SCIENCE TO SAGE · SPECIAL INVESTIGATION

You Are *Mostly Water* — And They Are Microwaving You

Why 5G is not simply a communications technology debate — it is a question about what happens when microwave radiation meets a body that is, molecule by molecule, almost entirely water.

RESEARCH COMPILATION · KAREN ELKINS · SCIENCE TO SAGE

01 — THE HIDDEN PREMISE

What Are We, Really?

Before any conversation about 5G, wireless radiation, or electromagnetic frequency can be fully understood, we need to confront a fact that mainstream biology quietly buries in its footnotes:

99%

OF ALL MOLECULES IN THE HUMAN BODY

ARE WATER

— Dr. Gerald Pollack, Professor of Bioengineering, University of Washington &
ScienceDirect: Water Metabolism

We are routinely told the body is "60–70% water" — and by *mass*, that is broadly true. But mass is the wrong lens. When you count molecule by molecule — the most chemically meaningful way — **99 out of every 100 molecules in your body are water molecules.**

Every protein, every strand of DNA, every cell membrane is suspended in, surrounded by, and chemically dependent on this vast ocean of H_2O. Water is not the medium of life. Water *is* life, structured around it at a molecular level.

Now ask a different question: **What does microwave technology do to water?**

You already know the answer. You use it every morning. A microwave oven works precisely because it causes

water molecules to vibrate at resonant frequencies — agitating them to generate heat. The operating frequency of a standard microwave oven is **2.45 GHz**. Early 5G infrastructure operates between **600 MHz and 86 GHz**, with millimeter-wave 5G operating between **24–100 GHz**.

We are deploying microwave technology — at an unprecedented density of transmitters, at continuous exposure — around bodies that are, at the molecular level, almost entirely water.

This is not a fringe observation. This is physics. And the question being suppressed is whether the *biological* consequences of that physics have ever been adequately studied before rollout.

02 — THE FOURTH PHASE

Water Is Not What You Were Taught

Dr. **Gerald Pollack**, Professor of Bioengineering at the University of Washington and founding Editor-in-Chief of the journal *WATER*, has spent decades investigating

what water actually does inside living systems — and his findings fundamentally change the stakes of the 5G debate.

Pollack identified what he calls the **Fourth Phase of Water** — a structured, liquid-crystalline state that forms wherever water meets any hydrophilic (water-attracting) surface. Inside the human body, that is virtually everywhere: every cell membrane, every protein, every strand of DNA is surrounded by this structured water layer.

This structured water — called **EZ water** (Exclusion Zone water) — has the formula H_3O_2, not H_2O. It carries a negative electrical charge. It excludes toxins and other solutes. And it acts as a *biological battery*, storing and releasing energy that drives cellular processes.

> *Absorbed radiant energy splits water molecules; the negative moiety constitutes the building block of the EZ, while the positive moiety forms free hydronium ions that drive biological processes. The energy for building water structure comes from radiant energy — from infrared, from light, from the electromagnetic environment.*

> — DR. GERALD POLLACK, THE FOURTH PHASE OF WATER

Here is the critical intersection: **EZ water is electromagnetically sensitive.** It is built by infrared and visible light — natural frequencies that organisms evolved within. And it is *disrupted* by microwave frequencies.

Pollack's research found that microwaves disrupt the process by which EZ water forms and maintains its structured state — collapsing the very biological architecture that enables cellular function, molecular transport, and energy production throughout the body.

When we consider that the human body is 99% water molecules, and that the biological activity of that water depends on a precisely structured electromagnetic environment — the saturation of that environment with artificial microwave radiation is not a trivial concern. It is potentially a fundamental disruption of the conditions that make life function.

Key Resources — Water Science

POLLACK LABORATORY — UNIVERSITY OF WASHINGTON

Official research home of EZ water / Fourth Phase of Water science

pollacklab.org

THE FOURTH PHASE OF WATER — INTERNET ARCHIVE

Pollack's landmark book — free access via Internet Archive

archive.org

99% OF BODY MOLECULES ARE WATER — STONY BROOK NEUROTEXT

Peer-reviewed confirmation of water's molecular dominance in biology

neurotext.library.stonybrook.edu

SCIENCEDIRECT — WATER METABOLISM OVERVIEW

Scientific literature confirming 99% molecular water composition

sciencedirect.com

03 — THE SCIENTIST SPEAKING OUT

Dr. Lennart Hardell and the Cancer Evidence

> *My advice: dismantle 5G. It is a toxic agent forced on humans.*
>
> — LENNART HARDELL, MD, PHD — PROFESSOR OF ONCOLOGY, ÖREBRO UNIVERSITY, SWEDEN

Dr. Lennart Hardell is not a blogger or a conspiracy theorist. He is one of the world's most cited cancer researchers — originally recognized internationally for his work linking Agent Orange and environmental chemicals to cancer. Over the past two decades, he turned his attention to radiofrequency radiation from wireless technologies.

His conclusion, published across multiple peer-reviewed journals, is that **radiofrequency radiation should be classified as a Group 1 human carcinogen** — the same classification as asbestos and tobacco — not

merely "possibly carcinogenic" (Group 2B) as IARC currently holds.

His argument rests on converging evidence across three domains:

Human epidemiology — long-term mobile phone users show increased rates of glioma and acoustic neuroma, with risk rising with cumulative use and years of exposure.

Animal studies — the $25 million U.S. National Toxicology Program study found clear evidence of malignant schwannomas of the heart and gliomas of the brain in RF-radiation-exposed male rats — the same tumor types seen in human epidemiological studies.

Laboratory findings — multiple studies demonstrate DNA strand breaks, oxidative stress, and altered cell signaling in response to RF radiation — establishing biological mechanisms by which cancer could arise.

Hardell's most recent work specifically addresses 5G: a series of human case reports documented the emergence of what he calls *Microwave Syndrome* — headaches, sleep disturbance, cognitive disruption, fatigue — appearing in residents following the installation of 5G base stations near their homes, and

resolving when they relocated to lower-radiation environments.

Key Research Papers — Hardell

ONCOLOGY LETTERS, 2020 — PUBMED

Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest

pubmed.ncbi.nlm.nih.gov/32774488

WORLD JOURNAL OF GASTROENTEROLOGY, 2021

Health Council of the Netherlands and 5G cancer risks — full analysis of regulatory failures

wjgnet.com

FIRST 5G HEALTH STUDY — ENVIRONMENTAL HEALTH TRUST

16 human case reports on Microwave Syndrome following 5G installation; symptoms resolved on relocation

ehtrust.org

HARDELL'S RESEARCH BLOG — ENGLISH

Ongoing peer-reviewed publications on RF radiation, 5G, and regulatory critique

lennarthardellenglish.wordpress.com

ICBE-EMF — SCIENCE ON CELL PHONES, TOWERS & CANCER

International Commission on Biological Effects of EMF — independent research compilation

icbe-emf.org

04 — THE GOVERNMENT'S OWN STUDY

The National Toxicology Program — $25 Million, 10 Years

Perhaps the most significant study in this field was funded not by activists or alternative researchers — but by the **United States federal government** through the National Toxicology Program (NTP), a division of the National Institute of Environmental Health Sciences.

The study ran for a decade, cost $25 million, and was specifically designed to be the definitive scientific word

on whether RF radiation from cell phones causes cancer in mammals.

The NTP peer review panel found: A statistically significant increase in malignant schwannomas of the heart and malignant gliomas of the brain in male rats exposed to RF radiation — the same tumor types found in epidemiological studies of long-term human cell phone users. Additional increases were found in the adrenal gland, pancreas, prostate, pituitary, liver, and lung.

DNA breaks were also found in the brains of exposed rats. A subsequent external peer-review panel of pathologists concluded that the link to cancer was *stronger* than the NTP's own reports had acknowledged — and recommended that seven of the NTP's own evaluations be upgraded.

NTP TECHNICAL REPORT — NIH/NCBI

Full peer-reviewed technical report on RF radiation carcinogenesis in rats and mice

ncbi.nlm.nih.gov/books/NBK564537

NTP PEER REVIEW — ENVIRONMENTAL HEALTH TRUST

Full documentation of the 2018 peer review and upgraded findings

ehtrust.org — NTP Peer Review

NTP GENOTOXICITY STUDY — PMC

DNA damage findings in brain, blood, and hippocampus from RF radiation exposure

ncbi.nlm.nih.gov/pmc/articles/PMC7027901

COMMENTARY DEFENDING NTP FINDINGS — SCIENCEDIRECT

Dr. Ron Melnick (NTP study designer) rebutting industry-funded criticisms

sciencedirect.com

MICROWAVE NEWS — NTP FINAL RF REPORT ANALYSIS

Independent reporting on the upgraded pathology panel conclusions

microwavenews.com

05 — THE CAPTURED INSTITUTIONS

Why WHO, ICNIRP, and the FCC Cannot Be Trusted on This Question

The instinct to defer to authoritative bodies is understandable — but on this issue, that deference has been systematically exploited. The organizations setting global safety standards for electromagnetic radiation carry documented, structural conflicts of interest with the telecommunications industry.

INSTITUTION	DOCUMENTED PROBLEM
ICNIRP	A self-selecting private club of just 14 members with no independent oversight. Founded by Michael Repacholi, who was found to be channeling industry money through a hospital for his EMF activities and is now an industry consultant — yet remains an ICNIRP Emeritus Member.
WHO EMF Project	Founded by the same Michael Repacholi, with the project largely funded by the telecom industry's own lobbying organizations — the GSM Association and Mobile Manufacturers Forum. Repacholi simultaneously headed both WHO and ICNIRP, inviting telecom and military industries into standard-setting meetings.

INSTITUTION	DOCUMENTED PROBLEM
FCC (US)	Described in a Harvard study as a "captured agency" — regulatory revolving doors between the FCC and the telecommunications industry mean the regulator is effectively serving the industry it is supposed to regulate.
FDA (US)	Post-COVID institutional trust collapse, compounded by historical pharmaceutical industry capture and suppression of inconvenient findings in drug and device safety domains.

As researchers have noted, this pattern is not new. It mirrors the documented strategies of the tobacco, asbestos, and pesticide industries — funding favourable research, placing industry-linked scientists in regulatory positions, and weaponizing the language of scientific uncertainty to delay action for decades while harm accumulates.

> *There seems to be a cartel of individuals monopolizing evaluation committees, thus reinforcing the no-risk paradigm. We*

> *believe that this activity should qualify as scientific misconduct.*
>
> — HARDELL & CARLBERG, ONCOLOGY LETTERS, 2020

Key Resources — Institutional Capture

ICNIRP CONFLICTS OF INTEREST — FULL DOCUMENTATION

Environmental Health Trust — comprehensive compilation of funding ties, member conflicts, and suppressed research

ehtrust.org — ICNIRP Conflicts

EU PARLIAMENT 98-PAGE ICNIRP REPORT

MEPs Rivasi and Buchner — formal parliamentary investigation into ICNIRP industry capture and push for 5G

linkedin.com — ICNIRP Report Summary

RADIATION PROTECTION DOMINATED BY INDUSTRY — EHT

> *Researchers describe ICNIRP as "an extended arm of the mobile communications industry and a closed club without democratic legitimation"*
>
> ehtrust.org — Industry Domination

> DR. MAGDA HAVAS — WIRELESS INDUSTRY & ICNIRP CONFLICT OF INTEREST
>
> *Analysis of funding flows between telecom and the researchers who set safety standards*
>
> magdahavas.com

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06 — FOLLOW THE MONEY

The Patent Gold Rush: Who Profits from 5G Rollout

When evaluating any technology's safety narrative, the first question is always: *who profits if the public accepts it without question?* In the case of 5G, the financial stakes are so extraordinary that they constitute a structural conflict of interest at civilization scale.

$1.3T

PROJECTED GLOBAL 5G INVESTMENT BY 2030

The U.S. C-band spectrum auction alone raised $81 billion — one of the largest single sales in history.
— PatentPC / Allied Market Research

The 5G ecosystem is not merely a communications upgrade — it is the foundational infrastructure for smart cities, autonomous vehicles, the Internet of Things, and total environmental data capture. The companies holding the patents and spectrum licenses will extract royalties from *every device, every connection, every data transaction* for decades to come.

AT&T — Spectrum and Infrastructure Domination

AT&T has invested tens of billions of dollars securing the spectrum licenses that make 5G operation possible — betting the company's future on a technology they have zero financial interest in questioning.

Key AT&T 5G investments:

In 2025, AT&T acquired approximately 30 MHz of nationwide 3.45 GHz mid-band spectrum and approximately 20 MHz of nationwide 600 MHz low-band spectrum for approximately $23 billion in an all-cash transaction — covering over 400 markets across virtually every U.S. market.

AT&T holds more than 1,040 MHz of nationwide millimeter-wave (mmWave) spectrum — the highest-frequency, shortest-range, densest-deployment band of 5G, requiring the most transmitter infrastructure and generating the most concentrated exposure near the body.

Verizon, AT&T, and T-Mobile were the biggest winners of the C-band spectrum auction in 2021, which raised $81 billion — one of the largest spectrum sales in history.

With $23 billion spent on spectrum alone in a single transaction — before a single tower is built, before a single device is sold — AT&T's entire corporate trajectory depends on the public accepting 5G without the safety questions that would trigger regulatory delay or redesign.

Google / Alphabet — The Smart City Data Play

Google's interest in 5G is less about telecommunications revenue and more about what 5G *enables*: the total sensoring of physical environments at a scale that was previously impossible.

Through Alphabet's Sidewalk Labs, Google pursued the construction of a fully instrumented smart city district in Toronto — promising 5G internet for everyone, smart curbs that sense vehicles, and data collection to continuously improve services and infrastructure, including a centralized identity management system connecting residents' transit, library, and civic records.

Critics noted bluntly: "Smart cities are surveillance cities. There is no coincidence that the city is also the first target of technology giants: if they manage to control its infrastructure, the rest will follow."

The Toronto project was ultimately cancelled after a public backlash over data sovereignty. But the vision did not die — Sidewalk Labs folded its smart city products back into Alphabet, creating spin-off company Replica, which implements data platforms that measure traffic, consumer spending, and more for cities. The infrastructure ambition continues; only the branding changed.

Google has also filed multiple 5G-specific patents — including for secure 5G IoT device access and network architecture — and companies such as Google and Meta, often considered peripheral to wireless communication, are now actively shaping the 6G standards process, cementing their position in the next generation of the technology before the current one has been safety-evaluated.

The Patent Licensing Machine

The 5G standard essential patents licensing market is set to become one of the most lucrative — not just in terms of royalties but also for maintaining leadership of increasingly competitive industrial value chains.

The global cellular licensing market is estimated at **$15–20 billion per year**. The number of declared 5G patent families has increased tenfold between 2017 and 2023, reaching over 60,000 — almost 2.5 times more than the 24,000 patent families declared for 4G.

As of 2025, the United States leads with 109,461 5G patents, reflecting its strong presence in core wireless technologies and standards-driven innovation. Every one of those patents represents a future revenue stream — contingent on 5G being deployed, normalized, and never meaningfully challenged on safety grounds.

The structural reality: The companies holding 5G patents and spectrum licenses have collectively invested hundreds of billions of dollars — sums that create an overwhelming institutional incentive to suppress, delay, or discredit any safety research that might trigger regulatory intervention. This is not conspiracy; it is basic corporate economics. The same dynamic drove tobacco's 50-year delay, asbestos's continued use long after harm was known, and leaded gasoline's persistence despite clear evidence of neurotoxicity.

AT&T $23B SPECTRUM ACQUISITION — OFFICIAL PRESS RELEASE

AT&T's own announcement of their largest spectrum purchase, covering virtually every U.S. market

about.att.com

5G INVESTMENT TRENDS — PATENTPC ANALYSIS

Who is spending the most on 5G: $1.3 trillion projected by 2030, $81B C-band auction, $50B+ annual R&D

patentpc.com

5G PATENT LANDSCAPE — GREYB RESEARCH

Comprehensive analysis of who owns 5G patents: 109,461 U.S. patents, top holders, financial stakes

insights.greyb.com

LEXISNEXIS IP — 2026 5G REPORT: TOP 50 TECHNOLOGY OWNERS

Current patent ownership, royalty valuations, and the $15–20B/year licensing market

lexisnexisip.com

GOOGLE PATENTS — 5G IOT SECURITY (US20210368341A1)

Example of Google's direct 5G patent holdings — secure access architecture for 5G IoT networks

patents.google.com

SIDEWALK LABS SMART CITY DATA CONCERNS — CIGI ANALYSIS

Scholarly analysis of Google's smart city surveillance ambitions and data governance failures

cigionline.org

USPTO — 5G PATENT ACTIVITY REPORT

Official U.S. Patent Office analysis of 5G patent concentration, major holders, and global filing trends

uspto.gov — 5G Patent Report PDF

THE WIRELESS INDUSTRY IS DROWNING IN 5G PATENTS — LIGHT READING

Industry analysis of the patent licensing gold rush — 60,000+ declared patent families and growing

lightreading.com

07 — INDEPENDENT VOICES

Where to Go for Uncaptured Science

If the bodies setting the standards cannot be trusted, where does responsible inquiry turn? These are the researchers and institutions working outside the industry funding loop:

5G APPEAL TO THE EU

Signed by hundreds of independent scientists and physicians — calling for moratorium on 5G deployment until safety studies are conducted

5gappeal.eu

ENVIRONMENTAL HEALTH TRUST

Comprehensive, peer-reviewed research archive on EMF, RF radiation, and biological effects

ehtrust.org

ICBE-EMF — INDEPENDENT COMMISSION ON BIOLOGICAL EFFECTS

Scientists providing alternative framework to ICNIRP — peer-reviewed, industry-free

icbe-emf.org

PHYSICIANS FOR SAFE TECHNOLOGY

Medical professionals compiling and translating EMF research for clinical and public understanding

mdsafetech.org

RADIATION RESEARCH (HARDELL'S PLATFORM)

Case reports, 5G health documentation, policy commentary, and independent research

radiationresearch.org

DR. MAGDA HAVAS PHD

Decades of independent research on biological effects of electromagnetic radiation

magdahavas.com

MICROWAVE NEWS

Long-running independent journalism on the science and politics of microwave radiation research

microwavenews.com

PMC — 5G CARCINOGENESIS MECHANISMS REVIEW

Peer-reviewed paper examining three proposed biological mechanisms of 5G radiation carcinogenesis

pmc.ncbi.nlm.nih.gov/articles/PMC7753259

The Question They Don't Want Asked

We have built an entire civilization on a technology whose interaction with the primary molecule of life has never been adequately studied.

We are walking, breathing vessels of structured water — and we are bathed, continuously and without consent, in the same frequency range that makes water molecules vibrate.

The science is there. The researchers are speaking. The institutions are captured.

The question is whether enough people will listen before the evidence becomes impossible to ignore.

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