

# **SOME 30 KEY STUDIES ON ELECTROSENSITIVITY AND ELECTROMAGNETIC HYPERSENSITIVITY**

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| 1. 3d fMRI brain scans               | 8. Mechanisms                       |
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| 6. Genetics                          | 13. Specific symptoms               |
| 7. Guidelines: long-term, biological | 14. Subconscious effects            |

## **1. 3d fMRI Brain Scans**

- Heuser G et al.: "Functional brain MRI in patients complaining of electro-hypersensitivity after long term exposure to electromagnetic fields" *Rev Environ Health*. (2017) [PMID: 28678737](#); [Article](#). Heuser G et al.: "Corrigendum" *Rev Environ Health*. (2017) [PMID: 29206645](#). [Article](#).

## **2. Challenge to medical profession**

- Hedendahl L et al.: "Electromagnetic hypersensitivity - an increasing challenge to the medical profession" *Rev Environ Health* (2015) [PMID: 26372109](#). [Article](#).

## **3. Co-morbidity: e.g. chemicals, mercury**

- Hardell L et al.: "Increased concentrations of certain persistent organic pollutants in subjects with self-reported electromagnetic hypersensitivity - a pilot study" *Electromagn Biol Med*. (2008) [PMID: 18568937](#).
- Mortazavi G et al.: "Increased mercury release from dental amalgam restorations after exposure to electromagnetic fields as a potential hazard for hypersensitive people and pregnant women" *Rev Environ Health*. (2015) [PMID: 26544100](#).

## **4. Diagnosis and Markers**

- Austrian Medical Association: "Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF related health problems and illnesses (EMF syndrome)" (2012) [Article](#).
- Belpomme D et al: "Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder" *Rev Environ Health* (2015) [PMID: 26613326](#). [Article](#).
- Irigaray P et al.: "How Ultrasonic Cerebral Tomosphygmography can Contribute to the Diagnosis of Electrohypersensitivity" *J Clin Diagn Res*. (2018) [Article](#).
- Irigaray P et al.: "Oxidative stress in electrohypersensitivity self-reporting patients: Results of a prospective in vivo investigation with comprehensive molecular analysis" *Int J Mol Med*. (2018) [PMID: 30015864](#). [PMC6108880](#).
- Tuengler A et al.: "Hypothesis on how to measure electromagnetic hypersensitivity" *Electromagn.Biol. Med*. (2013) [PMID: 23301924](#). [Article](#).

## 5. Electrosensitivity and Electrophobia (nocebo effect): different conditions

- Bogers RP et al.: "Individual variation in temporal relationships between exposure to radiofrequency electromagnetic fields and non-specific physical symptoms: A new approach in studying 'electrosensitivity'" *Environ Int.* (2018) [PMID: 30227317](#). [Article](#).
- Dieudonne M: "Does electromagnetic hypersensitivity originate from nocebo responses? Indications from a qualitative study" *Bioelectromagnetics* (2016) [PMID: 26369906](#). [Article](#).

## 6. Genetics

- De Luca C et al: "Metabolic and genetic screening of electromagnetic hypersensitivity subjects as a feasible tool for diagnostics and intervention" *Mediators Inflamm.* (2014) [PMID: 24812443](#). [Article](#).

## 7. Guidelines: long-term and biological

*The FCC's and ICNIRP's short-term (6 or 30 minutes) heating-only guidelines were based on Schwan's 1953 mistake that heating is the only health effect. In fact, exercise can also cause a one degree rise in body temperature but without the specific cancer, cardiovascular, fertility and neurological damage, including electrosensitivity, caused by man-made EMFs.*

- Belyaev I et al.: "EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses" *Rev Environ Health* (2016) [PMID: 27454111](#). [Article](#).
- [BioInitiative Report](#): "A Rationale for Biologically-based Public Exposure Standards for Electromagnetic Fields (ELF and RF)" (2012).
- Fragopoulou A et al.: "Scientific panel on electromagnetic field health risks: consensus points, recommendations, and rationales" *Rev Environ Health.* (2010) [PMID: 21268443](#). [Article](#).

## 8. Mechanisms

- Pall ML: "Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects" *J Cell Mol Med.* (2013) [PMID: 23802593](#). [PMC3780531](#).
- Sherrard RM et al.: "Low-intensity electromagnetic fields induce human cryptochrome to modulate intracellular reactive oxygen species" *PLoS Biol.* (2018) [PMID: 30278045](#). [Article](#).
- Yakymenko I et al: "Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation" *Electromagn Biol Med.* (2015) [PMID: 26151230](#).

## 9. Prevalence

- Bevington M: "The Prevalence of People with Restricted Access to Work in Manmade Electromagnetic Environments" *J Environ Health Sci.* (2019) [Article](#).

## 10. Proof from conscious symptoms

- Abdel-Rassoul G et al.: "Neurobehavioral effects among inhabitants around mobile phone base stations" *Neurotoxicology.* (2007) [PMID: 16962663](#).

- Eger H et al.: "Specific Health Symptoms and Cell Phone Radiation in Selbitz, Bavaria, Germany: Evidence of a Dose-Response Relationship" *Um Medizin Gesellschaft* (2010) [Article \(trans\)](#).
- McCarty DE et al.: "Electromagnetic hypersensitivity: evidence for a novel neurological syndrome" *Int J Neurosci.* (2011) [PMID: 21793784](#). [Article](#).
- Navarro E et al.: "The Microwave Syndrome: A preliminary study in Spain" *Electromagn Biol Med.* (2003); [article](#).
- Rea WJ et al.: "Electromagnetic field sensitivity" *J Bioelectricity* (1991) [Article](#).

#### 11. Proof from subconscious markers

- Buchner K et al.: "Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields - A Long-term Study under Real-life Conditions" *Umwelt-Medizin-Gesellschaft* (2011) [Article](#).
- Havas M et al.: "Dirty electricity and electromagnetic hypersensitivity: five case studies" *World Health Organization Workshop on Electrical Hypersensitivity, Prague* (2004) [Article](#).
- Havas M: "Radiation from wireless technology affects the blood, the heart, and the autonomic nervous system" *Rev Environ Health.* (2013) [PMID: 24192494](#). [Article](#).

#### 12. Socio-economic consequences, functional impairments

- Gibson PR et al.: "Unmet health care needs for persons with environmental sensitivity" *J Multidiscip Healthc.* (2015) [PMID: 25670904](#). [Article](#).
- Johansson O: "Electrohypersensitivity: a functional impairment due to an inaccessible environment" *Rev Environ Health* (2015) [PMID: 26613327](#); [Article](#).
- Kato Y et al.: "Reported functional impairments of electrohypersensitive Japanese: A questionnaire survey" *Pathophysiology.* (2012) [PMID: 22458999](#).

#### 13. Specific symptoms

- Hutter H et al.: "Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations" *Occup Environ Med.* (2006) [PMID: 16621850](#).
- Medeiros LN et al.: "Tinnitus and cell phones: the role of electromagnetic radiofrequency radiation" *Braz J Otorhinolaryngol.* (2016) [PMID: 26602000](#). [Article](#).
- Pall ML: "Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression" *J Chem Neuroanat.* (2015) [PMID: 26300312](#). [Article](#).

#### 14. Subconscious effects

- Marshall TG et al.: "Electrosmog and autoimmune disease" *Immunol Res.* (2017) [PMID: 27412293](#). [Article](#).
- Meo SA et al.: "Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health" *Am J Mens Health.* (2018) [PMID: 30526242](#).

For thousands of additional relevant studies, see: [Selected Studies on ES and EHS](#).