5G JA TERVEYS

SUURI JA TUTKIMATON

Dariusz Leszczynski, PhD, DSc

Adjunct Professor of Biochemistry (Dosentti), University of Helsinki, Finland
Chief Editor of Radiation and Health specialty of the Frontiers in Public Health, Lausanne, Switzerland
Science Blogger at BRHP - Between a Rock and a Hard Place
WHO I AM… EDUCATION AND WORK

• Two doctorates
  • Molecular biology (DSc), Jagiellonian University, Krakow (1983)
  • Biochemistry/cell biology (PhD), Helsinki University (1990)
• Dosenetti (biochemistry), Helsinki University (1992 - )
• Currently Retired; Independent Expert; actively advising and lecturing
• 22 years (1992-2013) at STUK
  • 2003-2007 as Head of Radiation Biology Laboratory
  • 2000-2013 as Research Professor
• Assistant Professor at Harvard Medical School, USA; 1997-1999
• Guangbiao Professor at Zhejiang University, Hangzhou, China; 2006-2009
• Visiting Professor at Swinburne Univ. Technology, Melbourne, Australia; 2012-2013
WHO I AM... EXPERT EXPERIENCE

- 20 years of experimental work on EMF and health
- Testified, advised, lectured at:
  - ARPANSA, Australia, 2018
  - Polish Ministry of Digitization; 2016
  - Canadian Parliament’s House of Commons’ hearing; 2015
  - India’s Minister of Health and Family Welfare; 2014
  - USA Senate Appropriations Committee hearing; 2009
- Member of the 2011 International Agency for Research on Cancer (IARC) 30-Experts Working Group for classification of the carcinogenicity of cell phone radiation
- Advised e.g.: Parliament of Finland; National Academies, USA; World Health Organization; Bundesamt für Strahlenshutz, Germany; International Commission on Non-Ionizing Radiation Protection (ICNIRP); Swiss National Foundation; The Netherlands Organization for Health Research and Development;
PERPETUAL DÉJÀ VU

• The Beginning
  • 1980s communications technology developed for US Department of Defense was put to civilian commercial use
  • Food and Drug Administration (FDA) allowed cell phones to be sold without pre-market testing for human health hazard - the “low power exclusion”

• 30 years later...
  • In 2011, based on the post-deployment research, International Agency for Research on Cancer (IARC) classified cell phone radiation as a possible human carcinogen
  • Earlier assumed lack of health hazard appears to be false
  • Smart phones (e-pads, laptops) have completely changed human body exposure patterns

• Fast forward to Today...
  • 5G technology is being deployed without prior testing for human health hazard

• The Future is unknown...

Leszczynski, The Finnish Society for Natural Philosophy, Helsinki, Oct. 15, 2019
ICNIRP is prone to provide unreliable and skewed evaluation of the scientific evidence on EMF and health for the following reasons:

- it is a “private club” where current members elect new members, without need to publicly justify the selection
  - lack of accountability before anyone
  - lack of transparency of their activities
  - complete lack of supervision of its activities
- skewed science evaluation because of the close similarity of the opinions of all members of the Main Commission and all of the other scientists selected as advisors to the Main Commission.
SAFETY LIMITS HAVE TO BE BASED SOLELY ON THE AVAILABLE, CORRECTLY INTERPRETED, SCIENCE

- ICNIRP under-plays the significance of the research data
- Activists over-estimate the significance of the research data
- ICNIRP and Activists – both mislead by interpreting scientific evidence ‘to suit their pre-conceived opinions’
- There is enough of scientific evidence to support the Precautionary Principle, without the need for misleading interpretation of data
- Children, because of their known higher sensitivity to environmental factors, should be exposed as little as possible, as a precautionary measure
  - E.g. no wireless internet in schools and daycare centers
  - E.g. age limit for smart phone ownership
EFFECTS OF CO-EXPOSURES

• Co-carcinogen studies show effects (just few performed) – cell phone radiation might potentiate effects of carcinogenic chemicals or radiation

• 6 co-carcinogenicity studies in animals were used as supportive evidence for IARC 2011 classification of cell phone radiation as possible carcinogen

• Study of Tillmann et al. 2010 was replicated and confirmed by Lerchl et al. 2015

• **Lack of co-carcinogenicity studies (!)**
EPIDEMIOLOGY CASE-CONTROL STUDIES SUPPORT POSSIBLE/PROBABLE BRAIN CANCER RISK

- International Agency for Research on Cancer 2011 classification was based on the results of Interphone and Hardell studies
- Currently, the four case-control epidemiological studies suggest the cell phone radiation increases risk of developing brain cancer in avid users
  - Regular user (!) – no problem at all but... definition: 1 call/week for 6 months
  - Avid user = ca. 30 minutes/day for 10+ years
  - Interphone 40%; Hardell 170%, CERENAT 100%, Canadian Interphone 100% increase in glioma risk = glioma is and remains 'rare disease'
- Interphone 2016 analysis of full data confirms location of cancer in the most exposed parts of brain
- **NOTICE: all case-control studies underestimate risk of brain cancer because of poor radiation dosimetry**

Leszczynski, The Finnish Society for Natural Philosophy, Helsinki, Oct. 15, 2019
PROBLEM: EPIDEMIOLOGY CASE-CONTROL STUDIES HAVE NO RADIATION EXPOSURE DATA...

- Surrogate for radiation exposure – minutes of using cell phone
- Such surrogate leads to underestimation of the effect
- Two persons talking for the same length of time may have entirely different radiation exposure because of the different proximity to cell tower
- Persons with dramatically different radiation exposure were analyzed as if having the same exposure (!)

...HOW IT WILL APPLY TO 5G MICROCELLS NOBODY KNOWS
BRAIN CANCER TRENDS AND CELL PHONE USAGE TRENDS DO NOT MATCH

HUGE INCREASE IN CELL PHONE USE OVER DECADES BUT NO EQUALLY DRAMATIC BRAIN CANCER RISE

WHY?
LESZCZYNSKI: 
HYPOTHESIS OF INDIVIDUAL SENSITIVITY TO EMF

• Health of the majority of human population will not be affected by exposures to EMF
• Only individuals with higher sensitivity to EMF (≠EHS!) will be affected
• Individual sensitivity to EMF may be modulated by other environmental factors
• Corroborating observations supportive for the hypothesis:
  • Epidemiology – brain cancer was rare disease and appears to remain rare disease because only highly-sensitive persons respond (?)
  • Toxicology – NTP study exposed animals to huge doses of EMF but only few rats developed cancer because only highly sensitive animals responded (?)
• The PROBLEM – we do not know who might be more than average sensitive to EMF and we do not study this issue at all (EHS psychological studies do not suffice)
“...Whether or not to invoke the Precautionary Principle is a decision exercised where scientific information is insufficient, inconclusive, or uncertain and where there are indications that the possible effects on environment, or human, animal or plant health may be potentially dangerous and inconsistent with the chosen level of protection...”
REASONS FOR INVOKING PRECAUTIONARY PRINCIPLE

• **Scientific information is insufficient, inconclusive, or uncertain**
  • IARC classification of cell phone radiation as possible carcinogen (Group 2B) means that the science is insufficient, inconclusive, and uncertain

• **There are indications that the possible effects on human health may be potentially dangerous**
  • Four replications of epidemiological studies (Interphone, Hardell, CERENAT, Canadian Interphone) show an increased risk of brain cancer in long-term avid users – potentially dangerous effect

• **Inconsistent with the chosen level of protection**
  • Epidemiological studies, showing increased risk in long-term avid users, were generated in populations using regular cell phones, compliant with the current safety standards = **current safety standards are insufficient to protect users**
1. Proposed term of the individual sensitivity to EMF includes the phenomenon of the electromagnetic hypersensitivity (EHS) but it has a much broader meaning

2. EHS exists (for explanation why see ‘Brief Report on EHS’ available on the BRHP blog)
PROBLEMS of the EHS provocation studies
by Dariusz Leszczynski, February 11, 2018

Problem #1
Research Execution
Methods used in provocation studies are insufficient to prove or to disprove EHS-EMF causality link

Problem #2
Research Outcome
False and evidence-unsupported conclusions of the studies performed on volunteers with uncertain EHS self-diagnosis and with unproven methods

The Solution
Search for persons responding in significantly different way, than the rest of population, to EMF exposures by screening of tissues and body fluids with a variety of ‘omics’ techniques

- Scientists do not know if volunteers participating in the study have correct-self diagnosis of EHS
- Scientist introduce bias by excluding volunteers with pre-existing health problems
- Bias introduced by volunteers withdrawing from studies because of the fear of experimental radiation exposure
- Bias introduced by volunteer withdrawing from studies because of distrust in objectivity of scientists
- Scientists have no proof that methods they use are capable to detect EHS – lack of positive controls
- Bias introduced by the nocebo and placebo effects

False claims of research studies mislead decision-makers leading to falsely premature conclusions that EHS is not linked to EMF exposures

Correlating molecular level responses to EMF exposures with the health status and formulation of knowledge-based research hypotheses for how the EMF might affect health in long-term exposures
5G "CONFUSION"

5G IS BEING DEVELOPED AND DEPLOYED AT THE SAME TIME

EVEN THE TECHNICAL STANDARDS DEALING WITH THE 5G ARE NOT ALL READY YET
5G AND SKIN

- Skin is the largest organ of the human body
  - Involved in regulation of the immune response
  - Generates mediators affecting nervous system
- Lack of science on human skin response to 5G EMF
- Single study on RF-EMF (GSM) and skin proteome [Karinen et al. 2008]
- 5G technology spectrum 6 GHz – 100 GHz where above 6 GHz energy is deposited solely in the skin
- ICNIRP plans to classify skin as ‘limbs’
  - Limbs are permitted to get higher exposure than the head and trunk
RESEARCH ON 5G MILLIMETER-WAVES AND SKIN

• Performed studies on mm-waves & skin
  • Human volunteer – ca. 11 studies
  • Human in vitro – ca. 26 studies
  • Animal in vivo (rat, mice) – ca. 56 studies
  • Animal cells (rat, mice) – ca. 10 studies
• TOTAL of ca. 103 studies

• If the exposure is for long periods and non-thermal – we do not know how skin cells will respond to the deposited energy

• Claims that "we know skin will not be affected" and claims that "we know skin will be affected" are premature and, based on the available scientific evidence, misleading & false
LIMITATIONS OF RESEARCH ON 5G MILLIMETER-WAVES

• Very limited number of studies
  • Mobile & Wireless Forum refers some 470 studies
  • EMF Portal lists some 100 technical/dosimetry studies
  • Leszczynski & Kuster refer some 100+ studies on skin and skin-related effects
  • ORSAA database lists some 100 studies
• Lack of 5G pertinent research
  • Lack of studies examining human volunteers
  • Lack of studies on individual sensitivity
  • Lack of studies on chronic, long-term, exposures
• Studies from a very limited number of research groups (!)
• Lack of replication studies confirming correctness of observations (!)
• Vast majority of studies done in animals and in vitro on cells grown in laboratory

Leszczynski, The Finnish Society for Natural Philosophy, Helsinki, Oct. 15, 2019
WE DO NOT KNOW WHAT HEALTH EFFECTS OF 5G MILLIMETER WAVES MIGHT BE

CLAIMS THAT 5G IS SAFE AND CLAIMS THAT 5G IS HARMFUL HAVE NO BASIS IN PUBLISHED RESEARCH

WE MAY SUSPECT THAT SOME EFFECTS WILL TAKE PLACE BUT...

RESEARCH HAS NOT BEEN DONE YET!
CONCLUSIONS

• **Urgent research needs**
  - Search for sensitive sub-population (biochemistry and high-throughput)
  - Study impact of co-exposures to chemicals and wireless radiation
  - Epidemiology with real wireless radiation exposure data
  - Does DNA damage happen in humans and is it relevant for cancer
  - Examining potential leakage of human blood-brain barrier
  - Study skin and skin-dependent systemic responses to 5G exposures

• **There is enough of science to implement the Precautionary Principle**
• **Especially children should be protected from all unnecessary exposures**
LOPUKSI…

• ICNIRP, ICES, ja eri valtioiden säteilysuojeluviranomaiset, kuten STUK Suomessa tai ARPANSA Australiassa, pitävät 5G-säteilyä vaarattomana ihmisten terveydelle

• Aktivistien organisaatiot, kuten BioInitiative, EHT ja ICEMS, puolestaan katsovat, että tieteellisillä tutkimuksilla on jo täysin osoitettu 5G-säteilyn olevan vahingollista ihmisen terveydelle

• Molemmat osapuolet liioittelevat mielipiteitään

• Totuus 5G:n terveysvaikutuksista on vielä täysin epäselvä

• Suurin ongelma on tutkimuksen puute 5G:n millimetriaalloilla

• Emme yksinkertaisesti tiedä kuinka 5G millimetriaallot vaikuttavat ihmisen terveyteen

• Tällä hetkellä saatavilla olevan tieteellisen näytön perusteella on täysin mahdotonta tehdä mitään johtopäätöksiä 5G-säteilyn terveysvaikutuksista väestötasolla

• Keskustelun vastakkaiset osapuolet ovat vääritteissään väärrässä, kumpikin suuntaansa liioitellen