sweden, 1997–2003 and 2007–2009."

Pathophysiology 22, no. 1 (2014): 1-13. <https://doi.org/10.1016/j.pathophys.2014.10.001>.

Clegg, Frank M., Margaret Sears, Margaret Friesen, Theodora Scarato, Rob Metzinger, Cindy Lee Russell, Alex Stadtner, and Anthony B. Miller. "Building science and radiofrequency Radiation: What makes smart and healthy buildings." *Building and Environment* 176 (June 2020). <https://doi.org/10.1016/j.buildenv.2019.106324>.

Coureau, Gaëlle, Ghislaine Bouvier, Pierre Lebailly, Pascale Fabbro-Peray, Anne Gruber, Karen Leffondre, Jean-Sebastien Guillamo, et al. "Mobile Phone Use and Brain Tumours in the CERENAT Case-Control Study." *Occupational and Environmental Medicine* 71, no. 7 (July 2014): 514-522. [10.1136/oemed-2013-101754](https://doi.org/10.1136/oemed-2013-101754).

Falcioni, L., L. Bua, E. Tibaldi, M. Lauriola, L. De Angelis, F. Gnudi, D. Mandrioli, et al. "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 (August 2018): 496-503. <https://doi.org/10.1016/j.envres.2018.01.037>.

Fernández C., A.A. de Salles, M.E. Sears, R.D. Morris, and D.L. Davis. "Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality." *Environmental Research* 167 (November 2018): 694-699. <https://doi.org/10.1016/j.envres.2018.05.013>.

Foerster Milena, Thielens Arno, Joseph Wout, Eeftens Marloes, and Röösl Martin. "A Prospective Cohort Study of Adolescents' Memory Performance and Individual Brain Dose of Microwave Radiation from Wireless Communication." *Environmental Health Perspectives* 126, no. 7 (July 2018): <https://doi.org/10.1289/EHP2427>.

Halgamuge Malka N., Devra Davis, and Efstratios Skafidas. "A meta-analysis of in vitro exposures to weak radiofrequency radiation exposure from mobile phones (1990–2015)." *Environmental Research*

184 (May 2020). <https://doi.org/10.1016/j.envres.2020.109227>.

IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. *Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields: IARC Monographs on the Evaluation of Carcinogenic Risks to Humans/World Health Organization, International Agency for Research on Cancer Volume 102*. IARC Publications. <https://publications.iarc.fr/126>.

Kim, Ju Hwan, Da-Hyeon Yu, Yang Hoon Huh, Eun Ho Lee, Hyung-Gun Kim, and Hak Rim Kim. (2017). "Long-Term Exposure to 835 MHz RF-EMF Induces Hyperactivity, Autophagy and Demyelination in the Cortical Neurons of Mice." *Scientific Reports* 7 (January 2017). [10.1038/srep41129](https://doi.org/10.1038/srep41129).

Kocaman, Adam, Gamze Altun, Arife Ahsen Kaplan, Ömür Gülsüm Deniz, K?ymet Kübra Yurt, and Süleyman Kaplan. "Genotoxic and carcinogenic effects of non-ionizing electromagnetic fields." *Environmental Research* 163 (May 2018): 71-79. <https://doi.org/10.1016/j.envres.2018.01.034>.

Kostoff, Ronald N., and Clifford G.Y. Lau. "Combined biological and health effects of electromagnetic fields and other agents in the published literature." *Technological Forecasting and Social Change* 80, no. 7 (September 2013): 1331-1349. <https://doi.org/10.1016/j.techfore.2012.12.006>.

Lai H. [Genetic effects of non-ionizing electromagnetic fields](https://doi.org/10.1080/15368378.2021.1881866), *Electromagn Biol Med*. 2021 Feb 4:1-10. doi: 10.1080/15368378.2021.1881866. Epub ahead of print. PMID: 33539186.

Lai H., and N.P. Singh. "Acute low-intensity microwave exposure increases DNA single-strand breaks in rat brain cells." *Bioelectromagnetics* 16, no. 3 (1995): 207–210. [10.1002/bem.2250160309](https://doi.org/10.1002/bem.2250160309).

Lai H., and N.P. Singh. "Single and double-strand DNA breaks in rat brain cells after acute exposure to radiofrequency electromagnetic radiation." *International Journal of Radiation Biology* 69, no. 4 (April 1996): 513–521. [10.1080/095530096145814](https://doi.org/10.1080/095530096145814).

Lerchl, Alexander, Melanie Klose, Karen Grote, Adalbert F.X. Wilhelm, Oliver Spathmann, Thomas Fiedler, Joachim Streckert, Volkert Hansen, and Markus Clemens. "Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans." *Biochemical and Biophysical Research Communications* 459, no. 4 (April 2015): 585-590. <https://doi.org/10.1016/j.bbrc.2015.02.151>.

Leszczynski, Dariusz, Sakari Joenväärä, Jukka Reivinen, and Reetta Kuokka. "Non-thermal activation of the hsp27/p38MAPK stress pathway by mobile phone radiation in human endothelial cells: Molecular mechanism for cancer- and blood-brain barrier-related effects." *Differentiation* 70, no. 2–3 (May 2002): 120-129. [10.1046/j.1432-0436.2002.700207.x](https://doi.org/10.1046/j.1432-0436.2002.700207.x).

Luo, J., et al [Genetic susceptibility may modify the association between cell phone use and thyroid cancer: A population-based case-control study in Connecticut](https://doi.org/10.1080/10934513.2020.1818866), *Environmental Research*, Volume 182, 2020

Miller, Anthony B., L. Lloyd Morgan, Iris Udasin, and Devra Lee Davis. "Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102)." *Environmental Research* 167 (November 2018): 673-683. <https://doi.org/10.1016/j.envres.2018.06.043>.

Miller, Anthony B., Margaret E. Sears, L. Lloyd Morgan, Devra L. Davis, Lennart Hardell, Mark

Oremus, and Colin L. Soskolne. "Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices." *Frontiers in Public Health* 7 (August 2019): 223. <https://doi.org/10.3389/fpubh.2019.00223>.

Pall, Martin L. "Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects." *Journal of Cellular and Molecular Medicine* 17, no. 8 (August 2013): 958–965. [10.1111/jcmm.12088](https://doi.org/10.1111/jcmm.12088).

Pall, Martin L. "Wi-Fi is an important threat to human health." *Environmental Research* 164 (July 2018): 405-416. <https://doi.org/10.1016/j.envres.2018.01.03>.

Panagopoulos, Dimitris J., Olle Johansson, and George L. Carlo. "Polarization: A Key Difference between Man-made and Natural Electromagnetic Fields, in regard to Biological Activity." *Scientific Reports* 5 (October 2015). [10.1038/srep14914](https://doi.org/10.1038/srep14914).

Panagopoulos, Dimitris J., Olle Johansson, and George L. Carlo. "Real versus Simulated Mobile Phone Exposures in Experimental Studies." *BioMed Research International* 2015 (August 2015). [10.1155/2015/607053](https://doi.org/10.1155/2015/607053).

Gang Yu, Zhiming Bai, Chao Song, Qing Cheng, Gang Wang, Zeping Tang, Sixing Yang,

Current progress on the effect of mobile phone radiation on sperm quality: An updated systematic review and meta-analysis of human and animal studies, *Environmental Pollution*,

Volume 282, 2021, 116952, ISSN 0269-7491, <https://doi.org/10.1016/j.envpol.2021.116952>.

Russell, Cindy L. "5 G wireless telecommunications expansion: Public health and environmental implications." *Environmental Research* 165 (August 2018): 484-495. <https://doi.org/10.1016/j.envres.2018.01.016>.

Schuermann D, Mevissen M. [Manmade Electromagnetic Fields and Oxidative Stress—Biological Effects and Consequences for Health](https://doi.org/10.3390/ijms22073772). *International Journal of Molecular Sciences*. 2021; 22(7):3772. <https://doi.org/10.3390/ijms22073772>

Tang, Jun, Yuan Zhang, Liming Yang, Qianwei Chen, Liang Tan, Shilun Zuo, Hua Feng, Zhi Chen, and Gang Zhu. "Exposure to 900MHz electromagnetic fields activates the mcp-1/ERK pathway and causes blood-brain barrier damage and cognitive impairment in rats." *Brain Research* 1601 (March 2015): 92-101. [10.1016/j.brainres.2015.01.019](https://doi.org/10.1016/j.brainres.2015.01.019).

Volkow, Nora D., Dardo Tomasi, Gene-Jack Wang, Paul Vaska, Joanna S. Fowler, Frank Telang, and Christopher Wong. "Effects of cell phone radiofrequency signal exposure on brain glucose metabolism." *JAMA* 305, no. 8 (February 2011): 808–813. [10.1001/jama.2011.186](https://doi.org/10.1001/jama.2011.186).

West, John G., Nimmi S. Kapoor, Shu-Yuan Liao, June W. Chen, Lisa Bailey, and Robert A. Nagourney. "Multifocal Breast Cancer in Young Women with Prolonged Contact between Their Breasts and Their Cellular Phones." *Case Reports in Medicine* 2013 (September 2013). [10.1155/2013/354682](https://doi.org/10.1155/2013/354682).

Yakymenko, Igor, Olexandr Tsybulin, Evgeniy Sidorik, Diane Henshel, Olga Kyrylenko, and Sergiy Kyrylenko. "Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation." *Electromagnetic Biology and Medicine*

35, no. 2 (2016): 186-202. [10.3109/15368378.2015.1043557](https://doi.org/10.3109/15368378.2015.1043557).

Research Studies on Impacts to Wildlife and Trees

Balmori, Alfonso. [Electromagnetic radiation as an emerging driver factor for the decline of insects](https://doi.org/10.1016/j.scitotenv.2020). *Sci Total Environ*. Available online 28 January 2021, 144913. <https://doi.org/10.1016/j.scitotenv.2020>.

Balmori, Alfonso. "Anthropogenic radiofrequency electromagnetic fields as an emerging threat to wildlife orientation." *Science of The Total Environment* 518–519 (June 2015): 58–60. <https://doi.org/10.1016/j.scitotenv.2015.02.077>.

Balmori, Alfonso. "Electrosmog and species conservation." *Science of the Total Environment* 496 (October 2014): 314-316. [10.1016/j.scitotenv.2014.07.061](https://doi.org/10.1016/j.scitotenv.2014.07.061).

Balmori, Alfonso. "Mobile phone mast effects on common frog (*Rana temporaria*) tadpoles." *Electromagnetic Biology and Medicine* 29, no. 1-2 (June 2010): 31-35. [10.3109/15368371003685363](https://doi.org/10.3109/15368371003685363).

Balmori, Alfonso. "Possible Effects of Electromagnetic Fields from Phone Masts on a Population of White Stork (*Ciconia ciconia*)." *Electromagnetic Biology and Medicine* 24, no. 2 (July 2009): 109-119. <https://doi.org/10.1080/15368370500205472>.

Breunig, Helmut. "Tree Damage Caused By Mobile Phone Base Stations An Observation Guide." Published March 2017. https://kompetenzinitiative.com/wp-content/uploads/2019/08/2017_Observation_Guide_ENG_FINAL_RED.pdf.

You can also download the Tree Observation Guide at: [Competence Initiative for the Protection of Humanity, the Environment and Democracy](https://www.kompetenzinitiative.com/en/competence-initiative-for-the-protection-of-humanity-the-environment-and-democracy).

Chandel Shikha, Shalinda Kaur, Harminder Pal Singh, Daizy Rani Batish, and Ravinder Kumar Kohli. "Exposure to 2100 MHz electromagnetic field radiations induces reactive oxygen species generation in *Allium cepa* roots." *Journal of Microscopy and Ultrastructure* 5, no. 4 (December 2017): 225-229. <https://doi.org/10.1016/j.jmau.2017.09.001>.

Council of Europe Parliamentary Assembly. "Resolution 1815 Final Version: The potential dangers of electromagnetic fields and their effect on the environment." May 27, 2011. <http://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-en.asp?fileid=17994&>.

Cucurachi, S., W.L.M. Tamis, M.G. Vijver, W.J.G.M. Peijnenburg, J.F.B. Bolte, and G.R. de Snoo. "A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF)." *Environment International* 51 (January 2013): 116–140. <https://doi.org/10.1016/j.envint.2012.10.009>.

Division of Migratory Bird Management (DMBM), U.S. Fish & Wildlife Service. "Briefing Paper on the Need for Research into the Cumulative Impacts of Communication Towers on Migratory Birds and Other Wildlife in the United States." PDF file, 2009. <http://electromagnetichealth.org/pdf/CommTowerResearchNeedsPublicBriefing-2-409.pdf>.

Engels, Sevenja, Nils-Lasse Schneider, Nele Lefeldt, Christine Maira Hein, Manuela Zapka, Andreas Michalik, Dana Elbers, Achim Kittel, P.J. Hore, and Henrik Mouritsen. "Anthropogenic electromagnetic

noise disrupts magnetic compass orientation in a migratory bird.” *Nature* 509, no. 7500 (2014): 353–356. [10.1038/nature13290](https://doi.org/10.1038/nature13290).

Favre, Daniel. “Mobile phone induced honeybee worker piping.” *Apidologie* 42 (2011): 270-279. <https://doi.org/10.1007/s13592-011-0016-x>.

Gustavino, Bianca, Giovanni Carboni, Robert Petrillo, Giovanni Paoluzzi, Emanuele Santovetti, and Marco Rizzoni. “Exposure to 915 MHz radiation induces micronuclei in *Vicia faba* root tips.” *Mutagenesis* 31, no. 2 (March 2016): 187-192. [10.1093/mutage/gev071](https://doi.org/10.1093/mutage/gev071).

Haggerty, Katie. “Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings.” *International Journal of Forestry Research* 2010 (May 2010). <https://doi.org/10.1155/2010/836278>.

Halgamuge, Malka N. “Weak radiofrequency radiation exposure from mobile phone radiation on plants.” *Electromagnetic Biology and Medicine* 36, no. 2 (2017): 213-235. [10.1080/15368378.2016.1220389](https://doi.org/10.1080/15368378.2016.1220389).

Halgamuge, Malka N., and Devra Davis. “Lessons learned from the application of machine learning to studies on plant response to radio-frequency.” *Environmental Research* 178 (November 2019). <https://doi.org/10.1016/j.envres.2019.108634>.

Halgamuge, Malka N., See Kye Yak, and Jacob L. Eberhardt. “Reduced growth of soybean seedlings after exposure to weak microwave radiation from GSM 900 mobile phone and base station.”

Bioelectromagnetics 36, no. 2 (January 2015): 87-95. <https://doi.org/10.1002/BEM.21890>.

Kumar, Neelima R., Sonika Sangwan, and Pooja Badotra. “Exposure to cell phone radiations produces biochemical changes in worker honey bees.” *Toxicology International* 18, no. 1 (2011): 70–72. [10.4103/0971-6580.75869](https://doi.org/10.4103/0971-6580.75869).

Pall, Martin L. “Electromagnetic Fields Act Similarly in Plants as in Animals: Probable Activation of Calcium Channels via Their Voltage Sensor.” *Current Chemical Biology* 10, no. 1 (2016): 74-82. [10.2174/2212796810666160419160433](https://doi.org/10.2174/2212796810666160419160433).

Schorpp, Volker. “Tree Damage from Chronic High Frequency Exposure Mobile Telecommunications, Wi-Fi, Radar, Radio Relay Systems, Terrestrial Radio, TV etc.” Powerpoint presentation, February 2011. <https://ehtrust.org/wp-content/uploads/tree-health-radiation-Schorpp-2011-02-18.pdf>.

Shepherd, Sebastian, Georgina Hollands, Victoria C. Godley, Suleiman M. Sharkh, Chris W. Jackson, and Phillip L. Newland. “Increased aggression and reduced aversive learning in honey bees exposed to extremely low frequency electromagnetic fields.” *PLOS One* (October 2019). <https://doi.org/10.1371/journal.pone.0223614>.

Sivani, S., and D Sudarsanam. “Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem-a review.” *Biology and Medicine* 4, no. 4, (2012): 202–216. https://www.biolmedonline.com/Articles/Vol4_4_2012/Vol4_4_202-216_BM-8.pdf.

Waldmann-Selsam, Cornelia, Alfonso Balmori-de la Puente, Helmut Breunig, and Alfonso Balmori.

“Radiofrequency radiation injures trees around mobile phone base stations.” *Science of the Total Environment* 572 (December 2016): 554-69. [10.1016/j.scitotenv.2016.08.045](https://doi.org/10.1016/j.scitotenv.2016.08.045).

Advisory Papers on Regulatory Limits

Environmental Health Trust. “International Policy Briefing.” PDF file, 2018. <https://ehtrust.org/wp-content/uploads/International-Policy-Precautionary-Actions-on-Wireless-Radiation.pdf>.

Gandhi, O.M.P. “Microwave Emissions From Cell Phones Exceed Safety Limits in Europe and the U.S. When Touching the Body.” *IEEE Access* 7 (2019): 47050-47052. [10.1109/ACCESS.2019.2906017](https://doi.org/10.1109/ACCESS.2019.2906017).

Kelley, Elizabeth, Martin Blank, Henry Lai, Joel M. Moskowitz, and Magda Havas. “[International Appeal: Scientists call for protection from non-ionizing electromagnetic field exposure.](https://doi.org/10.1016/j.ejor.2015.12.001)” *European Journal of Oncology* 20, no. 3 (December 2015): 180-182. https://www.researchgate.net/publication/298533689_International_Appeal_Scientists_call_for_protection_from_non-ionizing_electromagnetic_field_exposure.

Panagopoulos. Dimitris J., Olle Johansson, and George L. Carlo. “Evaluation of specific absorption rate as a dosimetric quantity for electromagnetic fields bioeffects.” *PLOS One* 8, no. 6 (June 2013). [10.1371/journal.pone.0062663](https://doi.org/10.1371/journal.pone.0062663).

Redmayne, Mary. “International policy and advisory response regarding children’s exposure to radio frequency electromagnetic fields (RF-EMF).” *Electromagnetic Biology and Medicine* 35, no. 2 (2016): [10.3109/15368378.2015.1038832](https://doi.org/10.3109/15368378.2015.1038832).

Stam, Rianne. “Comparison of international policies on electromagnetic fields (power frequency and radiofrequency fields).” National Institute for Public Health and the Environment, RIVM. PDF file, January 2018. <https://www.rivm.nl/sites/default/files/2018-11/Comparison%20of%20international%20policies%20on%20electromagnetic%20fields%202018.pdf>.

Letter from the EPA to Environmental Health Trust

——— Forwarded message ———

From: **Veal, Lee**<[\[email protected\]](#)>

Date: Wed, Jul 8, 2020 at 11:32 AM

Subject: RE: Letter with specific Questions Related to the FDA review and to the EPA, CDC, NIOSH and FDA Jurisdiction on EMFs

To: Theodora Scarato <[\[email protected\]](#)>

Dear Director Scarato;

Thank you for sending us your questions and references regarding radiofrequency (RF) radiation. Up through the mid-1990s, EPA did study non-ionizing radiation. The Telecommunications Act of 1996

directs the Federal Communications Commission (FCC) to establish rules regarding RF exposure, while the U.S. Food and Drug Administration (FDA) sets standards for electronic devices that emit non-ionizing or ionizing radiation. EPA does not have a funded mandate for radiofrequency matters, nor do we have a dedicated subject matter expert in radiofrequency exposure. The EPA defers to other agencies possessing a defined role regarding RF. Although your questions are outside our current area of responsibilities, we have provided a response to each one as you requested.

What is your response to these scientists' statements regarding the FDA report and the call to retract it?

EPA Response: The EPA does not have a funded mandate for radiofrequency matters, has not conducted a review of the FDA report you cited or the scientists' statements, and therefore has no response to it.

To the FDA – What consultants were hired for the FDA review and report on cell phone radiation?

EPA Response: This is not an EPA matter. Please refer this question to the FDA.

What U.S. agency has reviewed the research on cell phone radiation and brain damage? I ask this because the FDA only has looked at selected studies on cancer. If your agency has not, please simply state you have not.

EPA Response: EPA's last review was in the 1984 document [Biological Effects of Radiofrequency Radiation \(EPA 600/8-83-026F\)](#). The EPA does not currently have a funded mandate for radiofrequency matters.

What U.S. agency has reviewed the research on damage to memory by cell phone radiation? If so, when and send a link to the review.

EPA Response: EPA's last review was in the 1984 document [Biological Effects of Radiofrequency Radiation \(EPA 600/8-83-026F\)](#). The EPA does not currently have a funded mandate for radiofrequency matters.

What U.S. agency has reviewed the research on damage to trees from cell phone radiation? If so, when was it issued and send a link to the review. [Note this study showing damage from long term exposure to cell antennas.](#)

EPA Response: The EPA does not have a funded mandate for radiofrequency matters, and we are not aware of any EPA reviews that have been conducted on this topic. We do not know if any other U.S. agencies have reviewed it.

What U.S. agency has reviewed the research on impacts to birds and bees? If so, when and send a link to the review. I will note the latest research showing [possible impacts to bees](#) from higher frequencies to be used in 5G.

EPA Response: The EPA does not have a funded mandate for radiofrequency matters, and we are not aware of any EPA reviews that have been conducted on this topic. We do not know if any other US agencies have reviewed it.

Opposition to 5G is worldwide. Cities and entire countries have taken action to [ban, delay, halt, and limit installation](#) AS WELL AS issue moratoriums. The [majority of scientists](#) oppose deployment. In May, [scientists submitted a letter to President Biden](#) asking him to protect the public from 5G and [other unsafe technology](#). Americans opposed to 5G may [click here](#) to sign a letter asking the Biden administration to stop deployment immediately.

By B.N. Frank

Category

1. Main
2. Opinion
3. Video

Tags

1. Hu?o
2. Informacna vojna
3. Infovojna
4. Lichtner

Date Created

August 2021