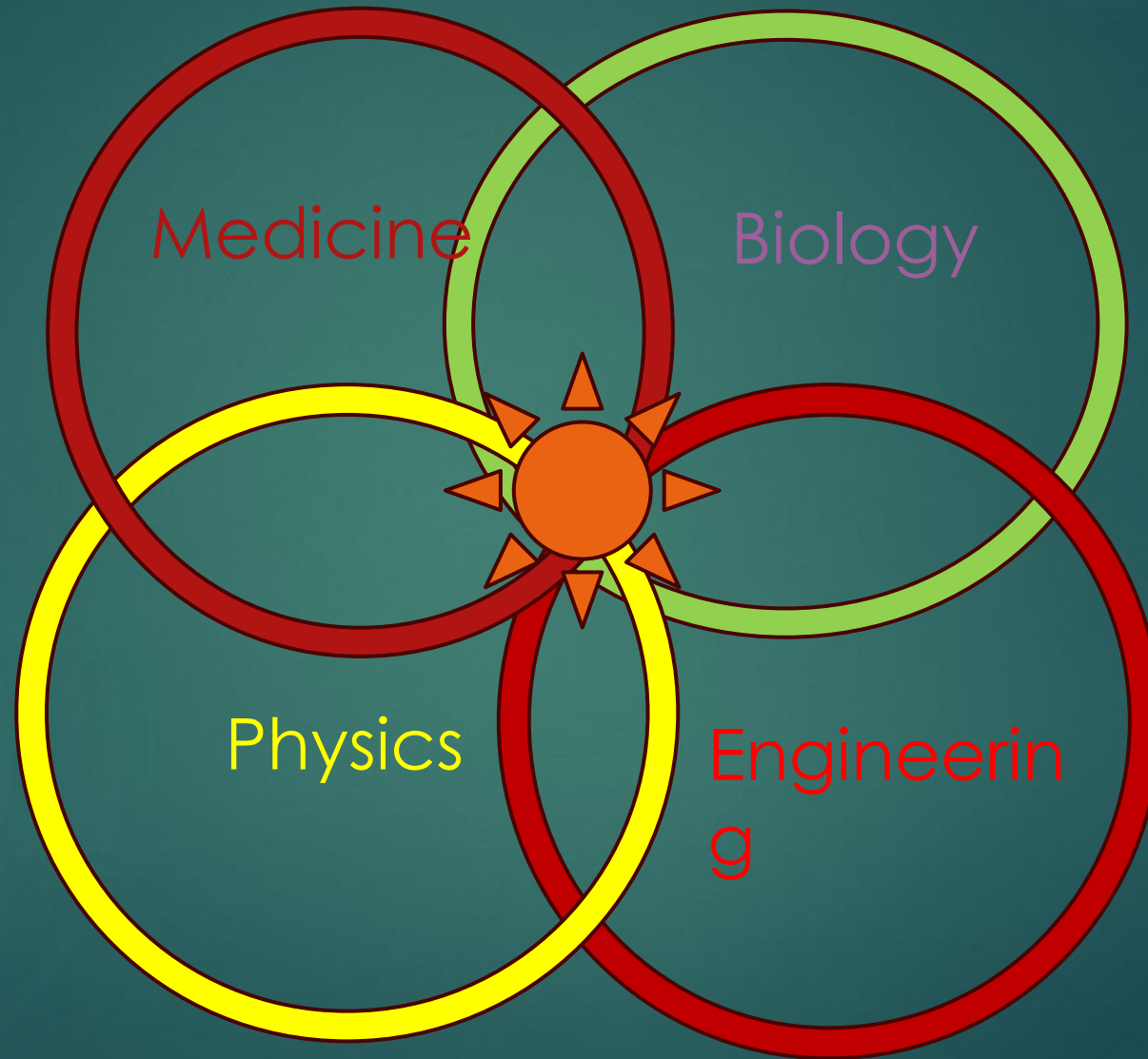


Town of Ashland, MA - Select Board Meeting
April 17, 2024

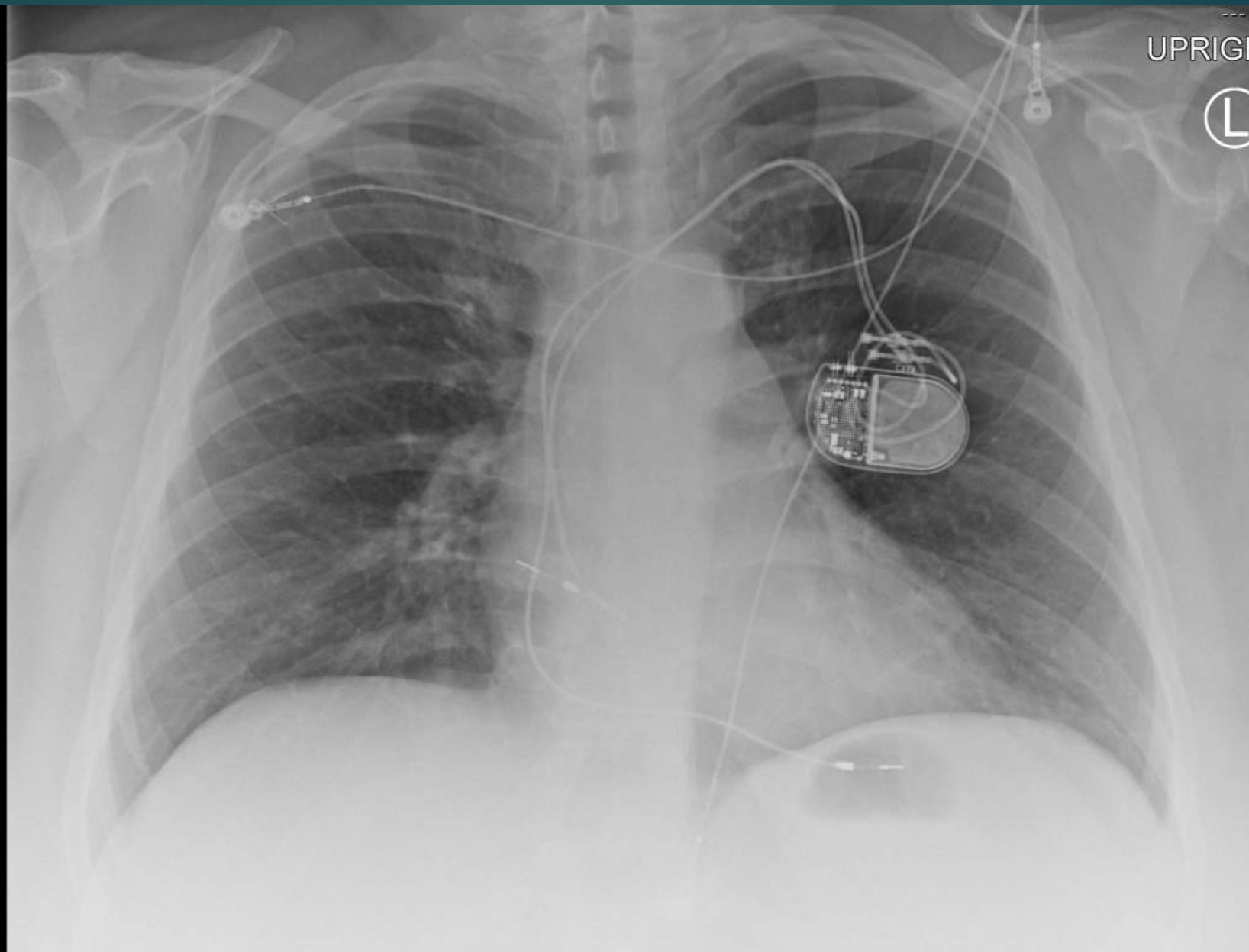
Health Effects of Wireless Communication Radiation (WCR)

Rob Brown, MD
Radiologist – Radiology Partners - Phoenix
VP Scientific Research and Clinical Affairs
Environmental Health Trust
rbrown@ehtrust.org

A Fringe Science

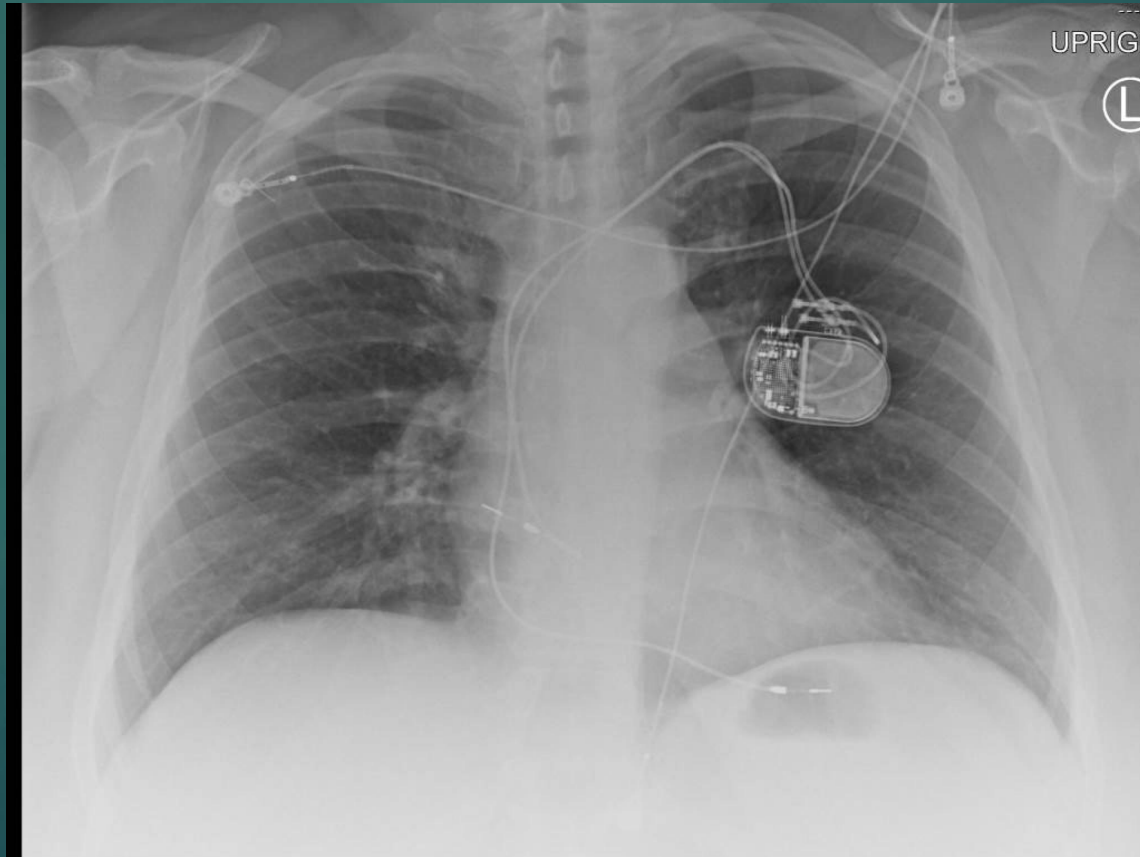


Radiation?



Electromagnetic radiation
penetrates the human body

X-Rays



Electromagnetic radiation
penetrates the human body

Light



Electromagnetic radiation
penetrates the human body

Magnetic fields and radiofrequency radiation

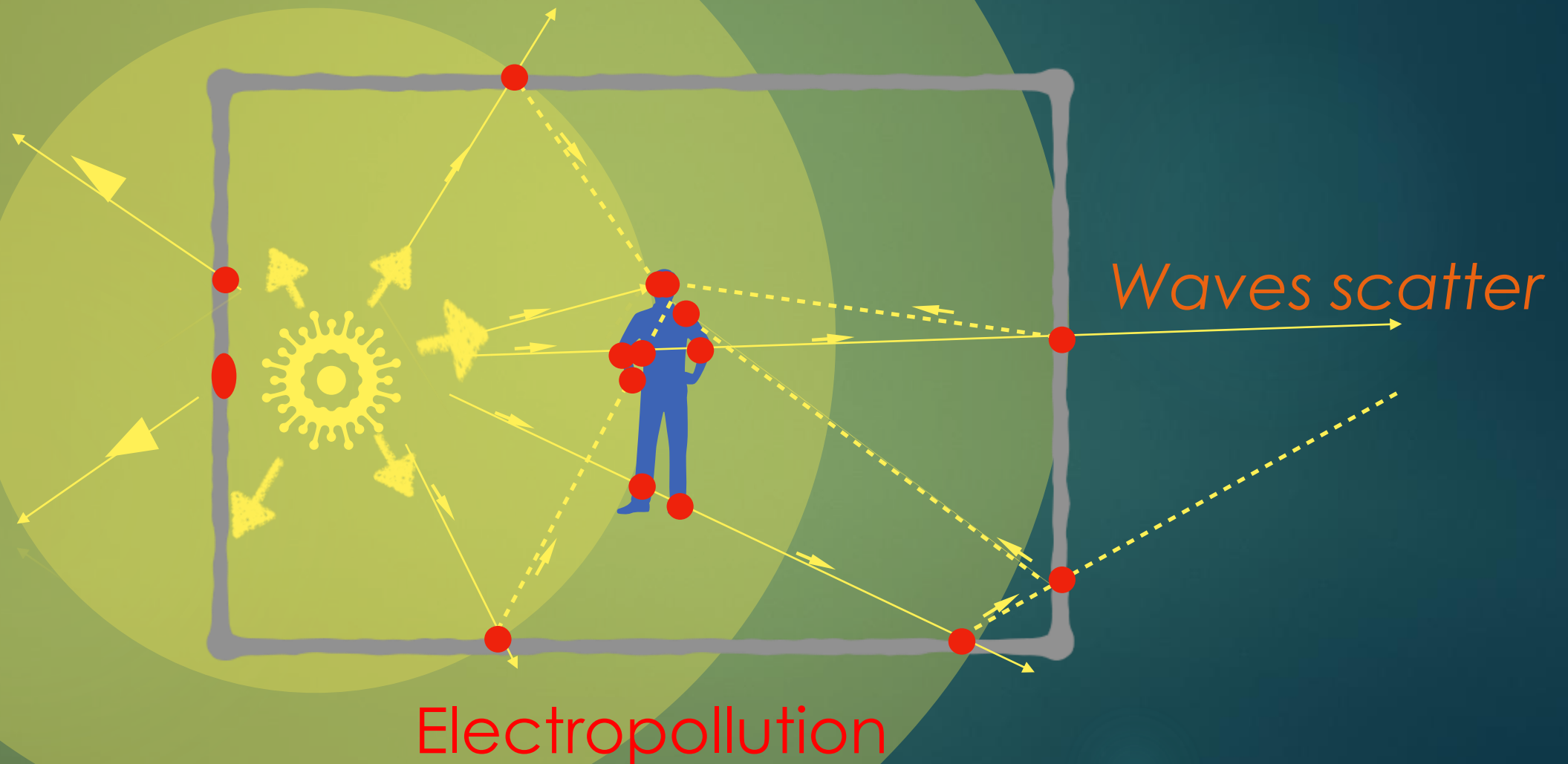


Radiofrequency radiation emitting devices

- ▶ Smart homes - security systems, thermostats, lights, appliances,
 - ▶ 2G, 3G, 4G, 5G data networks
 - ▶ SMART utility meters
 - ▶ Air pods and blue tooth devices
 - ▶ Virtual reality head sets
 - ▶ Cordless phone sets, cell phones
 - ▶ Gaming devices, remote controls, key fobs
- Tablets, iPods
 - Wi-Fi routers
 - Baby monitors
 - More every year...

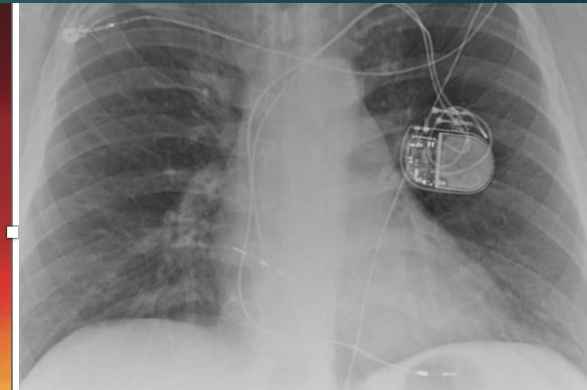
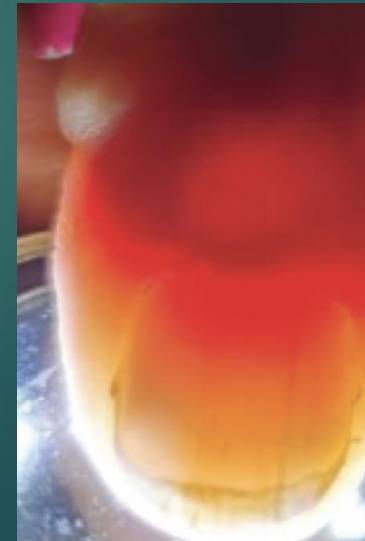
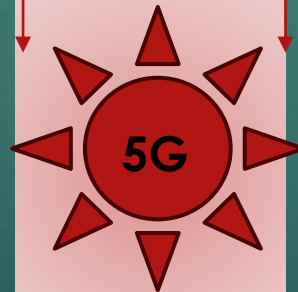
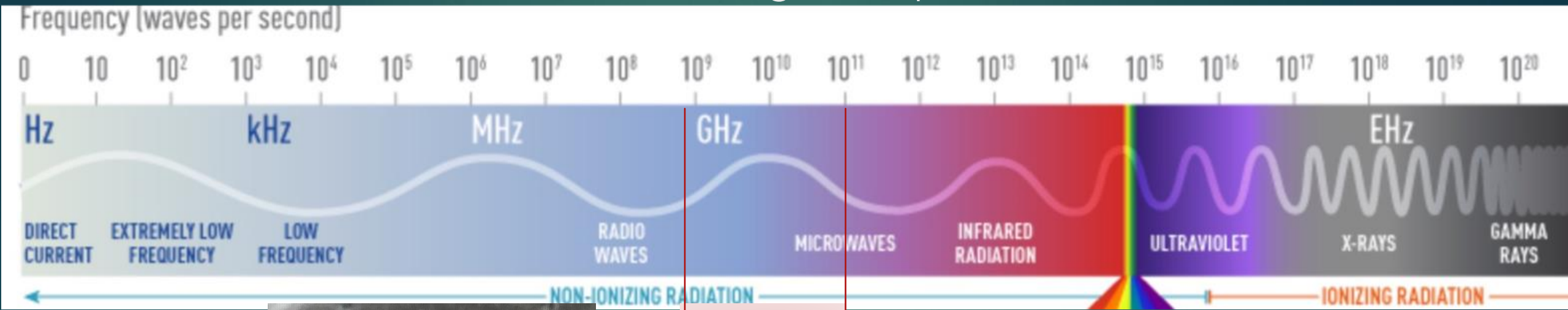
Characteristics of Electromagnetic Radiation

Absorption/penetration/reflection



Electromagnetic radiation penetrates the human body

The electromagnetic spectrum

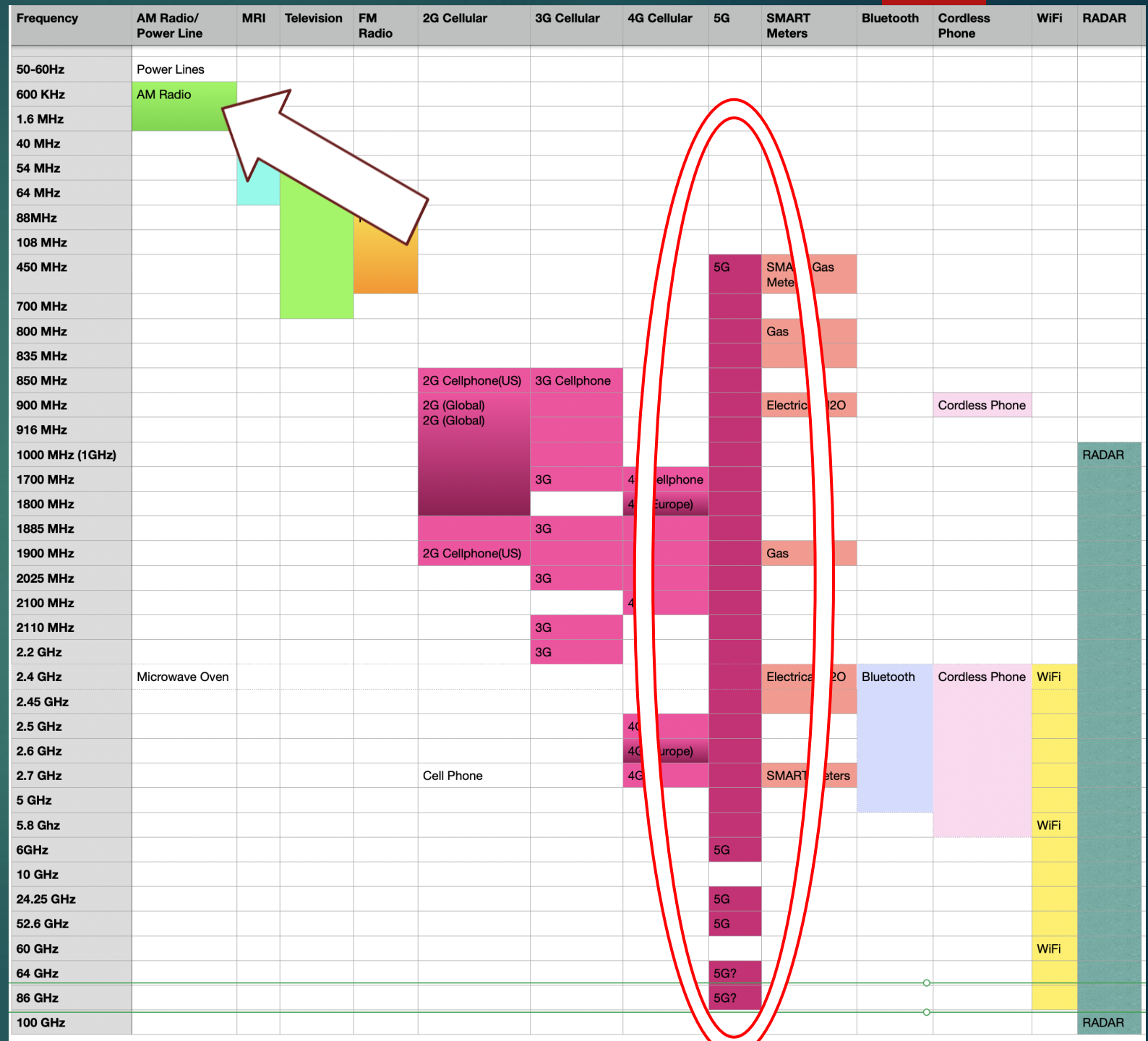


ELF-EMF
"Dirty" Electricity

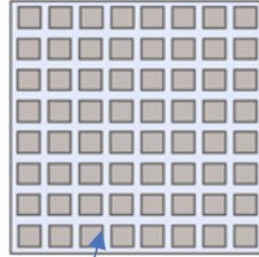
Radiofrequency
Radiation
100 kHz - 300 GHz

5G

Microwaves
1 - 1000 GHz



Massive MIMO



5G – High-frequency Band Demo

Front Porch



Non-ionizing EMR can cause cellular oxidative stress - Yakymenko et al., 2015

Electromagnetic Biology and Medicine >
Volume 35, 2016 - Issue 2

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Review Articles

Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation

Igor Yakymenko ✉, Olexandr Tsybulin, Evgeniy Sidorik, Diane Henshel, Olga Kyrylenko & Sergiy Kyrylenko
Pages 186-202 | Received 10 Jan 2015, Accepted 12 Apr 2015, Published online: 07 Jul 2015

Download citation <https://doi.org/10.3109/15368378.2015.1043557> Check for updates

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ABSTRACT

This review aims to cover experimental data on oxidative effects of low-intensity radiofrequency radiation (RFR) in living cells. Analysis of the currently available peer-reviewed scientific literature reveals molecular effects induced by low-intensity RFR in living cells; this includes significant activation of key pathways generating reactive oxygen species (ROS), activation of peroxidation, oxidative damage of DNA and changes in the activity of antioxidant enzymes. It indicates that among 100 currently available peer-reviewed studies

Related research ⓘ

People also read	Recommended articles	Cited by 126
Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stati ... >		
Zothansiamia et al. Electromagnetic Biology and Medicine		

Cellular effects of oxidative stress

- CELL MEMBRANE DAMAGE
- PROTEIN/ENZYME DAMAGE
- DNA DAMAGE – MUTAGENESIS
- MITOCHONDRIAL DYSFUNCTION



Body Parts at Risk

Thyroid gland

Testes

Skin

Blood

Immune system

Neurons

Eyes

Brain

Heart

Others?

Thyroid

Thyroid gland is a superficial structure, therefore extremely radiosensitive.

Exposed mice showed correlation between radiation exposure from mobile phone use and increasing TSH values and thyroid gland insufficiency

(Baby, et al. 2017)

(Alkayyali, et al 2021)

A 900/1800 MHz mobile phone 1 hour / day for 2 months caused thyroid hyperstimulation in students (Shaukat et al 2013)



Baby, N.M., et al., Indian Journal of Endocrinology and Metabolism; 2017:
doi.org/10.4103/ijem.IJEM_12_17

Alkayyali et al. Cureus 2021: DOI: 10.7759/cureus.17329

Shaukat et al., Journal of Biological and Chemical Research 2014

Thyroid hormone effect on immunity, heart rhythm and weight

Hypothyroidism:

Immune effects

Decreased function of neutrophils
 Decreased function of NK Cells
 Pro-inflammatory macrophage response

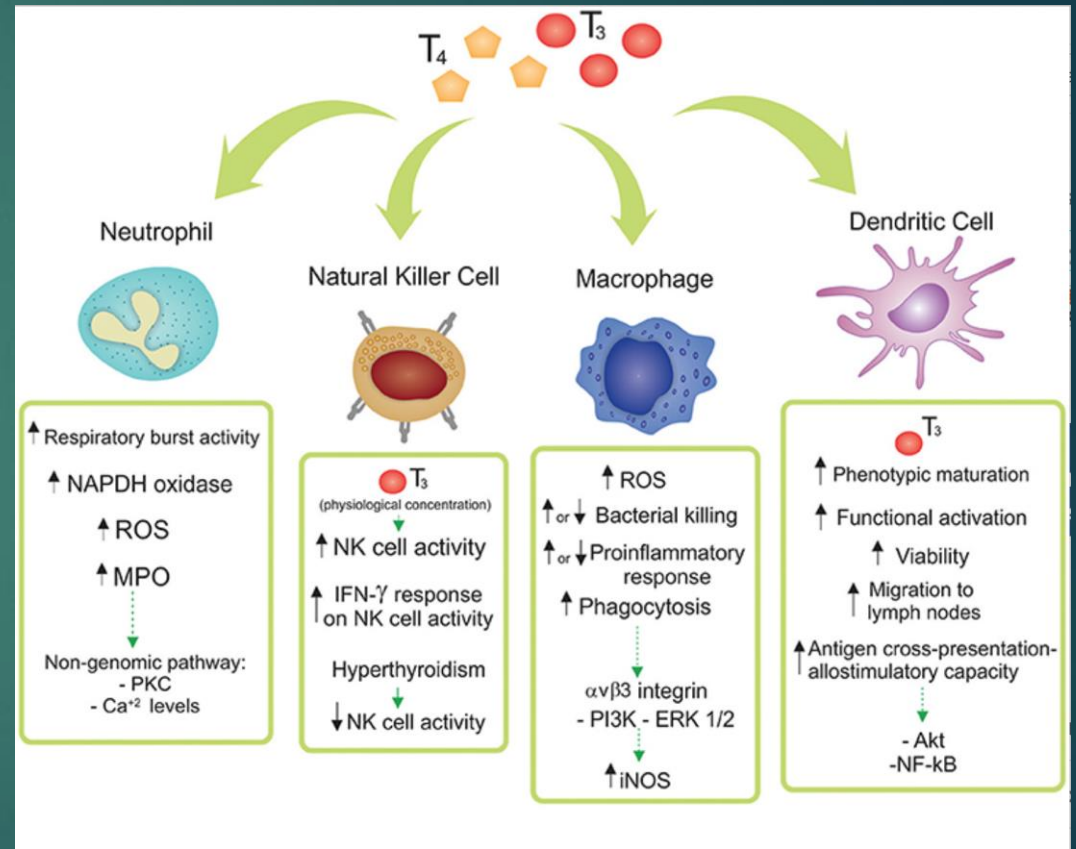
Cardiac ventricular arrhythmia
 Weight gain

Hyperthyroidism:

Immune effects

Increased ROS production of neutrophils
 Decreased NK cell activity
 Macrophage inhibition

Heart palpitations
 Cardiac atrial arrhythmias (AFib)
 Weight loss



Montesinos & Pellizas. *Frontiers in Endocrinology*; 04 June 2019:

DOI=10.3389/fendo.2019.00350

Marrakchi, et al. *Herz* 2015. DOI: [10.1007/s00059-014-4123-0](https://doi.org/10.1007/s00059-014-4123-0)

Spermatozoa - bioeffects from RF radiation

Studies on Rats, mice and rabbits - RF-EMR decreases sperm count, reduces motility and increases oxidative stress.

Human studies - RF-EMR decreases sperm motility, affects morphology, decreased viability.



Immune Cell Effects from EMF

- Macrophage behavior affected by EMF exposure time (Burrup, et al. 2018)
- Occupational exposure to EMF can affect NK cell counts (Rosado, et al. 2018)
- Microwave radiation can cause dose dependent morphologic and functional injury to NK-92 cells (in vitro) (Zhao, et al. 2017)
- Lymphocyte function can be affected by MW radiation (Grigoriev, 2010)
- Prolonged EMF exposure associated with immune suppression (Szmigielski , 2013)

Burrup, S. Proceedings: AACR Annual Meeting 2018; April 14-18, 2018; Chicago, IL:
DOI: 10.1158/1538-7445.AM2018-5692

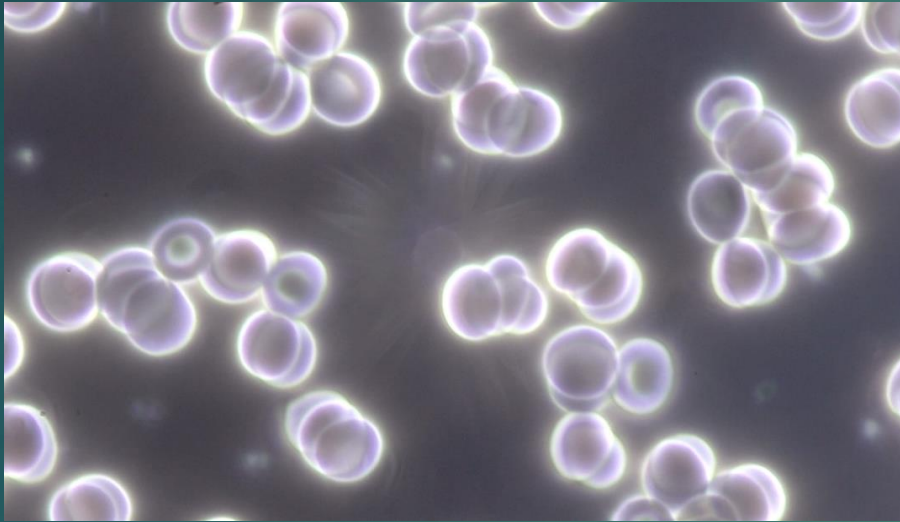
Grigoriev, Y.G., et al. Biophysics; 2010: DOI: 10.1134/S0006350910060278

Rosado, M.M., et al. Frontiers in Public Health; 2018: DOI=10.3389/fpubh.2018.00085

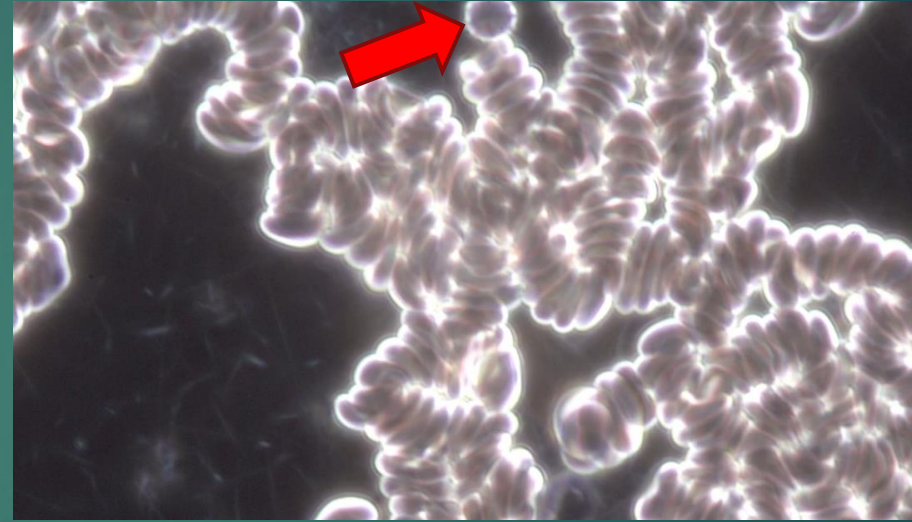
Zhao, L., et al. Biomedical and Environmental Sciences; 2017:
DOI:10.3967/bes2017.043.

Szmigielski S. Science of the Total Environment 2013: DOI:

RF Radiation effect on blood



Normal blood smear prior to EMR exposure



Courtesy of Dr. Magda Havas,
PhD

Same patient/same day/same hour: 10 minute exposure to 2.45 GHz "Wi-Fi" causes reversible rouleaux formation

Symptoms

- Insomnia/sleep disturbance
- Headache
- Pressure sense head/ears
- Sharp pains head/ears
- Sensations of electric shock
- Dizziness/Vertigo
- Tinnitus
- Visual/hearing disturbance
- Short term memory loss
- Anomia/thought block
- Tremor/vibration/seizure
- Synesthesia
- Cardiac dysrhythmia/ palpitations
- BP anomaly/POTS
- Musculoskeletal pains
- Joint dysfunction
- Thirst/dehydration
- Urinary/bowel urgency
- Altered energy levels
- Increased chemical sensitivity
- Increased food sensitivity
- General sensory up-regulation
- symptoms Collection
- Circadian rhythm reversal

What can we do?

- ▶ Reduce our exposure to electropollution
 - ▶ Increase distance from antennas
 - ▶ Turn off devices when not in use
 - ▶ Hardwire when possible
- ▶ Increase intake of anti-oxidants

