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SAFE  
TECHNOLOGY

# Health Risks of Wireless Technology

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Sept 26, 2023





# Wireless Technologies in Schools

- Wireless Radiation as a Toxicant
- Unique Vulnerabilities of Children
- Best Practices for Safe Technology in Schools



Teachers



Staff



Administration



Buses

Students



Classrooms



Janitors



# Digital Technology Risks



- Distraction/Addiction/Learning
- Psychosocial- Depression, Anxiety, ADHD, Suicide
- Commodification of Children's Data-Ed Tech
- Privacy and Security- EdTech
- Eye Health
- **Physical Health Effects of Wireless Radiation**

# Wireless Technology Biologic and Health Effects

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# Cell Tower Health Effects?

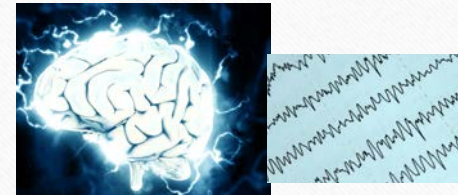


- Neurologic Symptoms: Insomnia, headaches, fatigue, memory loss, depression
- Cancer
- DNA damage
- Hormone imbalance
- Blood cell abnormalities





# What I learned About Wireless Radiation



- **Wireless radiation passes through bodies and organisms**
- **Wireless radiation is absorbed by anything containing water**
- **Wireless radiation can interfere with and harm cellular biological processes (not through heat)**
- **Wireless radiation is a mix of artificial electromagnetic frequencies**
- **We are electrical beings: Brain, Heart, Nervous and Endocrine Systems**





## I Also Learned...

- There are 7 Decades of military and basic science on harm from RFR
- Wireless radiation affects all living organisms
- Acts as an environmental and human toxicant
- Effects are cumulative
- Biological effects are seen at levels well below current guidelines. Safety guidelines are obsolete, not protective of human or environ





# Variables in EMF Exposure

- Time
- Distance
- Location
- Power Density
- Frequencies
- Modulation
- Buildings
- Trees
- Walls



Figure 8. Gervais Street: Another cell phone base station antenna close to street level and causing high exposure to pedestrians (exposure scenario illustration). Note the antenna appears undistinguishable from the utility pole and unnoticeable between the trees.

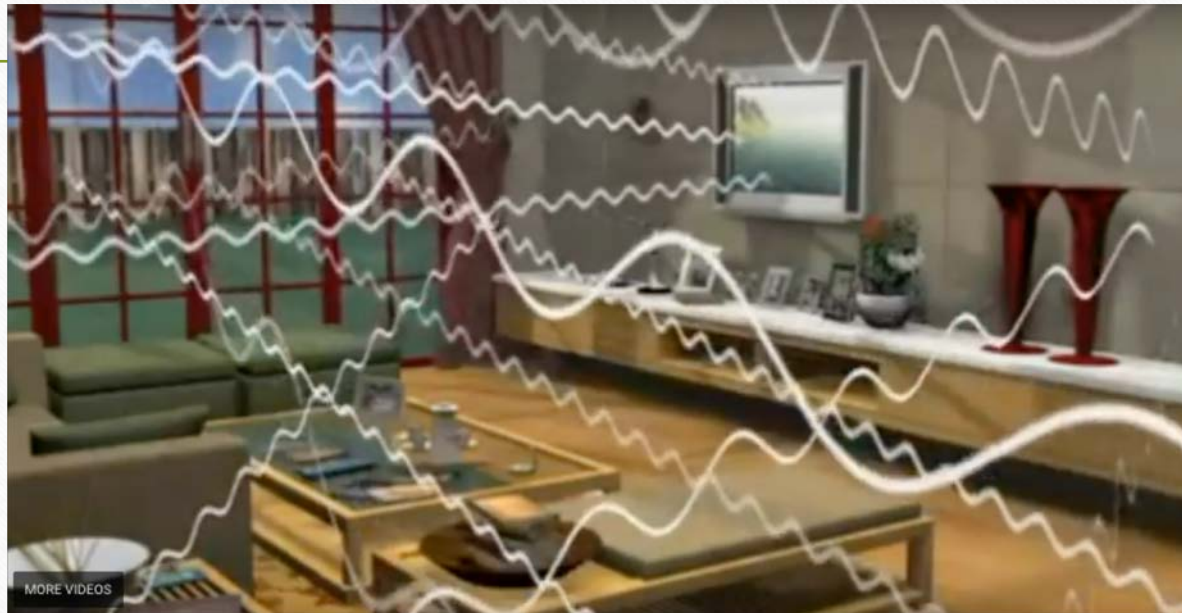
Radiofrequency radiation from nearby mobile phone base stations—a case comparison of one low and one high exposure apartment. (2022) Koppel T, Hardell L. et al





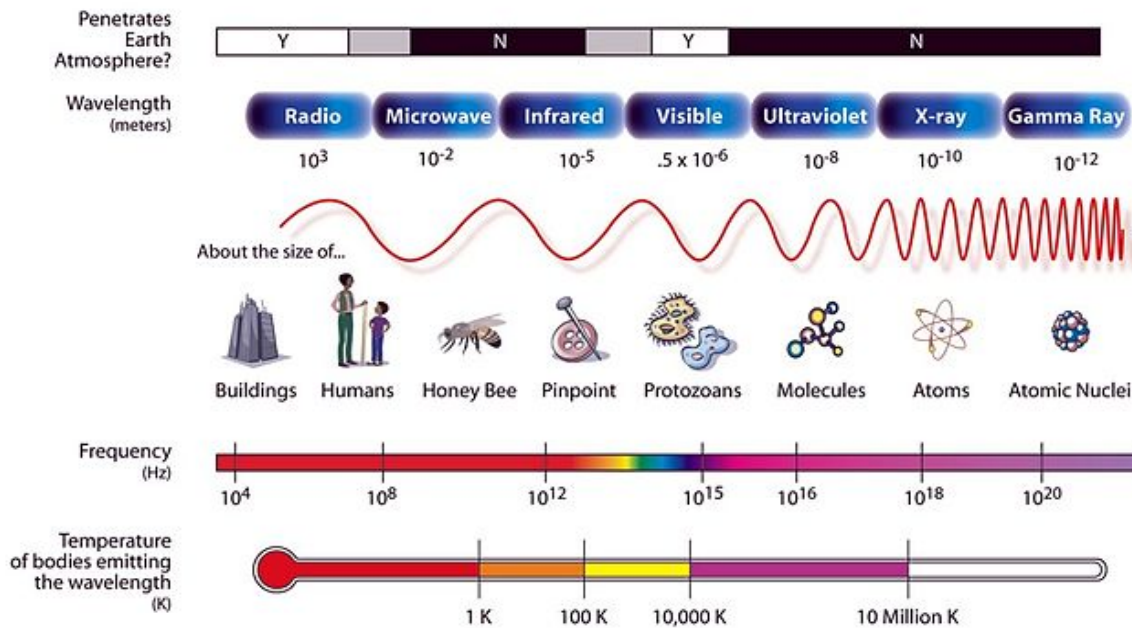


# Wireless Radiation Surrounds Us



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# THE ELECTROMAGNETIC SPECTRUM

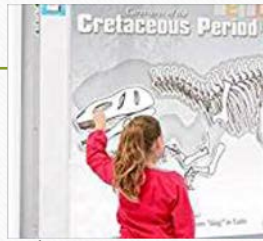


Non-Ionizing Radiation RFR EMF EMR -----^-----Ionizing Radiation

# Classroom & Home Sources of Wireless RF Radiation



- Wi Fi Routers
- Tablets/Laptops
- Wireless White Boards
- Wireless Printers
- Cell phones
- Cordless phones
- Smart meters
- Cell Towers



# Is Wireless Radiation Safe or Toxic?

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# Toxic Exposures Affects Our Health

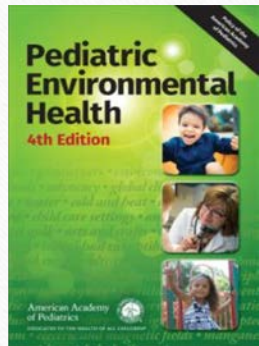


- Cumulative harm
- Synergistic toxic exposures
- Affects all organ systems
- Vulnerable populations- pregnancy, children, elderly,
- Genetics
- Nutrition

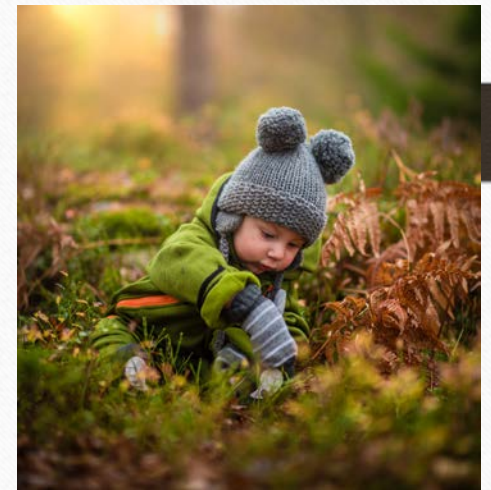


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# Children Are More Vulnerable to Toxic Exposures



- Rapid growth, cell division and differentiation
- Metabolic processes are immature until after puberty
- Critical windows during organ development
- Longer life and more accumulation of toxic injury





## The Developing Brain is the Most Vulnerable



- **Critical windows** of development-
- **Extraordinary complexity** and fragility of human brain development
- **Wide range of toxins** affect the brain
- **Decades to identify** a neurotoxin
- **Scientific Stages Toxins:** First occupational toxicity at high doses, then poisoning, then subclinical effects in children, then silent pandemic

Grandjean P and Landrigan PJ. Developmental neurotoxicity of industrial chemicals. The Lancet. 2006



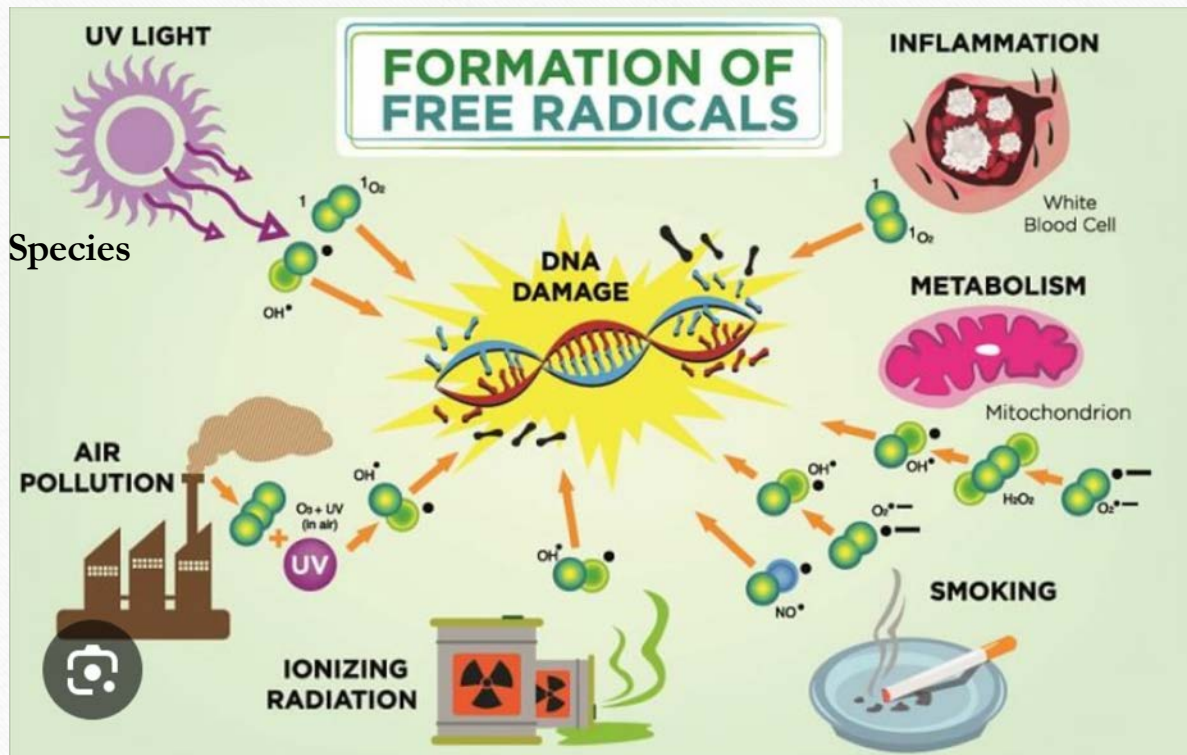
# Biologic Mechanism of Toxins

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# What is the Mechanism of Harm From Toxins?



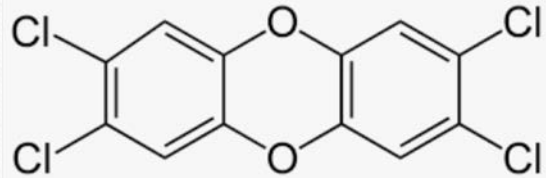
\*Reactive Oxygen Species

\*Free Radicals

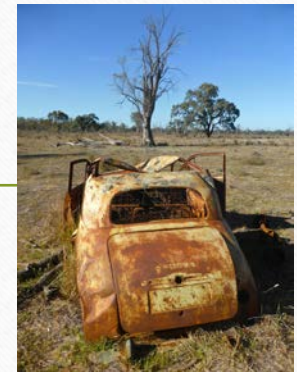
\*Oxidation

\* Oxidative Stress

# Mechanism of Action for Chemical Toxicity: Oxidation (ROS)

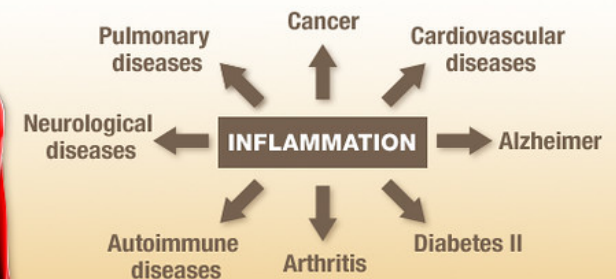


- **DDT** creates **Reactive Oxygen Species**,
- **Lead, Mercury, Arsenic, OP pesticides, Dioxins, PAH's** all induce oxidative stress by depleting the major intracellular antioxidant, glutathione
- **Diesel Exhaust** induces reactive oxygen (ROS) species in bronchial tissues
- **Oxidation** causes rust- non biologic reaction equivalent



# Oxidative Stress → Inflammation → Human Disease

- **Cancer** via activation of transcription factors of inflammatory pathways and ROS (Reuter 2010)
- **Alzheimer's Disease**
- **Type-2 Diabetes Mellitus** via Reactive Oxygen Species (ROS) Toxicity (Ahmad 2017; Attara 2009)
- **Aging, CV and Metabolic Disease** from lipid peroxidation via ROS- (Hauck 2016)



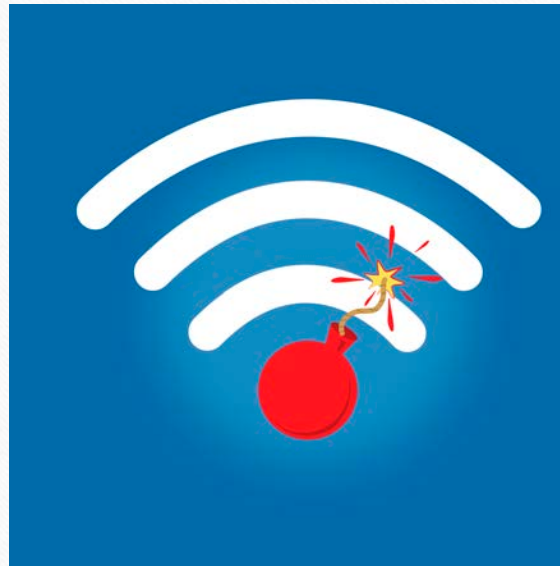
Oxidative stress in health and disease. Hybertson (2011)



# Is There a Biologic Mechanism of Harm From Wireless Radiation?

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Physicists say NO!



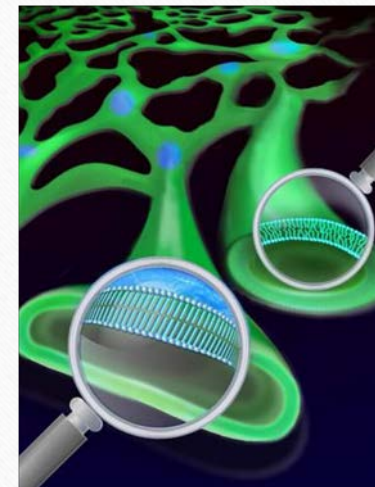
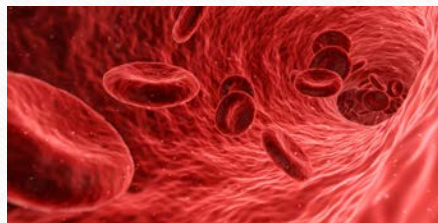
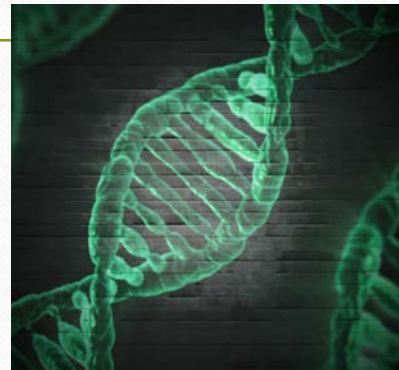
Biologists say YES!  
It's Oxidation!



# RFR Biological Damage to Cellular Molecules

## RFR-Oxidative Stress & Free Radical Formation

- DNA Damage
- Lipid Peroxidation
- Membrane Disruption



BioIntitative Report -Lai- 203/225 -89% show effects; Yakymenko -93/100 studies show oxidation

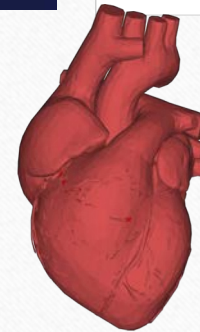
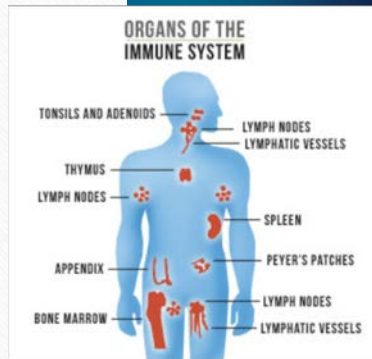


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# RFR Oxidative Damage to Cells

- Sperm and Ovaries
- Nerve Cells
- Cardiac Cells
- Blood Cells
- Immune System

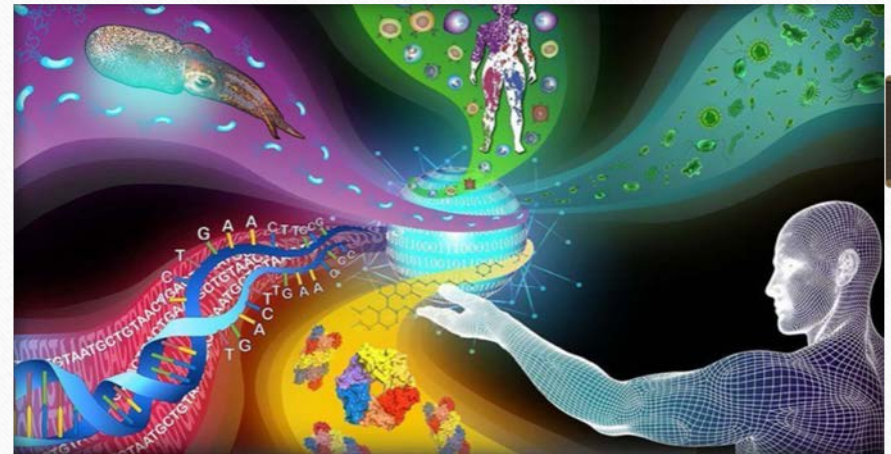


Antioxidants Reverse the Effects



# RFR Oxidative Stress → Inflammation → Modern Human Disease

- **Cancer** (Lerchi 2015)
- **Reproductive Harm** (Kesari 2018)
- **Neurologic Dysfunction/Alzheimer's Disease** (Othman 2017) (Gupta 2018)
- **Cardiac Disease** (Tuerdi 2015)
- **Immune Suppression** (Szmigielski 2013)



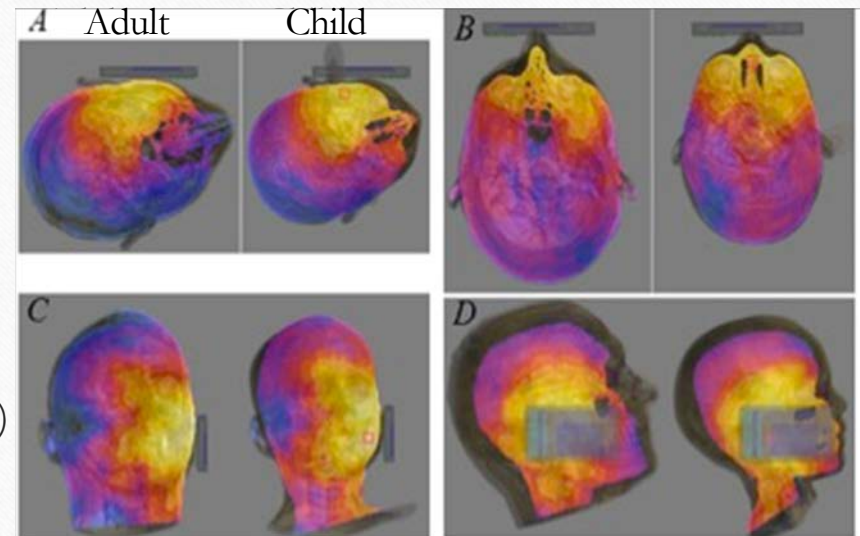
National Institute of Health 2019 Cancer and Inflammation



# Children are More Vulnerable to Wireless EMR

Adult      Child

- Skulls thinner
- Higher content of water in brain
- More absorption of radiation- 2 to 5 times
- Deeper absorption to hippocampus (Christ 2010)
- Organ, and reproductive systems are not developed



Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality. (2018) Fernandez C et al. Environmental Research. June 5, 2018



# Short Term and Long Term Health Effects



# ElectroHypersensitivity (EHS)

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“A phenomenon where individuals experience adverse health effects while using or being in the vicinity of devices emanating electric, magnetic or electromagnetic fields (EMFs)”. Bergqvist et al. (1997) Sweden.

# ElectroHypersensitivity

## Many Disabled and Cannot Work

- **ElectroHypersensitivity:** Headaches, nausea, fatigue, brain fog, insomnia, heart palpitations
- **5% to 30%** of people have mild EHS
- **1.5 to 5%** of people have Moderate EHS
- **0.65% Restricted access to work** = 435,500 people in the UK. (2 Million in USA)



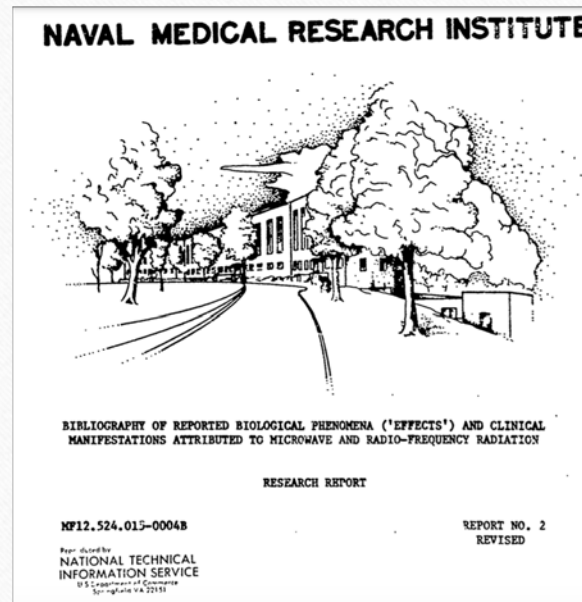
The Prevalence of People with Restricted Access to Work in Manmade Electromagnetic Environments. Bevington (2019)



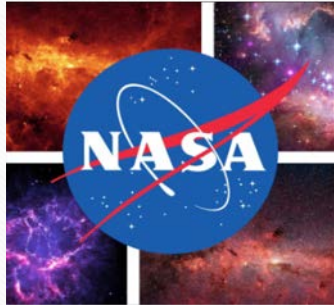


## 1971: Naval Medical Research Institute Neurologic Effects of Non-Ionizing RFR

- Headaches
- Insomnia
- Fatigue
- Restlessness/Anxiety
- Lack of Concentration
- Memory Loss
- Dizziness
- Irritability
- EEG changes/Seizures
- Cardiac changes



*Bibliography of reported biological phenomena ("effects") and clinical manifestations attributed to Microwave and Radiofrequency Radiation- 2300 studies- by Zorach Glaser, PhD*



## NASA Study 1981 Microwave Illness



**RAINES Report on Occupational Injury and Microwave Illness** in workers in electromagnetic fields showed symptoms headaches, irritability, fatigue, dizziness, disturbed sleep, nervous tension, mental depression, memory impairment, loss of hair, pain in muscles, breathing difficulties

- **Showed 19 neuropsychiatric effects associated with occupational RFR**
- ***Showed increasing prevalence of neuropsychiatric symptoms with cumulative years of exposure***

**NASA 1981: Electromagnetic Field Interactions With the Human Body: Observed Effects and Theories**



# Firefighters Cell Tower Health Effects



- **First Responder Cell Towers:** Headaches, extreme fatigue, sleep disruption, unexplained anger, depression, profound memory loss
- Firefighter on 911 call got lost in city he grew up in
- **2004 IAFF Study** firefighters in fire stations with cell towers
- **IAFF Resolution 2004; CA AB57-2016, AB357 (2021)** - firefighters exempt from cell tower placement due to health



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# What's the Diagnosis Doctor? Dr. Scott Eberle

- Headaches
- Dizziness
- Nausea
- Heart palpitations
- Irritability
- Poor concentration

## PERSONAL HISTORY

*Dr. Scott Eberle has been medical director of Hospice of Petaluma in Petaluma, California for 24 years. He specializes in end-of-life care and also co-founded "The Practice of Living and Dying," an innovative wilderness curriculum for which he is also a guide. This article is reprinted from Sonoma Medicine, Fall 2014, by permission of the Sonoma County Medical Association.*



Eberle S. An Underworld Journey: Learning to cope with electromagnetic hypersensitivity. (2017) *Ecopsychology*; June 2017; 9 (2): 106-111.



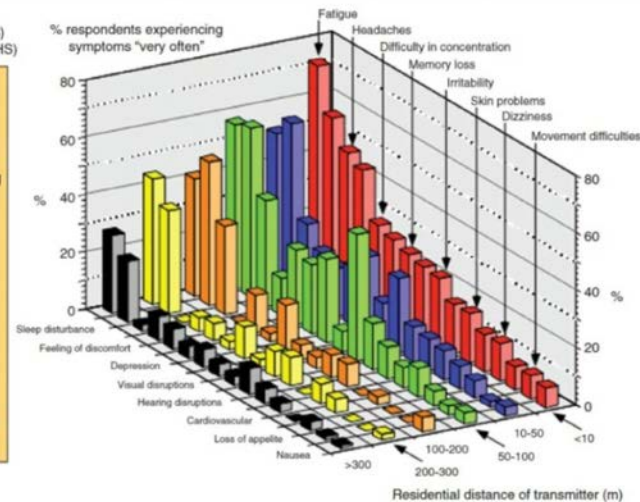
# Neurologic Symptoms and Cell Towers

- Fatigue, headache, difficulty concentratin, depression, memory loss,,,
- Symptoms within 500 meters – 1640 feet
- Shinjyo and Shinjyo 2014- Most symptoms disappeared 3 months after cell tower removed.

## Neurobehavioral Symptoms near Cell Towers

Rapid aging syndrome (RAS)  
Electro-Hyper-Sensitivity (EHS)

1. Fatigue
2. Sleep disturbance
3. Headaches
4. Feeling of discomfort
5. Difficulty concentrating
6. Depression
7. Memory loss
8. Visual disruptions
9. Irritability
10. Hearing disruptions
11. Skin problems
12. Cardiovascular
13. Dizziness
14. Loss of appetite
15. Movement difficulties
16. Nausea



Santini 2002 Symptoms  
Near Cellular Base  
Stations

Discussion and  
conclusions of the  
published report include:

"This study gives  
evidence of the fact that  
bioeffects are reported  
by people exposed at up  
to 300 m from base  
stations."

"The significant increase  
in the frequency of  
complaints in relation to  
the reference group  
(people exposed at >  
300 m or not exposed)  
leads toward the  
observation found in the  
Australian governmental  
report indicating that at  
200 m from a base  
station, some people  
exposed in their homes  
are complaining of  
chronic fatigue and  
sleep disruption."

Work of Santini et al (France): Pathol Biol. 2002;50:S369-73.





# Havana Syndrome



- Havana 2016, China 2018, Austria 2021, Arlington, VA 2021
- Incapacitating neurologic symptoms in diplomats, family and pets
- Headaches, fatigue, nausea, vomiting, dizziness, insomnia, imbalance, nosebleeds, memory loss, hives, ringing in the ears and hearing loss.
- **National Academy of Sciences report 2020 concluded this was pulsed microwave radiation**

Golomb BA (2018) **Diplomats' Mystery Illness and Pulsed Radiofrequency/Microwave Radiation.**(2018) Neural Comput. 2018 Nov;30(11):2882-2985.



# Long Term Health Effects

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# The Brain

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# Wireless Radiation Acts as a Neurotoxin

- **Loss of brain cells in the Hippocampus-Memory** (Shahain 2018; Fragopoulou 2018; Sahin 2015)
- **Oxidative stress** and inflammation (headaches, sleep disturbance, fatigue, memory) (Yakymenko 2016 : Shahin 2015; Fragopoulou 2012)
- **Decreased Neurotransmitter Levels** (mood) (Hu 2021;Eris 2015; Ismail 2015; Aboulezz 2013)
- **Demyelination with chronic exposure** (Kim 2017)
- **Disturbs Nervous System Signaling** required to regulate the body's response to disease





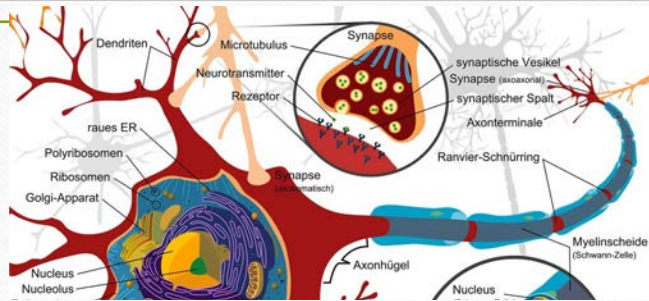
## Fetal Exposure to Cell Phone Radiation and ADHD



- Study looking at cell phone radiation effects on fetus and later development of ADHD. Study eliminated confounding factors- ignoring child during development
- 2 groups of mice- 32 pregnant mice exposed to cell phone above the cage and 42 controls. Offspring tested as young adults.
- **Conclusions:** Offspring who were exposed to cell phone radiation had decreased memory, more hyperactivity, no fear. **Fetal radiofrequency radiation exposure led to neurobehavioral disorders in mice, such as ADHD**

Fetal Radiofrequency Radiation Exposure From 800-1900 MHz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice. Dr. Hugh Taylor . Yale 2012





*“It could be concluded that the **alterations in amino acid neurotransmitters induced by EMR** exposure of juvenile and young adult rats may underlie many of the neurological effects reported after EMR exposure including cognitive and memory impairment and sleep disorders. Some of these effects may persist for some time after stopping exposure.” Ahmed 2018*

The chronic effect of pulsed 1800 MHz electromagnetic radiation on amino acid neurotransmitters in three different areas of juvenile and young adult rat brain. Ahmed. Toxicol Ind Health. 2018



# Wireless Radiation Opens the Blood Brain Barrier



- **Increased permeability** of blood brain barrier (Salford 2003; Nittby 2008; Sirava 2016; Eberhardt 2008)
- **Low level EMR-** 0.12mW/kg (1.6W/Kg standard)
- **Leakage of albumin** at 8 weeks with 2 hours of exposure- (Salford 2003)
- **Neuronal damage in the cortex**, hippocampus, and basal ganglia (Salford 2003)

Salford LG et al. Nerve cell damage in mammalian brain after exposure to microwaves from GSM mobile phones. Environ Health Perspect. 2003 Jun;111(7):881-3





# Memory, Behavior & Learning

- **Speech Delay:** (Ma 2017) **American Academy Peds** -30-min increase in screen time = 49% increased risk of expressive speech delay.
- **Memory:** (Foerster 2018)-24 Swiss Schools- Decreased memory scores with cumulative phone use
- **ADHD:** (Birks 2017) 83,000 Women-Perinatal study-5 countries Denmark, Korea, Netherlands, Norway, Spain- Increased maternal cell phones –more ADHD and emotional problems





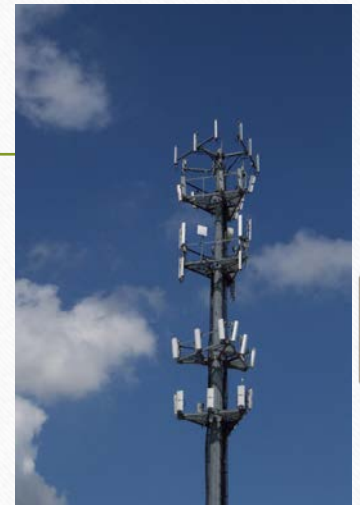
# Adolescents' Memory Performance and Long Term Use of Cell Phones (2018)



- Swiss prospective study of 843 adolescents in grade 7,8 and 9 in 24 secondary schools in Central Switzerland over 1 year
- Figural and verbal memory tasks evaluated along with minutes/hours of cell phone use
- **Results: “We found preliminary evidence suggesting that RF-EMF may affect brain functions such as figural memory in regions that are most exposed during mobile phone use.”**
- **No Cell Phones to the ears**



# Cognitive Decline in Students Near Cell Towers



- **2 Year study**
- 2 Schools, kids 13-16
- One School  $2.010 \mu\text{W}/\text{cm}^2$  for 6 hours a day
- Other School  $10.021 \mu\text{W}/\text{cm}^2$  for 6 hours a day
- **Result: Higher exposure group had delayed fine and gross motor skills, spatial working memory, and attention**

Meo SA et al. Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health. American Journal of Men's Health. December 7, 2018.



# Cell Phone Use: Increases Distraction Decreases Learning



- **Mobile telephone use decreased cognitive function in adolescents** (Abramson 2009)
- **Higher test scores in schools where cell phones banned in classrooms** (Beland- London school of economics)
- **Note taking, Learning and recall higher without phone use** (Kuznekoff2013)
- **“Brain Drain” of limited working memory and capacity in mere presence of cell phone**

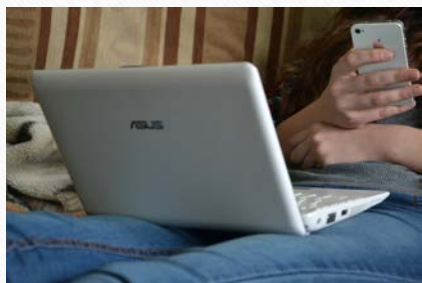




# Reproduction

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## Risks to Reproduction

- **Sperm Damage** - 40+ studies-Motility, DNA, Testosterone
- **Ovarian Damage** - 9+ studies
- **Embryo Damage** - 6+ studies
- **Miscarriage** - Dr. De Kun Li- Kaiser- 913 pregnant women, highest levels of everyday EMF gave 3 fold increase in miscarriage

MGye MC et al. Effect of electromagnetic field exposure on the reproductive system. (2012) Clin Exp Reprod Med. 2012 Mar; 39(1): 1-9.



# Wireless Devices and Miscarriage Kaiser Study

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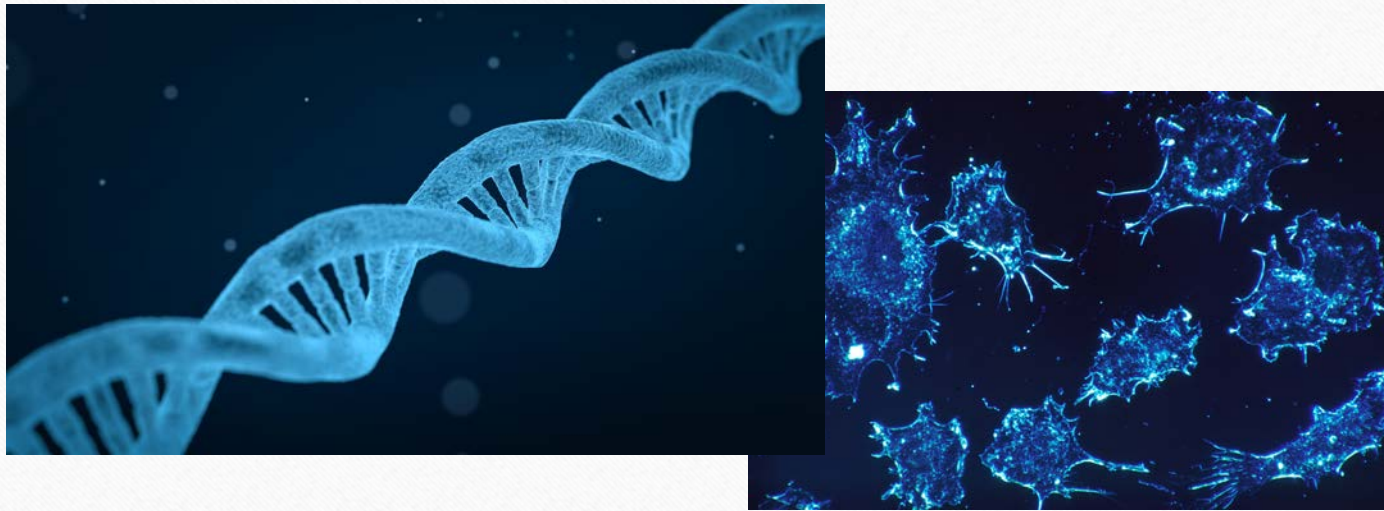
- Miscarriage is a sensitive indicator of EMR harm
- 913 pregnant women with exposimeters
- Controlled for other factors
- Three fold increase in miscarriage with everyday exposure

Exposure to Magnetic Field Non-Ionizing Radiation and the Risk of Miscarriage: A Prospective Cohort Study. (2017) Li et al. Sci Rep. 2017 Dec 13;7(1):17541.



# DNA Damage and Cancer

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## International Agency for Research on Cancer



PRESS RELEASE  
N° 208

31 May 2011

### IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

"This Classification applies to all RF –emitting devices, including Wi Fi." Robert A. Baan, PhD, IARC

"This classification justifies the implementation of the Precautionary Principle." Dr. Dariusz Leszczynski, IARC

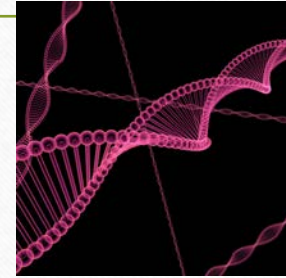






# DNA Damage and Cancer

- Oxidation major factor in DNA damage from toxins
- DNA repair mechanisms at work constantly
- If repair is overwhelmed leads to mutations
- Accumulation of mutations and epimutations leads to cancer
- Inherited gene variants in DNA repair enzymes are associated with higher probability of developing cancer





## Wireless Radiation: Cancer and DNA Damage



- **Dr. Lai Research Summaries on RFR Genotoxicity 224/346** showed effects (65%) , Comet Assays 78/125 showed effects (65%)
- **NTP Study 2018** - Clear evidence of cancer and DNA damage
- **Ramazzini Institute Study 2018** - Cancer and DNA damage
- **Occupational Reviews of Military Personnel (Peleg 2018)**
- **Markova (2010)** Low power RFR alters DNA repair in stem cells





**National Toxicology Program**  
U.S. Department of Health and Human Services

## **NTP Study on Long Term Exposure To Cell Phones and Cancer 2018**

- National Institutes of Environmental Health Sciences (NIEHS)- Research Triangle Park, North Carolina
- Gold Standard Study was 10 years and \$30 million
- Shielded cages
- Robust study



# NTP Study Key Findings: Clear Evidence of Cancer



National Toxicology Program  
U.S. Department of Health and Human Services

- Clear evidence for heart tumor schwannomas – same as epidemiologic studies
- Some evidence for glioma brain tumors
- DNA Damage
- Unexpected Cardiomyopathy- aging of the heart
- Increases in tumors in several other organs, including pituitary gland, thyroid, pancreas, skin and liver compared to controls.
- Controls with very low cancer rates



**NIEHS**  
National Institute of  
Environmental Health Sciences



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National Toxicology Program  
U.S. Department of Health and Human Services

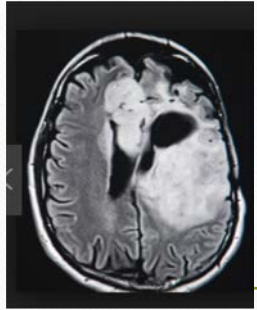
- *“The radiation level the rats received was “not very different” from what humans are exposed to when they use cellphones,”* Chris Portier, former associate director of the NTP who commissioned the study
- *“The assumption that non-ionizing radiation cannot cause cancer or other health effects, other than by tissue heating is **WRONG.**”* Ronald Melnick, Ph.D., Retired Senior Toxicologist at NIEHS and lead study designer-Presented to NC Dept of Health & Human Services 3/22/19



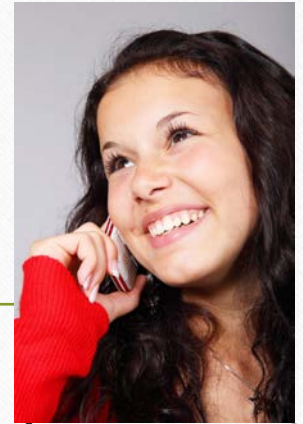
# Ramazzini Institute Cell Phone Study of Replicates NTP Study



- World's largest long-term study ever performed in rats on the health effects of RFR, including 2448 animals published in 2018
- Much lower levels of RF radiation than NTP
- DNA damage
- Significant increase in the incidence of heart Schwannomas at the highest dose,  
\*Increase in heart Schwann cell hyperplasia and malignant glial tumors in female rats at the highest dose
- Same cell type as those observed in some epidemiological studies on cell phone users



# Brain Cancer and Cell Phones



- Brain tumors are the most common solid tumors affecting children and adolescents, (John Hopkins)
- Brain tumors rising in England and France
- Significant association brain tumor and cell/cordless phone use on same side of head (Hardell and Carlberg)
- Interphone study -13 countries found increase in brain tumors in the highest user groups and after 10 years
- First court case on cell phones and brain cancer was won in Italy in 2017



# Cell Towers





# Cell Towers and Cancer

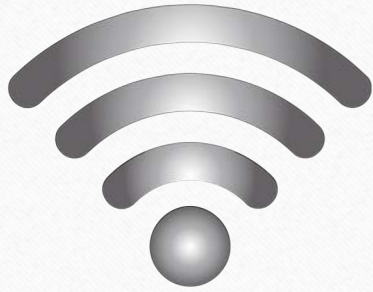
- **Eger (2004) Bavaria**-Increase within 400 M ( 1200 ft)
- **Khurana (2010) - 8 of 10 studies** showed an increase neurobehavioral symptoms or cancer within 500M of cell tower.
- **Dode (2011)- Brazil-** Increase within 500 M
- **Balmori Review of 38 studies (2023) - 77%** showed increase in cancer near cell towers



# Exposure of Wi Fi in Schools

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## Wi Fi Radiation Effects



- Oxidative Stress brain and liver (Çelik 2015)
- Decreased plasma prolactin, estrogen, and progesterone levels and Uterine oxidative injury. 60 min/day (Yuksel 2016)
- Alteration of miRNA with 2.4 GHz Wi Fi for 1 year Dasdag S et al. (2015)
- Decreased reaction time with Wi Fi at home (Bamdad 2019)
- Decreased object recognition (Hassanshahi 2017)

# Can Wi Fi Signals Stunt Plant Growth?

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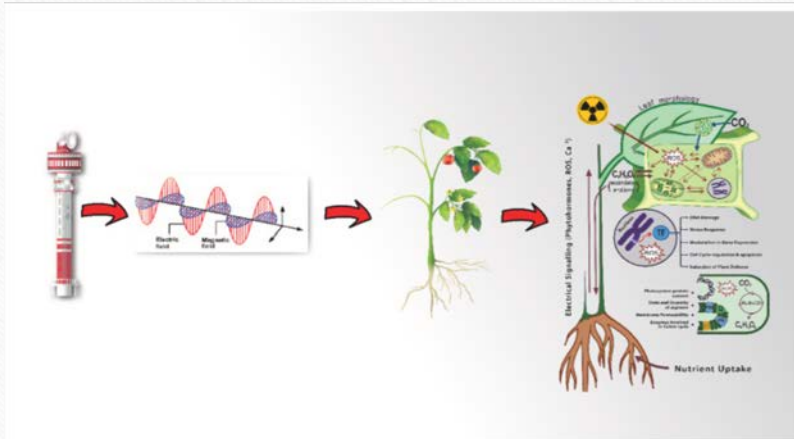




# High School Experiment Wi Fi and Cress Seed Germination



# Cell Phone Radiation Harms Tomato Plants



- Decreased seed germination, photosynthesis and root growth
- Reduction of phenolic compounds, flavonoids, vitamin C and antioxidant levels

**“Mobile communication agencies should be informed and installation of base stations for mobile communication towers should be prohibited at agricultural lands.” (2022)**

Attributes of non-ionizing radiation of 1800 MHz frequency on plant health and antioxidant content of Tomato (*Solanum Lycopersicum*) plants. Upadhyaya C. J of Rad Res and Applied Sciences. March 2022



# Wildlife Effects



- Birds
- Bees
- Trees
- Mammals
- Reptiles
- Insects
- Bacteria





# FCC Standards Outdated



- Based on short term (30 Min) thermal heating not long term biological effects
- Do not consider vulnerable populations- fetus, babies, elderly, chronic illness
- Do not consider those who are electrosensitive-
- Do not consider environmental effects
- Non-thermal biologic effects and mechanisms have been identified in scientific literature but not considered







# FCC Standards Need Reevaluation

- **American Academy of Pediatrics-** “Current FCC standards do not account for the unique vulnerability and use patterns specific to pregnant women and children. It is essential that any new standard for cell phones or other wireless devices be based on protecting the youngest and most vulnerable populations to ensure they are safeguarded throughout their lifetimes.”
- **California Department of Public Health** Guidelines on Cell Phone Radiation 2017: REDUCE YOUR EXPOSURE
- **Austrian Medical Association**
- **California Medical Association**
- **Government Accountability Office**



# People vs FCC

ORAL ARGUMENT REQUESTED  
20-1025 (Lead); 20-1138 (Consolidated)

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UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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ENVIRONMENTAL HEALTH TRUST; CONSUMERS FOR SAFE CELL  
PHONES; ELIZABETH BARRIS; THEODORA SCARATO

CHILDREN'S HEALTH DEFENSE; MICHELE HERTZ; PETRA BROKKEN;  
DR. DAVID O. CARPENTER; DR. PAUL DART; DR. TORIL H. JELTER; DR.  
ANN LEE; VIRGINIA FARVER, JENNIFER BARAN; PAUL STANLEY, M.Ed.

*Petitioners*

v.

FEDERAL COMMUNICATIONS COMMISSION;  
UNITED STATES OF AMERICA

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*“We find the Commission’s order  
arbitrary and capricious in its failure to  
respond to record evidence that  
exposure to RF radiation at levels  
below the Commission’s current limits  
may cause negative health effects  
unrelated to cancer.”*

*DC Court of Appeals  
August 13, 2021*



## BioInitiative Report: Biologically Based Exposure Limits

- Clear evidence of bioeffects at environmentally relevant levels
- The BioInitiative scientific benchmark is  $0.003 \text{ uW/cm}^2$  for **No Observable Effect** (Current standard is  $1000 \text{ uW/cm}^2$  )
- Report recommends that this **precautionary limit** should be adopted

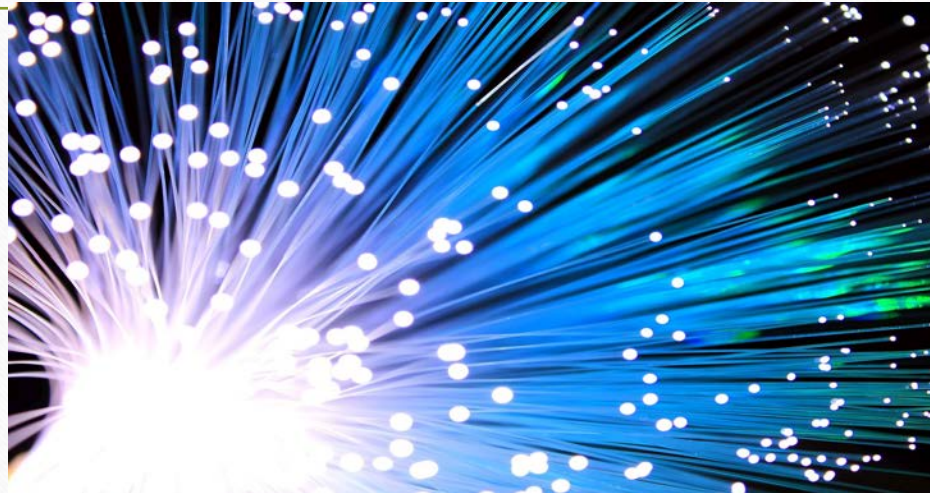
BioInitiative.org





## Re-Inventing Wires: The Future of Landlines and Networks

- Safer
- Faster
- More Secure



**National Institute for Science, Law & Public Policy**  
*Washington, DC*

# Reducing Exposure to Wireless

- Prefer wired connections over wireless
- Devices on a table and at least 8 inches from body
- Turn off wireless devices and Wi Fi when not in use
- Ban cell phone use at school
- Ban cell towers near schools, homes
- Fiberoptic network development



Hedendahl LK et al. Measurements of Radiofrequency Radiation with a Body-Borne Exposimeter in Swedish Schools with Wi-Fi. *Front Public Health*. 2017 Nov 20;5:279.

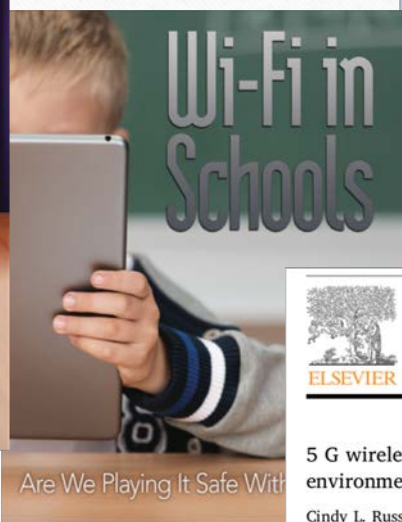


# Recommendations to Reduce EMR Exposures in Schools



- The 2011 European Council Resolution 1815
- The German Parliament
- Collaborative for High Performing Schools Best Practices for Low EMF
- Maryland Children's Environmental Health and Protection Advisory Council
- New Jersey Education Association
- Santa Clara County Medical Association Best Practices for Safe Technology

# 5G Wireless Technology and Public Health



Contents lists available at ScienceDirect

**Environmental Research**  
journal homepage: [www.elsevier.com/locate/envres](http://www.elsevier.com/locate/envres)

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**5 G wireless telecommunications expansion: Public health and environmental implications\***

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<p><b>ARTICLE INFO</b></p> <p><b>Keywords:</b> Wireless technology Public health Radiofrequency radiation</p>	<p><b>ABSTRACT</b></p> <p>The popularity, widespread use and increasing dependency on wireless technologies has spawned a telecommunications industrial revolution with increasing public exposure to broader and higher frequencies of the electromagnetic spectrum to transmit data through a variety of devices and infrastructure. On the horizon, a new generation of even shorter high frequency 5G wavelengths is being proposed to power the Internet of Things</p>
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# Thank You!

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## Reduce Your Exposure!







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*“Our vision is a world where technology serves our needs without undermining our physical, psychosocial or environmental health.”*

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