

Wireless Radiation Safety in 2014: The Year in Review

Two major research studies published this year found that brain cancer risk increased with wireless phone use. Several significant policy-related actions regarding wireless radiation also occurred in 2014.

French researchers found almost a 3-fold increase in brain cancer with 896 or more hours of lifetime cell phone use. Swedish researchers found a 2-fold increase in brain cancer with 1,486 or more hours of cell phone use and a 3-fold risk with 25 or more years of cell and cordless phone use.

These studies add to the evidence of increased brain cancer risk found among heavier cell phone users in the 13-nation *Interphone study* published in 2010. The International Agency for Research on Cancer (IARC) of the World Health Organization (WHO) relied heavily on the Interphone Study and earlier research by the Swedish researchers to declare radio frequency radiation “possibly carcinogenic to humans” in 2011.

A news report on the Swedish study by *Reuters Health* stimulated global media coverage—over 260 news articles published in 18 languages in 50 countries— demonstrating worldwide concern about the carcinogenicity of cell phone radiation.

Key developments in the past year

- The U.S. **Department of the Interior** accused the Federal Government of employing **outdated standards**: “*the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today.*” The standards violate federal law as they endanger federally-protected wildlife species which suffer adverse effects from cell tower radiation exposure.
- **Four resolutions** signed by **98 scientific experts** were submitted to the FCC which resolutions call on government to issue **stronger regulations** on wireless radiation, especially cell phone radiation.
- The *Wall Street Journal* reported that one in ten **cell phone towers** in the U.S., numbering about 30,000 in all, emit levels of microwave radiation that exceed the legal limit thus endangering the health of workers, noting that the FCC has issued only two citations for noncompliance since 1996.
- The **Centers for Disease Control and Prevention (CDC)** became the first Federal health agency to issue **precautionary health warnings** about cell phone use; however, CDC later **removed the warnings** from its web site after the media reported about this key policy change.
- Fifty-four scientists from 18 nations who study the effects of radio frequency radiation submitted a **declaration to Health Canada** calling on government to minimize public exposure to the microwave radiation emitted by wireless devices including cell phones, cordless phones, Wi-Fi, broadcast antennas, smart meters, and baby monitors.
- **SINTEF**, the largest independent research organization in Scandinavia, proposed manufacturing design guidelines to reduce the magnetic fields emitted by **hybrid and electric automobiles** which are possibly carcinogenic to humans.
- The City Council of **Berkeley**, California directed the City Attorney to draft a **cell phone “right to know” ordinance** that would require retailers to provide consumers with a fact sheet regarding the cell phone’s minimum separation distance from the body. Harvard law professor Lawrence Lessig has offered to defend this ground-breaking ordinance should the CTIA—The Wireless Association sue the City.
- In a **lawsuit** filed by 29 individuals who are suing the wireless industry for their brain tumors, the **D.C. Superior Court** admitted the testimony of expert witnesses for the plaintiffs. This ruling enables the case to move to the discovery phase of the trial, and the industry will be required to release relevant documents.
- The **Los Angeles Unified School District** officially accommodated a teacher who suffers from **Electromagnetic Hypersensitivity (EHS)** by approving her request to have the Wi-Fi turned off in her classroom and her request to be reassigned in the future to another school where Wi-Fi has not been installed. This is the first accommodation for EHS by a public school system in the U.S.
- A systematic **review of the research** on the effects of cell phone radiation on human **sperm** found that mobile phone exposure negatively affects sperm quality and may contribute to **infertility** in some men.

Although two wireless products launched in 2014 received extraordinary media coverage, the news media failed to mention the potential health risks from using these products:

- The Specific Absorption Rate (SAR), a measure of the maximum amount of microwave radiation absorbed, is much higher for the **Google Glass** than for most cell phones. This is of particular concern for the Glass as unlike cell phones it is worn on the user's head.
- The **iPhone 6**, like most smart phones, has several transmitters that simultaneously emit microwave radiation. When these transmitters are turned on the radiation emitted by this phone is close to the SAR legal limit; thus, one should turn off any transmitters not in use (e.g. Wi-Fi) to reduce exposure. According to Apple, the iPhone 6 should be kept at least 5 millimeters or two-tenths of an inch from the body whenever it is turned on (i.e., the device's minimum body separation distance is 5 mm).

Listed below in order of popularity are the ten most popular wireless radiation news releases distributed this year through [PRLog](#), a press release distribution website, and the ten most popular articles posted on the [Electromagnetic Radiation Safety website](#). In 2014, the news releases received over 65,000 page views, and the website received 130,000 page views from visitors in more than 100 countries.

Ten Most Popular Electromagnetic Radiation Safety Press Releases of the Year

[CDC Issues Precautionary Health Warnings about Cell Phone Radiation](#)

[Hybrid and Electric Automobiles Should Be Re-Designed to Reduce Electromagnetic Radiation Risks](#)

[Scientists Call on Government to Protect Public from Wireless Radiation Exposure](#)

[Google Glass Alert: Potential health risks from wireless radiation](#)

[FCC: 98 Scientific Experts Demand Stronger Regulation of Cellphone Radiation](#)

[iPhone 6 SAR: Radiation Levels and Separation Distance](#)

[Cell Phone Use and Prenatal Exposure to Cell Phone Radiation May Cause Headaches in Children](#)

[U.S. Department of Interior attacks FCC regarding Adverse Impact of Cell Tower Radiation on Wildlife](#)

[CDC Retracts its Precautionary Health Warning about Cell Phone Radiation](#)

[The Top Cell Phone Radiation Safety Stories of 2013](#)

Ten Most Popular Articles of the Year on the SaferEMR Website

[iPhone 6 SAR: Radiation Levels and Separation Distance](#)

[Cell Phones and Health](#)

[MOBI-KIDS: Childhood Brain Tumor Risk & Mobile Phone Use Study](#)

[Dept. of Interior Attacks FCC regarding Adverse Impact of Cell Tower Radiation on Wildlife](#)

[Wi-Fi in Schools](#)

[Welcome to EMR Safety](#)

[Everything You Wanted to Know about Cell Phone Radiation](#)

[Hybrid and Electric Automobiles Should Be Re-Designed to Reduce Electromagnetic Radiation Risks](#)

[Major breakthrough in cellphone industry product liability lawsuit in USA](#)

[Berkeley Cell Phone "Right to Know" Ordinance](#)

Labels: cancer, cell phone, cell towers, cordless phone, EHS, electric, Glass, hybrid, iPhone, lawsuit, ordinance, precautionary, regulation, SAR, Wi-Fi, wireless radiation, workers

Wednesday, December 17, 2014

Welcome to EMR Safety

Joel M. Moskowitz, Ph.D.
School of Public Health
University of California, Berkeley

Current news stories: [Facebook](#)

News releases: [PRLog](#)

Twitter updates: [@berkeleyprc](#)

Some Tips to Reduce Your Exposure to Wireless Radiation (one page handout)

Mobilize, a Film about Cell Phone Radiation

Best Documentary Feature at the California Independent Film Festival

Mobilize, a feature-length documentary about cell phone radiation, premiered on September 12, 2014. The film won the Slate Award for Best Documentary Feature at the 17th Annual California Independent Film Festival.

The film explores the potential long-term health effects from cell phone radiation and examines recent scientific research and the challenges politicians face trying to adopt precautionary legislation. Featuring interviews with experts, wireless industry representatives and prominent politicians, the film illuminates how industry's economic and political influence can undermine public health.

The film was directed by Kevin Kunze and produced by Ellen Marks, Joel Moskowitz, and Devra Davis.

The film can be viewed online or downloaded from [Vimeo](#) and is available on DVD from [Disinfo](#) and from [Amazon](#).

Short Clips

[Mobilize Trailer on Vimeo](#)

[Mobilize Official Trailer #1 \(2014\)](#)

[Mobilize Official Trailer #2 \(2014\)](#)

[Mobilize Trailer \(2013\)](#)

[Steven Colbert on Cell Phone Manuals](#)

[David Servan Schreiber on Cell Phones & Brain Cancer](#)

[Devra Davis on Cell Phone Radiation](#)

[Joel Moskowitz on Cell Phone Studies](#)

[Cell Phone Radiation & Breast Cancer](#)

Overview

Latest News Releases

"Some Tips to Reduce Your Exposure to Wireless Radiation" (one page handout)

Original English version: <http://bit.ly/1kVHRug>

Italian translation (by Associazione Elettrosmog Sicilia): <http://bit.ly/Y9E4Wy>

"Cellphones and Health" by Joel Moskowitz (Oct/Nov, 2013)

http://www.saferemr.com/2013/09/cellphones-and-health_9.html

Teléfonos Celulares y Salud por Dr. Joel Moskowitz

<http://www.saferemr.com/2014/02/telefonos-celulares-y-salud.html>

"New Federal Policy Needed for Cell Phone and Wireless Radiation Safety"

Prepared for "Oakland Voices: A Town Hall on Our Right to Communicate" (Jan 9, 2014)

<http://bit.ly/1cH1Yvf>

"Cell Phones and Cell Biology: Are We Selling Out?"

By David Katz, M.D., Huffington Post (Dec 12, 2013)

Based upon my press releases.

<http://huff.to/1gtpcsX>

Radio Interviews

"Your Call: What do you want to know about cell phone radiation?"

Host: Rose Aguilar, Your Call, KALW - FM, Sep 16, 2014 (49 minutes)

Guests: Joel Moskowitz, UC Berkeley; Kevin Kunze, "Mobilize" Director

<http://bit.ly/Yourcallcellphone>

"Mobilize: A Film on Cell Phone Radiation"

Host: Brian Edwards-Tiekert, Upfront, KPFA - FM, Sep 11, 2014 (25 minutes; starts at 33:50)

Guest: Joel Moskowitz, UC Berkeley

<http://bit.ly/mobilizeKPFA>

"Dr. Joel Moskowitz Joins the Show" (52 minutes)

Boil the Frog Slowly Radio and Patient Safety Radio, Aug 1, 2014

<http://bit.ly/boilfrogslowly>

"Wireless Revolution: Research/Policy Implications"

Host: Layna Berman, Your Own Health and Fitness, KPFA - FM, Apr 22, 2014 (1:00-2:00 PM)

Guest: Joel M. Moskowitz, UC Berkeley

<http://bit.ly/QwhjbB>

"Today on Your Call: What are 'best practices' for using digital devices?"

Host: Ali Budner, Your Call, KALW - FM, Mar 13, 2014 (53 minutes)

Guests: Joel Moskowitz, UC Berkeley

Levi Felix, founder The Digital Detox and director of Camp Grounded

<http://bit.ly/1dWdnJs> or <http://n.pr/1i41WCz>

"Cell Phones and Health"

KPFA-FM, Jan 31, 2014 (1:00-1:30 PM)

Moderator: Laura Garzon Chica

Guests: Josh Hart, Director, StopSmartMeters

Joel Moskowitz, UC Berkeley

Kevin Kunze, Director, "Mobilize"

<http://www.kpfa.org/archive/id/99666>

"What Do You Need to Know about Cellphone Radiation?"

An interview on KAHL radio news (Nov 22, 2013) (11 minutes).

Transcript: <http://bit.ly/1heyOFv>

Download at: <http://bit.ly/J2XAf9>

"Everything you and your 'Friends and Neighbors' need to know about cellphone radiation and how to protect yourselves"

A 2-part program aired on Calvary Radio Network in Dec, 2013 (50 minutes).

Download at: <http://bit.ly/18xbuIT>

Presentations

"Mobile Phone Use and Cancer Risk: Research on a Group 2B Carcinogen"

Joel Moskowitz, Webinar for CDC Workgroup on Cancer Prevention (Oct 29, 2014)

Slides: <http://bit.ly/CDCWebinar102914>

Audio: <http://bit.ly/101I2IR> or <http://bit.ly/1tDZbg2>

"Mobile Phone Radiation and Health: Recent Research and Policy Developments"

Joel Moskowitz, Haas School of Business, University of California, Berkeley (Jun 19, 2014)

Slides: <http://bit.ly/1IFp9vc>

"Brain Tumor Risk from Wireless Phone Use: Recent Research and Policy Implications"

Joel Moskowitz, Commonwealth Club of California (Part II: Dec 9, 2013)

Slides: <http://bit.ly/1k9PeRQ>

Video: <http://bit.ly/1kxkpto> or <http://bit.ly/1hx3t5j>

"Expert Roundtable: Skeptical about Cell Phones and Health?"

Forum at Commonwealth Club of California (Dec 9, 2013)

Other presentations will be available soon.

Agenda : <http://bit.ly/1aqek9K>

"Cell Phones & Brain Tumors What Does the Science Show?"

Joel Moskowitz, Commonwealth Club of California (Part I: Nov 18, 2010)

Slides: <http://bit.ly/W5tNCN>

Video (15 minutes): <http://vimeo.com/17266112>

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Labels: [cancer](#), [carcinogen](#), [cell phone](#), [electromagnetic](#), [health effects](#), [magnetic field](#), [mobile phone](#), [precautionary principle](#), [report](#)

Berkeley Cell Phone "Right to Know" Ordinance

November 21, 2014

On November 18, the Berkeley City Council adopted a [referral to the City Manager](#) on a 7-2 vote. The referral asks the City Manager to draft a cell phone "right to know" ordinance.

Once this ordinance is enacted, Berkeley will become the first city in the nation to require cell phone retailers to provide those who purchase a new phone an informational fact sheet. Retailers will be required to provide the fact sheet to those who purchase a cell phone which informs them to read the user manual to learn the cell phone's minimum separation distance from the body.

The FCC requires manufacturers to provide this information to ensure that the consumers' cell phone radiation exposure does not exceed the amount when the cell phone was tested. Few consumers are currently aware of this safety information because it is buried in their user manual or within their smart phone. Knowledge of this information is an important step in increasing awareness that cell phones should not be used next to the body.

Councilman Max Anderson who sponsored the referral grilled the CTIA representative, Gerard Keegan, about why the industry does not want consumers to see the safety information that the FCC mandates. The CTIA position is that this is between the FCC and the industry, and the FCC is in the process of deciding whether this information is necessary so the City should not act on this issue.

The referral directs the City Manager to ask City Attorney Zach Cowan and Harvard Law Professor Lawrence Lessig to draft the ordinance.

A [video of the meeting](#) is now available for streaming (see 01:44:50 - 03:36:25).

Summaries of the meeting have been published by [The Daily Californian](#) and the [Contra Costa Times](#).

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November 10, 2014

The Berkeley City Council postponed discussion of the cell phone "right to know" ordinance until Tuesday, November 18, 2014.

City Manager Referral: Cell Phone Ordinance Referral to City Manager (*Continued from October 28, 2014*)

From: Councilmember Anderson

Recommendation: Refer to City Manager for the creation of an ordinance to have cell phone retailers give to consumers who purchase a phone, a factual, informational handout referring the user to their cell phone manufacturers' disclosure regarding the recommended separation distance for use against the body.

Financial Implications: See report

Contact: Max Anderson, Councilmember, District 3, 981-7130

<http://bit.ly/1EvJvPz>

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October 15, 2014

Press Release: Berkeley's Proposed Cell Phone "Right to Know" Ordinance

<http://www.prlog.org/12383163>

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October 10, 2014

This cell phone "right to know" ordinance is on the consent calendar for the Berkeley City Council meeting to be held on Tuesday, October 28, 2014. The referral and briefing document are available at <http://bit.ly/BerkeleyReferral>.

City Manager Referral: Cell Phone Ordinance Referral to City Manager

From: Councilmember Anderson; Councilmember Worthington

Recommendation: Refer to City Manager for the creation of an ordinance to have cell phone retailers give to consumers who purchase a phone, a factual, informational handout referring the user to their cell phone manufacturers' disclosure regarding the recommended separation distance for use against the body.

Financial Implications: See report

Contact: Max Anderson, Councilmember, District 3, 981-7130

The advisory will be in the form of an informational handout to be handed to consumers by the retailer at the time of purchasing a cell phone. The proposed wording is as follows:

"The Federal Government requires that cell phones meet radio frequency (RF) exposure guidelines. Don't carry or use your phone in a pants or shirt pocket or tucked into a bra when the phone is turned ON and connected to a wireless network. This will prevent exposure to RF levels that may exceed the federal guidelines."

"Refer to the instructions in your phone or user manual for the recommended separation distance."

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Precaution or Paranoia? Berkeley May Require Cancer Warning Stickers for Cell Phones

Sabin Russell, *California Magazine*, August 19, 2014

[An indepth article about the science and politics underlying the proposed Berkeley cell phone ordinance--research on cancer risk and fetal effects on neurological development is discussed.]

Just as the world supply of mobile phones is reaching one unit for every human being on Earth, here comes Berkeley, with a warning: These things could be hazardous to your health ...

Stakes in this argument are extraordinarily high. Cell phones are radio transmitters that are not only ubiquitous, they are close at hand: We press them against our ears. We store them in our pants pockets. Women slip them into their bras. Teens sleep with them under their pillows. With the adult market nearly saturated, the big growth opportunity for mobile devices is **children**.

"In our society, the precautionary principle does not resonate well. We want to see a body count first."

The **CTIA statement** builds a case that the "scientific consensus" is firmly in their camp. In fact, the two-word term appears 28 times in their filing. They quote numerous federal agencies asserting a lack of evidence that cell phone radiation can cause harm. Among them is the FCC itself, the FDA, and most notably, the **National Cancer Institute**, which states on its web site that "there is no evidence from studies of cells, animals, or humans that radiofrequency energy can cause cancer.

Moskowitz dismisses the endorsements. "Industry and government agencies seem to be in denial, and have been in that frame of mind for decades," he says.

... Cell-phone makers in their fine print do advise keeping these devices **about a half-inch away** from your body, although there is no mention of it in an industry-written **parents' guide** to cell phone safety. And meanwhile, let's face it: We just love these little appliances. They are changing the way we live. If they are changing the way we die, we'll find out, eventually.

<http://bit.ly/1p7158O>

Also see:

Eric Schultz. Killer App: A Berkeley researcher weighs in on cell phones and cancer. *California Magazine*. Winter 2010. <http://bit.ly/1kSu5z5>

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Berkeley pushes for cancer warning stickers on cell phones

Carolyn Jones, SFGate, Jul 15, 2014 (updated)

Print version: "**CELL PHONE ORDINANCE: Berkeley will fight for cancer warnings,**" *San Francisco Chronicle*, Jul 15, 2014, pg. A - 1

Berkeley, undaunted by abandoned efforts in San Francisco, is attempting to become the first city in the nation to require retailers to put stickers on cell phone packaging warning people that the devices may emit cancer-causing radiation ...

Joel Moskowitz, head of UC Berkeley's [Center for Family and Community Health](#), has no such indecision. He's been studying the issue since 2009, and has concluded that cell phones are "one of the top emerging public health risks."

Studies cited by the cell phone industry are outdated, he said. Newer and more complex wireless technology, coupled with people spending increasing amounts of time on their phones, is almost certain to lead to an uptick in brain cancer, he said.

"It's just a matter of time," he said. "The evidence is a lot more compelling than it has been."

Radiation from cell phones penetrates the skin and skull and absorbs into the brain tissue, having an adverse affect on cells, he said. Phone radiation can also affect sperm count among men who carry phones in their pockets, he said.

Consumers should wear headsets, use the speaker feature and otherwise keep phones away from their bodies, he said.

"With cell phones, distance is your friend," he said.

Pregnant women and children are particularly vulnerable, he said.

A warning sticker should advise consumers that some studies link cell phones to rare but serious cancers, and they should take precautions, he said ...

<http://bit.ly/1p0gq6d>

Media coverage about the ordinance

[Australian Mobile Telecommunications Association](#) (Nov 13, 2014)

[BannedBook.org](#) (in Mandarin) (July 15, 2014)

[Bayvoice.net](#) (in Mandarin) (July 14, 2014)

[Berkeley High Jacket](#) (Dec 20, 2014)

[Berkeleyside Op-Ed](#) (Oct 17, 2014)

[Berkeleyside](#) (Nov 18, 2014)

[Berkeleyside](#) (Nov 26, 2014)

[Bloomberg News Radio](#) (mp3: 0:06:55 - 0:08:35) (Jul 15, 2014)

[Bloomberg Politics](#) (Nov 26, 2014)

[Breitbart News](#) (Jul 15, 2014)

[Business Insider](#) (Jul 15, 2014)

[Business Insider Australia](#) (Jul 16, 2014)

[Business Insider India](#) (Jul 15, 2014)

[California City News](#) (Dec 1, 2014)

[California Healthline](#) (Jul 16, 2014)

[California Magazine](#) (Aug 19, 2014)

[CBS SF Bay Area TV News](#) (Aug 22, 2014)

[CBS SF Bay Area TV News](#) (Jul 16, 2014)

[Chico Enterprise-Record](#) (Nov 21, 2014)

[Contra Costa Times](#) (Nov 21, 2014) ([Oakland Tribune](#), Nov 24, 2014)

[The Daily Californian](#) (Jul 16, 2014)

[The Daily Californian](#) (Nov 19, 2014)

[The Davis Enterprise](#) (Jul 22, 2014)

[East Bay Express](#) (Jul 15, 2014)

[ecosalon](#) (Jul 18, 2014)

[GSMA](#) (Nov 24, 2014)

[Headlines and Global News](#) (Jul 17, 2014)

[Healthcare Global](#) (Dec 1, 2014)

KALW Crosscurrents (audio - Sep 24, 2014)
KGO ABC 7 TV News (San Francisco) (Jul 15, 2014)
KGO 810 Radio News (San Francisco) (Jul 15, 2014)
The Kirk Show
KKSF AM Talk 919 (San Francisco) (audio) (Jul 15, 2014)
News Inferno (Jul 16, 2014)
PAN Swiss Newsroom
Public Health Watchdog (Jul 17, 2014)
San Francisco Chronicle (Jul 15, 2014)
Seattle Times (Jul 14, 2014)
SoundofHope.org (Beijing; in Mandarin) (Jul 15, 2014)
WCVB News (ABC5 Boston) (Jul 15, 2014)
Yahoo! Screen (CBS) (Jul 16, 2014)
YourLawyer.com (Jul 17, 2014)

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Labels: Berkeley, cancer, carcinogen, cell phone radiation, law, ordinance, reproductive health risks, retailer, sperm damage, warning

Effect of Mobile Phones on Sperm Quality: Summary of a Systematic Review and Meta-Analysis

Adams JA, Galloway TS, Mondal D, Esteves SC, Mathews M. Effect of mobile telephones on sperm quality: A systematic review and meta-analysis. *Environment International*. 70:106-112. September 2014.

Review Paper Summary

Mobile phones are owned by most of the adult population worldwide. Radio-frequency radiation (RFR) from these devices could affect sperm development and function. Around 14% of couples in high- and middle-income countries have difficulty conceiving. Male infertility is involved approximately 40% of the time. Several countries have reported unexplained declines in semen quality.

Animal research has found that RFR can affect the cell cycle of sperm, increase sperm cell death and produce histological changes in the testes. Research on humans has found that prolonged mobile phone use is associated with decreased motility, sperm concentration, morphology and viability suggesting a likely impact on fertility.

The authors of this peer-reviewed study conducted a systematic review of the research and a quantitative analysis to determine whether exposure to mobile phone radiation affects human sperm quality. Participants were from fertility clinics and research centers.

The study examined the sperm quality outcome measures most frequently used to assess fertility in clinical settings: motility (the ability to move properly through the female reproductive tract), viability (the ability to fertilize the egg), and concentration (the number of sperm in a milliliter of ejaculate).

Ten studies were examined including 1,492 human sperm samples. Exposure to mobile phones was found to be associated with a significant eight per cent average reduction in sperm motility and a significant nine per cent average reduction in sperm viability. The effects on sperm concentration were more equivocal. The results were consistent across experimental laboratory studies and correlational observational studies.

The authors concluded that the overall results suggest that mobile phone exposure negatively affects sperm quality in humans. The clinical importance of these effects in this study may be limited to subfertile men and to men at the lower-end of the normal spectrum.

This open access paper is available at: <http://bit.ly/cellphonespermdamage>.

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Labels: cell phone radiation, male infertility, meta-analysis, mobile phones, motility, research review, sperm, sperm damage, viability

Tuesday, December 16, 2014

Latest News Releases

Berkeley's Proposed Cell Phone "Right to Know" Ordinance
<http://www.prlog.org/12383163>

iPhone 6 SAR: Radiation Levels and Separation Distance
<http://www.prlog.org/12373670>

CDC Retracts its Precautionary Health Warning about Cell Phone Radiation

<http://www.prlog.org/12362077>

CDC Issues Precautionary Health Warnings about Cell Phone Radiation
<http://www.prlog.org/12359483>

FCC: 98 Scientific Experts Demand Stronger Regulation of Cellphone Radiation
<http://prlog.org/12355167>

Scientists Call on Government to Protect Public from Wireless Radiation Exposure
<http://bit.ly/ScientificDeclaration>

Hybrid and Electric Automobiles Should Be Re-Designed to Reduce Electromagnetic Radiation Risks
<http://www.prlog.org/12343742>

Google Glass Alert: Potential health risks from wireless radiation
<http://www.prlog.org/12310450>

Dept. of Interior Attacks FCC regarding Adverse Impact of Cell Tower Radiation on Wildlife
<http://www.prlog.org/12299815>

Cell Phone Radiation Label Bill Passes Maine Legislature Before Dying
<http://www.prlog.org/12299052>

Cell Phone Use and Prenatal Exposure to Cell Phone Radiation May Cause Headaches in Children
<http://www.prlog.org/12269207>

The Top Cell Phone Radiation Safety Stories of 2013
<http://www.prlog.org/12262295>

Everything You Wanted to Know about Cell Phone Radiation: Key submissions to the Federal Communications Commission
<http://www.prlog.org/12245111>

Belgium Adopts New Regulations to Promote Cell Phone Radiation Safety
<http://www.prlog.org/12231532>

French Health Agency Recommends Children and Vulnerable Groups Reduce Cell Phone Radiation Exposure
<http://www.prlog.org/12226630>

Brain Cancer Risk Increases with the Amount of Wireless Phone Use
<http://www.prlog.org/12216483>

LTE Cell Phone Radiation Affects Brain Activity in Cell Phone Users
<http://www.prlog.org/12215083>

Cell Phone Use, Acoustic Neuroma and Cancer of the Pituitary Gland
<http://www.prlog.org/12135511>

Most Significant Government Health Report on Mobile Phone Radiation Ever Published
<http://www.prlog.org/12125230>

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Labels: bioeffects, cancer, carcinogen, cell phone radiation, children, ctia, electromagnetic hypersensitivity, GAO, health, health effects,INTERPHONE, policy, precautionary principle, regulation, research, SAR, Wi-Fi
Wednesday, November 5, 2014

Is mobile phone use contributing to increased incidence of thyroid cancer?

Korea's Thyroid-Cancer "Epidemic" — Screening and Overdiagnosis (and wireless phone use?)

November 5, 2014

According to today's issue of the *New England Journal of Medicine*, South Korea has experienced a thyroid cancer epidemic in recent years (see paper and Figure below).

"Thyroid cancer is now the most common type of cancer diagnosed in South Korea."

The authors of this paper attribute the "epidemic" to a government-sponsored cancer screening program. As evidence, they report,

"There was a strong correlation between the proportion of the population screened in a region in 2008 and 2009 and the regional incidence of thyroid cancer in 2009. Although the aggregate correlation could be vulnerable to the ecologic fallacy, the finding of significant positive correlations in each of eight age- and sex-based groups suggests that the finding is more robust."

That widespread screening identifies more cancer is not surprising. This could at least partly explain the increasing incidence of thyroid cancer observed in South Korea, and nine other countries including the U.S.

The authors argue that most of these cancers are not life-threatening and advise other countries against widespread screening for thyroid cancer:

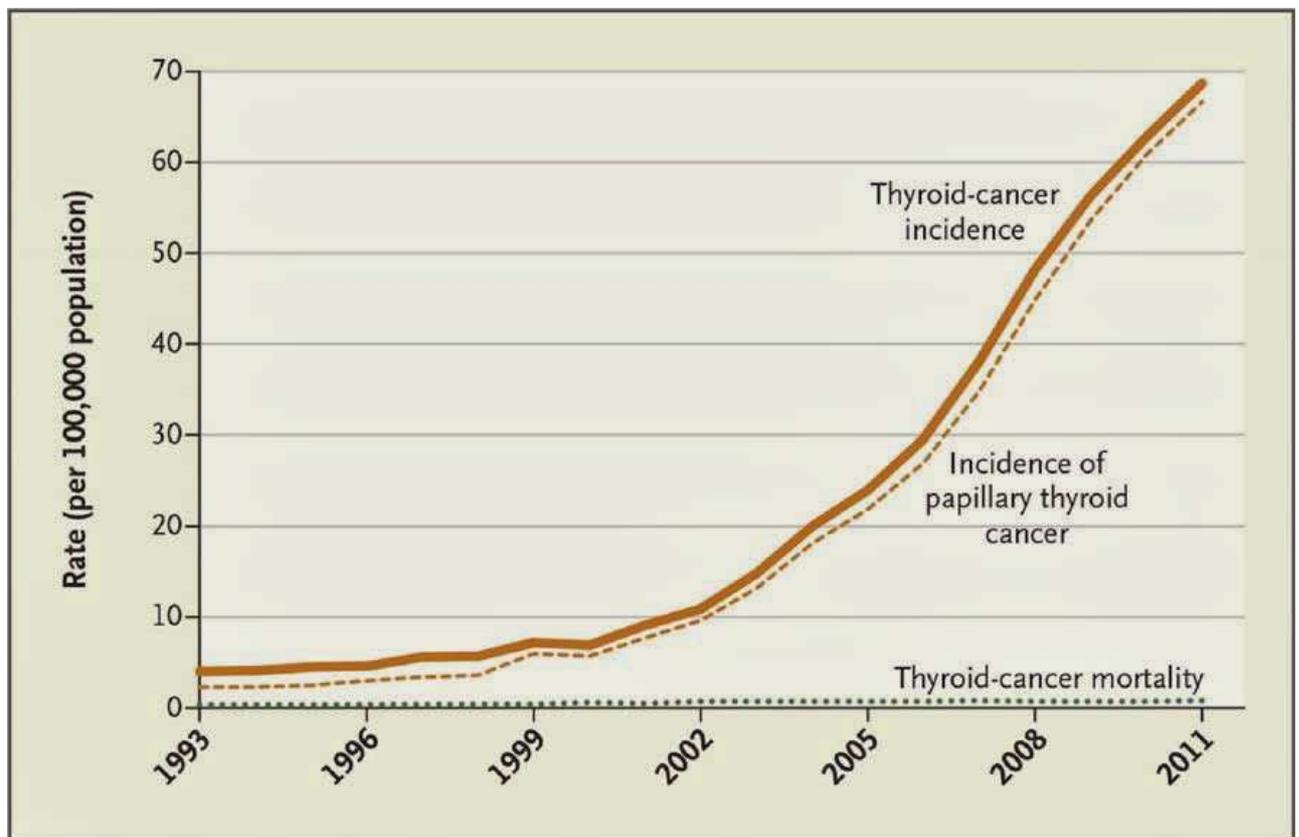
"The experience with thyroid-cancer screening in South Korea should serve as a cautionary tale for the rest of the world. During the past two decades, multiple countries have had a substantial increase in thyroid-cancer incidence without a concomitant increase in mortality. According to the Cancer Incidence in Five Continents database maintained by the International Agency for Research on Cancer, the rate of thyroid-cancer detection has more than doubled in France, Italy, Croatia, the Czech Republic, Israel, China, Australia, Canada, and the United States. The South Korean experience suggests that these countries are seeing just the tip of the thyroid-cancer iceberg — and that if they want to prevent their own "epidemic," they will need to discourage early thyroid-cancer detection."

I'm not sure the answer is to simply ignore these cancers, but I don't want to address that debate here.

Rather, I would like to focus on the question why has thyroid cancer become so prevalent in at least ten nations? According to the [American Cancer Society](#), although some thyroid cancers are linked to exposure to ionizing radiation, "the exact cause of most thyroid cancers is not yet known."

Could exposure to the electromagnetic radiation (RF and ELF) emitted by cell phones and cordless phones be contributing to this worldwide thyroid cancer epidemic? Isn't time for our government to fund research on the risk factors underlying this epidemic?

Hyeong Sik Ahn, Hyun Jung Kim, H. Gilbert Welch. Korea's Thyroid-Cancer "Epidemic" — Screening and Overdiagnosis. *N Engl J Med* 2014; 371:1765-1767 November 6, 2014 DOI: 10.1056/NEJMp1409841



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Is mobile phone use contributing to increased incidence of thyroid cancer?

July 9, 2014

The incidence of thyroid cancer has been increasing rapidly in recent years in many countries including the U.S., Canada, and Israel.

A headline in *Haaretz* a year ago March reads, "**Israeli scientists find possible link between cellphone use, thyroid cancer.**"

In response to questions posed to me on this topic today from several individuals, I did a PubMed search. Although I did not find any epidemiologic studies that examined the association between mobile phone use and thyroid cancer in humans, I found almost a dozen published papers that have studied the effects of cell phone radiation on thyroid function. Apparently, case-control research on this topic is warranted.

The abstracts from 11 published papers that examined the effects of exposure to cell phone radiation on thyroid function appear below. Please let me know if you are aware of important studies that I missed, and I will supplement this list. I did not include studies that examined exposure to power frequency radiation.

But first, here is the 2013 news article ...

Israeli scientists find possible link between cellphone use, thyroid cancer

Dan Even, *Haaretz*, Mar 6, 2013

Israeli scientists have reported preliminary findings of a possible link between the radiation from cellphones and thyroid cancer. There has been a steep rise in rates of thyroid cancer in recent years in Western countries.

The Israeli research, conducted at Beilinson Hospital in Petah Tikva and at Tel Aviv University, identified evidence for the first time of the possible connection between the rise in thyroid cancer

cases to the increased exposure to radiation emitted by cellphones.

In one experiment, human thyroid cells collected from healthy patients were subjected to radiation with a device, designed for the study, that simulates the electromagnetic radiation emitted by cellphones. The irradiated thyroid cells proliferated at a much higher, statistically significant rate than non-irradiated cells in the control group. A second experiment, using different methods and materials, gave similar results.

The research was conducted in the Felsenstein Medical Research Center, part of the Sackler Faculty of Medicine at Tel Aviv University and the Rabin Medical Center. Prof. Raphael Feinmesser, head of Beilinson's Ear, Nose and Throat Department was the lead researcher. The findings will be presented for the first time this weekend at the annual conference of the Israeli Society of Otolaryngology, Head and Neck Surgery, in Eilat.

"The findings are the first evidence of changes in thyroid cells in response to electromagnetic radiation," said Feinmesser. "But drawing sweeping conclusions as to a connection between cellphone radiation and thyroid cancer is still far off."

The scientific community is divided as to the connection between cellular radiation and cancer. One opinion is that because cellular radiation is non-ionizing and incapable of causing changes in cellular DNA, it cannot cause cancer. But in recent years evidence has mounted from epidemiological studies indicating a relationship between increased exposure to cellular radiation and cancerous growths, especially in the brain and the salivary glands.

"The thyroid gland is located in the neck, but the area is located the same distance from the ear as the regions of the brain where [cancerous] growths have been diagnosed as being related to the use of the [cellular] devices. This is a region that is not far from the center of the device's radiation," said Feinmesser.

The incidence of thyroid cancer has been on the rise in Israel for more than a decade, which matches the rise in the use of cellphones. Thyroid cancer is three times more common in women than men. It is the fourth most common form of cancer among Jewish women in Israel, at 16.6 cases per 100,000 people. The three most common forms of cancer for women are cancer of the breast, colon and cervix. Among Israeli Arab women the rate of thyroid cancer is 11.6 cases per 100,000, and it is the third most common cancer. From 1990 to 2007 there was a 67-percent rise in thyroid cancer rates among Jewish women, and a 250 percent increase among Arab women, Health Ministry figures show. For men, the rise from 2000 is more moderate, but still shows a 41 percent increase in thyroid cancer rates for Jewish men.

"One of the explanations is that the rise is related to better technical methods of early detection of these growths, which have been developed in recent years. But other research shows that even after neutralizing this influence a rise in these growths still remains," said Feinmesser.

Just this week it was reported that mobile operator Partner Communications (Orange) reached a settlement with a customer who claims he contracted cancer after using the company's cellphones. The customer, who is in his 50s, sued Partner in May, claiming that intensive use of the device resulted in an aggressive lymphoma near his left ear. Partner agreed to pay NIS 400,000 in an out-of-court settlement."

<http://bit.ly/14rrWfA>

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Hilly, Ohad; Silva, Verónica; Mizrachi, Aviram; Ariel, Ortal; Raiter, Annat; Hauptman, Yirmi; Hardy, Britta; Feinmesser, Raphael. EFFECT OF NON-IONIZING ELECTROMAGNETIC RADIATION AT MOBILE PHONE FREQUENCY ON HUMAN THYROID CELLS. Abstract from the World Thyroid Cancer Congress in Toronto 2013.

Otolaryngology Head and Neck Surgery, Rabin Medical Center, Petah Tikva, Israel; 2Felsenstein Medical Research Center, Tel Aviv University, Tel Aviv, Israel; 3Gal Safe Ltd., Or Yehuda, Israel

Background/Purpose: The aim of this study was to examine the effect of non-ionizing electromagnetic radiation (NIER) at mobile phone frequency on human thyroid cells.

Methods: We cultured samples of normal thyroid tissue and subsequently exposed the cultured thyrocytes to NIER for 3 hours. NIER effects were evaluated in terms of proliferation using a cell viability assay and immunohistochemistry.

Results: We found that NIER exposure for 3 hours has lead to an increased proliferation of thyrocytes in cell viability assay ($p=0.007$). This result was confirmed by immunohistochemistry with antibodies against Ki67.

Discussion & Conclusion: In this study we present for the first time an in vitro evaluation of NIER effects on human thyroid cells. Our results suggest a proliferative effect of NIER on human thyrocytes, an effect that may link NIER exposure with potential carcinogenesis.

http://thyroidworldcongress.com/wp-content/uploads/2013/07/O022_Mizrachi.pdf

PubMed Search Results (in chronological order)

K, Sechman A, Nieckarz Z. Plasma thyroid hormones and corticosterone levels in blood of chicken embryos and post hatch chickens exposed during incubation to 1800 MHz electromagnetic field. *Int J Occup Med Environ Health*. 2014 Jan 31. [Epub ahead of print]

Abstract

INTRODUCTION: This study attempted to determine the effect of a 1800 MHz electromagnetic field (EMF) (only carrier frequency) on thyroxine (T4), triiodothyronine (T3) and corticosterone (CORT) concentrations in the blood plasma of chick embryos, and to investigate the effect of electromagnetic field (EMF) exposure during embryogenesis on the level of these hormones in birds that are ready for slaughter.

MATERIAL AND METHODS: Throughout the incubation period, embryos from the experimental group were exposed to a 1800 MHz EMF with power density of 0.1 W/m², 10 times during 24 h for 4 min. Blood samples were collected to determine T4, T3 and CORT concentrations on the 12th (E12) and 18th (E18) day of incubation, from newly hatched chicks (D1) and from birds ready for slaughter (D42).

RESULTS: The experiment showed that T4 and T3 concentrations decreased markedly and CORT levels increased in the embryos and in the newly hatched chicks exposed to EMF during embryogenesis. However, no changes were found in the level of the analyzed hormones in the birds ready for slaughter. Differences in T4 and T3 plasma concentrations between the EMF-exposed group and the embryos incubated without additional EMF were the highest in the newly hatched chicks, which may be indicative of the cumulative effect of electromagnetic field on the hypothalamo-pituitary-thyroid axis (HPT).

DISCUSSION: The obtained results suggest that additional 1800 MHz radio frequency electromagnetic field inhibits function of HPT axis, however, it stimulates hypothalamo-pituitary-adrenal axis by inducing adrenal steroidogenic cells to synthesize corticosterone. Further investigations are needed to elucidate the mechanisms by which radio EMFs affect HPT and HPA axis function in the chicken embryos.

<http://1.usa.gov/1e4do9w>

Jin YB, Choi HD, Kim BC, Pack JK, Kim N, Lee YS. Effects of simultaneous combined exposure to CDMA and WCDMA electromagnetic fields on serum hormone levels in rats. *J Radiat Res*. 2013 May;54(3):430-7. doi: 10.1093/jrr/rrs120. Epub 2012 Dec 13.

Abstract

Despite more than a decade of research on the endocrine system, there have been no published studies about the effects of concurrent exposure of radiofrequency electromagnetic fields (RF-EMF) on this system. The present study investigated the several parameters of the endocrine system including melatonin, thyroid stimulating hormone, stress hormone and sex hormone after code division multiple access (CDMA, 849 MHz) and wideband code division multiple access (WCDMA, 1.95 GHz) signals for simultaneous exposure in rats. Sprague-Dawley rats were exposed to RF-EMF signals for 45 min/day, 5 days/week for up to 8 weeks. The whole-body average specific absorption rate (SAR) of CDMA or WCDMA was 2.0 W/kg (total 4.0 W/kg). At 4 and 8 weeks after the experiment began, each experimental group's 40 rats (male 20, female 20) were autopsied. Exposure for 8 weeks to simultaneous CDMA and WCDMA RF did not affect serum levels in rats of melatonin, thyroid stimulating hormone (TSH), triiodothyronine (T3) and thyroxin (T4), adrenocorticotrophic hormone (ACTH) and sex hormones (testosterone and estrogen) as assessed by the ELISA method.

<http://www.ncbi.nlm.nih.gov/pubmed/23239176>

Dimida A, Ferrarini E, Agretti P, De Marco G, Grasso L, Martinelli M, Longo I, Giulietti D, Ricci A, Galimberti M, Siervo B, Licitra G, Francia F, Pinchera A, Vitti P, Tonacchera M. Electric and magnetic fields do not modify the biochemical properties of FRTL-5 cells. *J Endocrinol Invest*. 2011 Mar;34(3):185-9. doi: 10.3275/7107. Epub 2010 Jun 11.

Abstract

BACKGROUND: Electric and magnetic fields (EMF) might be involved in human disease and numerous research and scientific reviews have been conducted to address this question. In particular thyroid structural and functional alterations caused by various forms of non-ionizing radiation have been described.

AIM: The aim of this study was to analyze the possible effects of EMF on thyroid, in particular we analyzed the effects caused by a GSM (Global System for Mobile Communications) signal (900 MHz) on cultured thyroid cells (FRTL- 5).

MATERIAL AND METHODS: The experimental setup was designed in order to expose samples to a radiofrequency wave in well-controlled conditions. We used the FRTL-5 cell line, an epithelial monoclonal continuous cell line derived from Fisher rat thyroid tissue growing as monolayer, expressing the TSH receptor and the sodium-iodide symporter (NIS). FRTL-5 were subsequently irradiate for 24, 48, and 96 h with EMF (800-900 MHz, power-frequency of mobile communication systems) and iodide uptake and cAMP production were measured.

RESULTS: The irradiation of cells with EMF at 900 Mhz for 24, 48, and 96 h did not influence the level of cAMP production and was not able to modify iodide accumulation in FRTL- 5 cells with respect to basal conditions.

CONCLUSIONS: In conclusion, EMF do not seem to be able to interfere with the biochemical properties of FRTL-5 cells in vitro.

<http://www.ncbi.nlm.nih.gov/pubmed/20543553>

Esmekaya MA, Seyhan N, Ömeroglu S. Pulse modulated 900 MHz radiation induces hypothyroidism and apoptosis in thyroid cells: a light, electron microscopy and immunohistochemical study. *Int J Radiat Biol*. 2010 Dec;86(12):1106-16. Epub 2010 Sep 1.

Abstract

PURPOSE: In the present study we investigated the possible histopathological effects of pulse modulated Radiofrequency (RF) fields on the thyroid gland using light microscopy, electron microscopy and immunohistochemical methods.

MATERIALS AND METHODS: Two months old male Wistar rats were exposed to a 900 MHz pulse-modulated RF radiation at a specific absorption rate (SAR) of 1.35 Watt/kg for 20 min/day for three weeks. The RF signals were pulse modulated by rectangular pulses with a repetition frequency of 217 Hz and a duty cycle of 1:8 (pulse width 0.576 ms). To assess thyroid endocrine disruption and estimate the degree of the pathology of the gland, we analysed structural alterations in follicular and colloidal diameters and areas, colloid content of the follicles, and height of the follicular epithelium. Apoptosis was confirmed by Transmission Electron Microscopy and assessing the activities of an initiator (caspase-9) and an effector (caspase-3) caspases that are important markers of cells undergoing apoptosis.

RESULTS: Morphological analyses revealed hypothyrophy of the gland in the 900 MHz RF exposure group. The results indicated that thyroid hormone secretion was inhibited by the RF radiation. In addition, we also observed formation of apoptotic bodies and increased caspase-3 and caspase-9 activities in thyroid cells of the rats that were exposed to modulated RF fields.

CONCLUSION: The overall findings indicated that whole body exposure to pulse-modulated RF radiation that is similar to that emitted by global system for mobile communications (GSM) mobile phones can cause pathological changes in the thyroid gland by altering the gland structure and enhancing caspase-dependent pathways of apoptosis.

<http://www.ncbi.nlm.nih.gov/pubmed/20807179>

Milham S. Most cancer in firefighters is due to radio-frequency radiation exposure not inhaled carcinogens. *Med Hypotheses*. 2009 Nov;73(5):788-9. doi: 10.1016/j.mehy.2009.04.020. Epub 2009 May 22.

Abstract

Recent reviews and reports of cancer incidence and mortality in firefighters conclude that they are at an increased risk of a number of cancers. These include leukemia, multiple myeloma, non-Hodgkin's lymphoma, male breast cancer, malignant melanoma, and cancers of the brain, stomach, colon, rectum, prostate, urinary bladder, testes, and thyroid. Firefighters are exposed to a long list of recognized or probable carcinogens in combustion products and the presumed route of exposure to these carcinogens is by inhalation. Curiously, respiratory system cancers and diseases are usually not increased in firefighters as they are in workers exposed to known inhaled carcinogens. The list of cancers with increased risk in firefighters strongly overlaps the list of cancers at increased risk in workers exposed to electromagnetic fields (EMF) and radiofrequency radiation (RFR). Firefighters have increased exposure to RFR in the course of their work, from the mobile two-way radio communications devices which they routinely use while fighting fires, and at times from firehouse and fire vehicle radio transmitters. I suggest that some of the increased cancer risk in firefighters is caused by RFR exposure, and is therefore preventable. The precautionary principle should be applied to reduce the risk of cancer in firefighters, and workman's compensation rules will necessarily need to be modified.

<http://www.ncbi.nlm.nih.gov/pubmed/19464814>

Mortavazi S, Habib A, Ganj-Karami A, Samimi-Doost R, Pour-Abedi A, Babaie A. Alterations in TSH and Thyroid Hormones following Mobile Phone Use. *Oman Med J*. 2009 Oct;24(4):274-8. doi: 10.5001/omj.2009.56.

Abstract

OBJECTIVES: In recent years, the widespread use of mobile phones has lead to a public debate about possible detrimental effects on human health. In spite of years of research, there is still a great controversy regarding the possibility of induction of any significant physiological effects in humans by microwave radiations emitted by mobile phones. This study aims to investigate the effects of electromagnetic fields induced by the Global System for Mobile communications (GSM) mobile phones on the Thyroid Stimulating Hormone (TSH) and thyroid hormones in humans.

METHODS: 77 healthy university students participated in this study. The levels of T3, T4 and TSH were measured by using appropriate enzyme-linked immunosorbent assay (ELISA) kits (Human, Germany).

RESULTS: The average levels of T3, T4 and TSH in students who moderately used mobile phones were 1.25 ± 0.27 ng/ml, 7.76 ± 1.73 µg/dl and 4.25 ± 2.12 µu/l respectively. The levels in the students who severely used mobile phones were 1.18 ± 0.30 , 7.75 ± 1.14 and 3.75 ± 2.05 respectively. In non-users, the levels were 1.15 ± 0.27 , 8.42 ± 2.72 and 2.70 ± 1.75 , respectively. The difference among the levels of TSH in these 3 groups was statistically significant ($P < 0.05$).

CONCLUSION: As far as the study is concerned, this is the first human study to assess the associations between mobile phone use and alterations in the levels of TSH and thyroid hormones. Based on the findings, a higher than normal TSH level, low mean T4 and normal T3 concentrations in mobile users were observed. It seems that minor degrees of thyroid dysfunction with a compensatory rise in TSH may occur following excessive use of mobile phones. It may be concluded that possible deleterious effects of mobile microwaves on hypothalamic-pituitary-thyroid axis affects the levels of these hormones.

<http://www.ncbi.nlm.nih.gov/pubmed/22216380>

Djeridane Y, Touitou Y, de Seze R. Influence of electromagnetic fields emitted by GSM-900 cellular telephones on the circadian patterns of gonadal, adrenal and pituitary hormones in men. *Radiat Res*. 2008 Mar;169(3):337-43.

Abstract

The potential health risks of radiofrequency electromagnetic fields (RF EMFs) emitted by mobile phones are currently of considerable public interest. The present study investigated the effect of exposure to 900 MHz GSM radiofrequency radiation on steroid (cortisol and testosterone) and pituitary (thyroid-stimulating hormone, growth hormone, prolactin and adrenocorticotropin) hormone levels in 20 healthy male volunteers. Each subject was exposed to RF EMFs through the use of a cellular phone for 2 h/day, 5 days/ week, for 4 weeks. Blood samples were collected hourly during the night and every 3 h during the day. Four sampling sessions were performed at 15-day intervals: before the beginning of the exposure period, at the middle and the end of the exposure period, and 15 days later. Parameters evaluated included the maximum serum concentration, the time of this maximum, and the area under the curve for hormone circadian patterns. Each individual's pre-exposure hormone concentration was used as his control. All hormone concentrations remained within normal physiological ranges. The circadian profiles of prolactin, thyroid-stimulating hormone, adrenocorticotropin and testosterone were not disrupted by RF EMFs emitted by mobile phones. For growth hormone and cortisol, there were significant decreases of about 28% and 12%, respectively, in the maximum levels when comparing the 2-week (for growth hormone and cortisol) and 4-week (for growth hormone) exposure periods to the pre-exposure period, but no difference persisted in the postexposure period. Our data show that the 900 MHz EMF exposure, at least under our experimental conditions, does not appear to affect endocrine functions in men.

<http://www.ncbi.nlm.nih.gov/pubmed/18302481>

Koyu A, Cesur G, Ozguner F, Akdogan M, Mollaoglu H, Ozen S. Effects of 900 MHz electromagnetic field on TSH and thyroid hormones in rats. *Toxicol Lett.* 2005 Jul 4;157(3):257-62. Epub 2005 Apr 11.

Abstract

In this study, the effects of exposure to a 900 megahertz (MHz) electromagnetic field (EMF) on serum thyroid stimulating hormone (TSH) and triiodothyronine-thyroxine (T3-T4) hormones levels of adult male Sprague-Dawley rats were studied. Thirty rats were used in three independent groups, 10 of which were control (without stress and EMF), 10 of which were exposed to 900 MHz EMF and 10 of which were sham-exposed. The exposures were performed 30 min/day, for 5 days/week for 4 weeks to 900 MHz EMF. Sham-exposed animals were kept under the same environmental conditions as the study groups except with no EMF exposure. The concentration of TSH and T3-T4 hormones in the rat serum was measured by using an immunoradiometric assay (IRMA) method for TSH and a radio-immunoassay (RIA) method for T3 and T4 hormones. TSH values and T3-T4 at the 900 MHz EMF group were significantly lower than the sham-exposed group ($p < 0.01$). There were no statistically significant differences in serum TSH values and T3-T4 hormone concentrations between the control and the sham-exposed group ($p > 0.05$). These results indicate that 900 MHz EMF emitted by cellular telephones decrease serum TSH and T3-T4 levels.

<http://www.ncbi.nlm.nih.gov/pubmed/15917150>

Wakeford R. The cancer epidemiology of radiation. *Oncogene.* 2004 Aug 23;23(38):6404-28.

Abstract

Ionizing radiation has been the subject of intense epidemiological investigation. Studies have demonstrated that exposure to moderate-to-high levels can cause most forms of cancer, leukaemia and cancers of the breast, lung and thyroid being particularly sensitive to induction by radiation, especially at young ages at exposure. Predominant among these studies is the Life Span Study of the cohort of survivors of the atomic bombings of Japan in 1945, but substantial evidence is derived from groups exposed for medical reasons, occupationally or environmentally. Notable among these other groups are underground hard rock miners who inhaled radioactive radon gas and its decay products, large numbers of patients irradiated therapeutically and workers who received high doses in the nuclear weapons programme of the former USSR. The degree of carcinogenic risk arising from low levels of exposure is more contentious, but the available evidence points to an increased risk that is approximately proportional to the dose received. Epidemiological investigations of nonionizing radiation have established ultraviolet radiation as a cause of skin cancer. However, the evidence for a carcinogenic effect of other forms of nonionizing radiation, such as those associated with mobile telephones or electricity transmission lines, is not convincing, although the possibility of a link between childhood leukaemia and extremely low-frequency electromagnetic fields cannot be dismissed entirely.

<http://www.ncbi.nlm.nih.gov/pubmed/15322514>

Bergamaschi A, Magrini A, Ales G, Coppeta L, Somma G. Are thyroid dysfunctions related to stress or microwave exposure (900 MHz)? *Int J Immunopathol Pharmacol.* 2004 May-Aug;17(2 Suppl):31-6.

Abstract

In the last decade, numerous scientific evidence suggested possible adverse health effects from exposure to electromagnetic fields (EMF'S) and the use of mobile phones. According to some studies EMF induced changes of trans-membrane Ca⁺⁺ flux may lead to altered metabolism and/or secretion of neurohormones including TSH, ACTH, GH, prolactin and melatonin. The aim of this research was to analyse the effects of mobile phone use on thyroid function and to evaluate the possible role of occupational stress. 2598 employees (1355 men and 1243 women) with different duties (vendors, operators and network technicians) were included in the study. Exposure to EMF'S, generated by mobile phones, was assessed both by submitting a questionnaire directly to the employees and acquiring data regarding conversation times. The workers were divided into three groups on the basis of their personal mobile phone use. Moreover, a group of 160 workers with TSH values below 0.4 UI/l was characterized. No statistically significant difference regarding TSH values below 0.4 UI/l was observed among workers with different duties but there was a greater prevalence of subjects with low SH values among 192 employees with more than 33 hrs./month conversation time; this difference was statistically significant ($p < 0.05$). On the basis of our data, it is not possible to establish whether this result is determined by exposure to EMF'S from mobile phones or by the stress of using these instruments.

<http://www.ncbi.nlm.nih.gov/pubmed/15345189>

Black DR, Heynick LN. Radiofrequency (RF) effects on blood cells, cardiac, endocrine, and immunological functions. *Bioelectromagnetics.* 2003;Suppl 6:S187-95.

Abstract

Effects of radiofrequency electromagnetic fields (RFEMF) on the pituitary adrenocortical (ACTH), growth (GH), and thyroid (TSH) hormones have been extensively studied, and there is coherent research on reproductive hormones (FSH and LH). Those effects which have been identified are clearly caused by heating. The exposure thresholds for these effects in living mammals, including primates, have been established. There is limited evidence that indicates no interaction between RFEMF and the pineal gland or an effect on prolactin from the pituitary gland. Studies of RFEMF exposed blood cells have shown that changes or damage do not occur unless the cells are heated. White cells (leukocytes) are much more sensitive than red cells (erythrocytes) but white cell effects remain consistent with normal physiological responses to systemic temperature fluctuation. Lifetime studies of RFEMF exposed animals show no cumulative adverse effects in their endocrine, hematological, or immune systems. Cardiovascular tissue is not directly affected adversely in the absence of significant RFEMF heating or electric currents. The regulation of blood pressure is not influenced by ultra high frequency (UHF) RFEMF at levels commonly encountered in the use of mobile communication devices.

<http://www.ncbi.nlm.nih.gov/pubmed/14628314>