

Cancer & EM Waves

João Gabriel
&
Fatine

Summary

Historical Parallel

Cigarettes were once seen as safe until scientific evidence proved otherwise

Relevance Today

Electromagnetic Field exposure is increasing, and its long-term health effects remain debated.

Scientific Evidence

Studies disagree : some report biological effects, others find weak or no clear risks.

Overall Picture

The field is divided; more independent long-term research is needed.

Think About It

In the early **20th century**, cigarettes were promoted as **relaxing and elegant**, with ads portraying them as glamorous and even endorsed by doctors and celebrities.

By the **1950s**, statistical studies linked tobacco to **lung cancer** and public perception shifted.

The tobacco industry responded by funding research to show doubt and delay regulation.

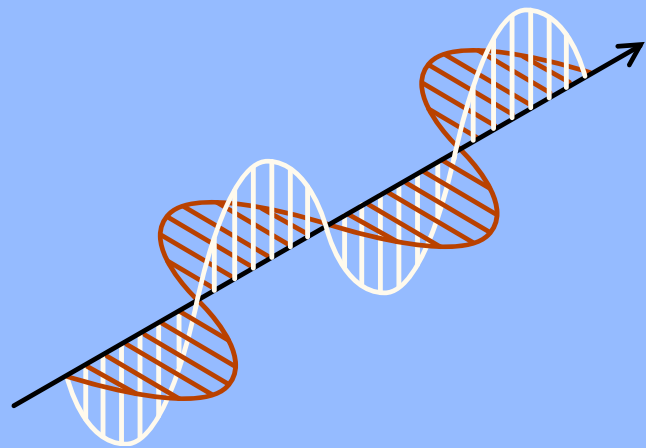
Why this matters ?



- 01** Just as early warnings about tobacco were ignored, some scientists argue that non-thermal electromagnetic radiation may have long-term health consequences.
- 02** Opponents contend that existing evidence is weak, misinterpreted or focused on extreme exposures not typical of daily life.
- 03** Understanding the balance of risks versus benefits is crucial as EMF exposures from phones, Wi-Fi and power lines continue to grow.

Electromagnetic Waves

Electromagnetic waves consist of oscillating **electric and magnetic fields** that propagate through space.



Humans are exposed through power lines, mobile phones, Wi-Fi routers, microwave ovens and medical imaging devices.

They span a spectrum from extremely low frequency (ELF) and radiofrequency (RF) to microwaves, infrared, visible light, ultraviolet, X-rays and gamma rays.



Radio Microwave Infrared Visible Ultraviolet X-ray Gamma ray

POSITION 1:

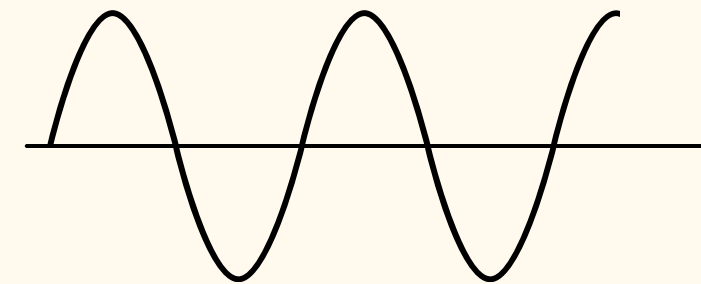
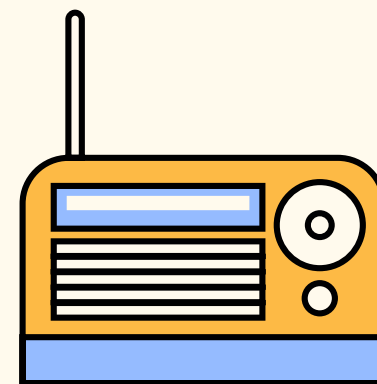
Health risks

Many studies find non-thermal RF exposure induces **oxidative stress**, **DNA damage** and **mitochondrial dysfunction**.

Epidemiological data show increased risk of **glioma** and **acoustic neuroma** in long-term mobile phone users.

Other effects

EMF can mutate DNA, delay melatonin release, alter blood–brain barriers, reduce sperm counts and increase miscarriage risk; some individuals develop EMF sensitivity such as **fatigue and insomnia**.



SCHOLARS ARGUE THAT FUNDING BIASES AND INSTITUTIONAL BARRIERS DIFFICULTS RECOGNITION OF THESE RISKS.



Health Outcomes

Brain & nervous system: **brain tumours** (glioma, acoustic neuroma), **Alzheimer's** disease and **Parkinson's** disease

Proposed effects

Haematologic: childhood and adult leukaemia;

Endocrine & reproductive: breast cancer, male infertility and miscarriages;

Development & children: slow development, asthma, autism, obesity and behavioural disorders;

Cardiovascular & systemic: arrhythmias, hypertension, fatigue, headaches and sleep disturbance

POSITION 2 :

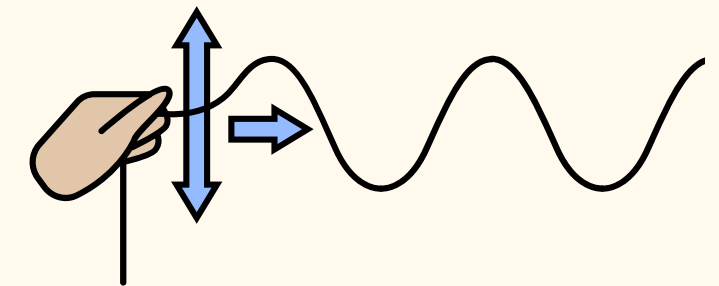
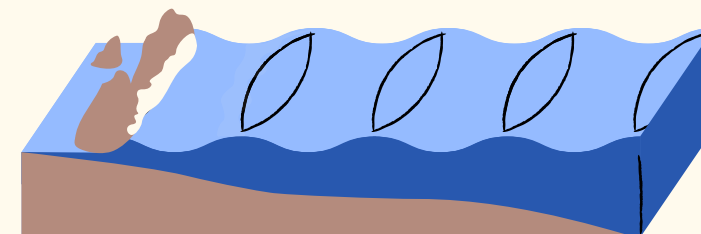
Today's facts

Regulatory bodies note **no firm evidence** of health hazards at typical public exposure levels; **guidelines** focus on avoiding **heating effects**.

Many epidemiological studies and reviews **find weak or inconsistent associations**; there is **limited evidence** of electromagnetic-wave dangers.

Boddy protection

Skin, skull and other tissues act as **effective shields**, and rapid **thermal dissipation** limits biological impact. EMF technologies also deliver **health benefits** (e.g., MRI, diathermy) illustrating safe use under controlled conditions.



CURRENT RESEARCH IS **INSUFFICIENT** TO CONCLUDE THAT **LONG-TERM** MOBILE PHONE USE HARMS HUMAN HEALTH



Considerations

Realistic exposure depends on **dose, distance** and **duration**; exposure from mobile phone antennas increases with **proximity** and **signal strength**.

Exposure

Epidemiological studies often rely on self-reported phone use and have small samples or poor exposure assessment, limiting conclusions.

Boddy

Cellular experiments may show **molecular changes** but may not translate to **whole-body effects** due to homeostatic mechanisms.

The Scientific Divide

“Gulf of opinions” (Héroux P.)

- Industry-funded research : thermal
- Independent research : non-thermal

Decades of polarisation

Early conflicting studies hardened views, each side reading the data their own way.

Fuel of division

Funding sources and assumptions about acceptable endpoints fuel the divide

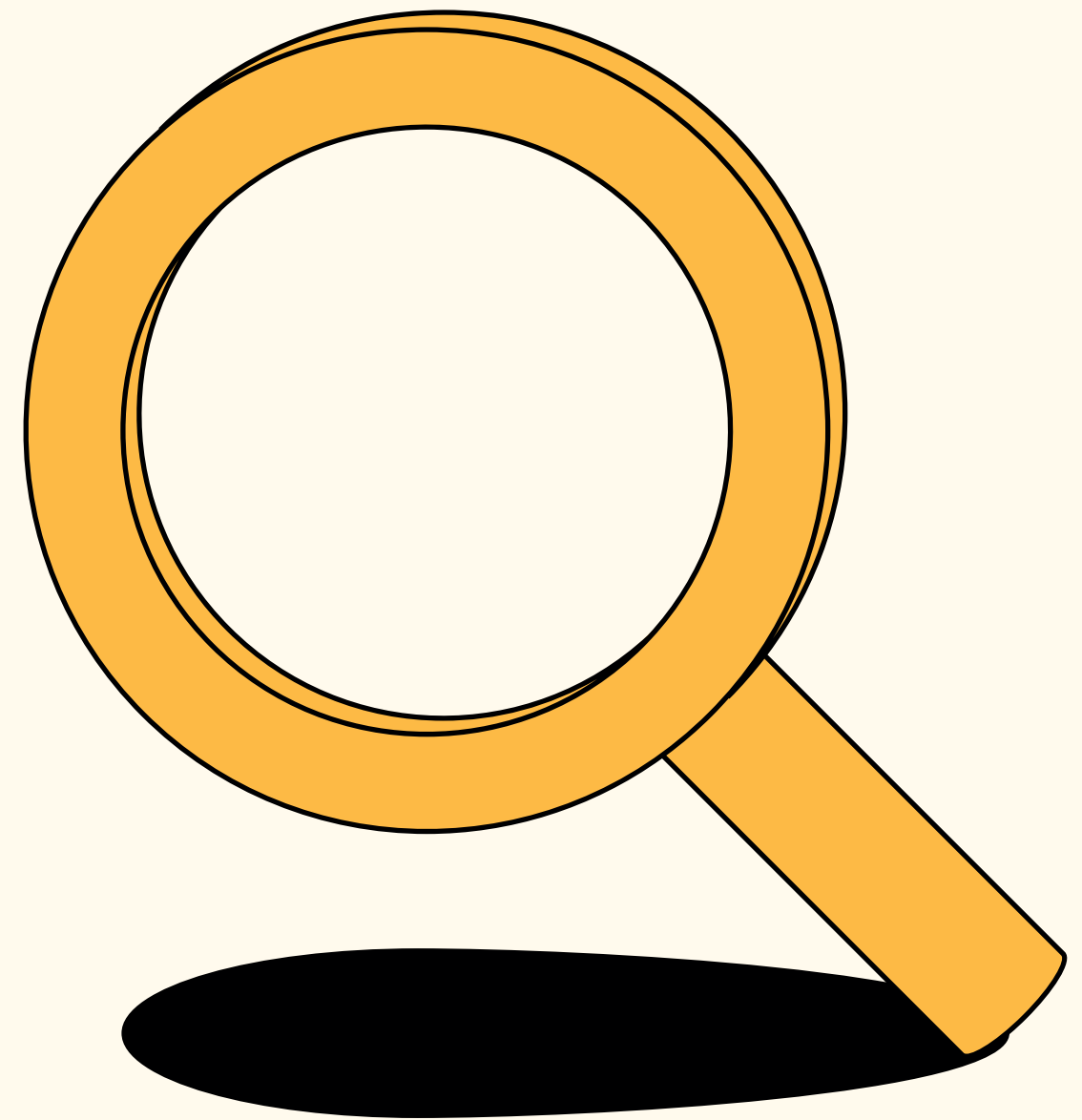


Scientific Consensus

There is no **unified consensus**:
evidence remains conflicting and
interpretations vary across disciplines.

The International Agency for Research
on Cancer (IARC) classifies RF radiation
as “**possibly carcinogenic to humans**”.

Regulatory guidelines are based on
avoiding thermal effects; non-thermal
bioeffects remain controversial.



Conclusion & Perspective

EMFs are ubiquitous, and a balanced view recognizes both potential risks and documented benefits.

Mixed evidence: some studies report oxidative stress and **possible cancer** or neurological effects, while others show **low penetration** and inconsistent epidemiological findings.

Prudent approach: reduce unnecessary exposure, support independent long-term research, and update guidelines as new evidence emerges.



References

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Questions ?

