COST EMF-MED

European network for innovative uses of EMFs in biomedical applications

EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

About COST EMF-MED

COST Actions are a flexible, fast, effective and efficient networking instrument for researchers. COST EMF-MED provides a cooperative framework to support the research on beneficial biological effects of non-ionizing EMFs and their use in biomedical applications.

Research on biological effects of EMFs has traditionally focused on health risks. This Action focuses on useful biological EMF interactions and associated biomedical applications, aiming for breakthrough results, new discoveries and innovative biomedical technologies.

COST EMF-MED aims to contribute to development and optimization of innovative EMF-based medical devices and procedures, which will be safer, more efficient and less invasive. COST EMF-MED is an open network, lasting from 2014 to 2018.

Activities

MC and WG meetings:

- 1st MCM (Kick-off): Brussels (Belgium), April 2014
- 2nd MCM, 1st WGMs: Split (Croatia), October 2014
- 3rd MCM, 2nd WGMs: Madrid (Spain), March 2015
- 3rd WGMs: Zurich (Switzerland), June 2015
- 4th MCM, 4th WGMs: Prague (Czech Republic), November 2015

Workshops:

- *"EMF Interaction with Excitable Tissues",* Madrid, 6 March 2015
- *"Immune System Modulation by EMF",* Rome, 15 May 2015
- *"Designing Focused Deep Hyperthermia by EMF",* Zurich, 23 June 2015
- *"Verification, Validation and Uncertainty Assessment in Medical EMF Applications"*, Prague, 18 November 2015

Training Schools:

- *"European Training School on Clinical Trials",* Galway, May 2015 (co-organization with COST Action TD1301)
- *"Summer School on Health Technology Assessment",* Warwick, September 2015 (co-organization with several organizations)
- *"Diagnostic and Therapeutic Applications of Electromagnetics",* Torino, September 2015 (co-organization with European School of Antennas)
- Erice International School of Bioelectromagnetics: *"EMFs and Nervous System - Biological effects, Methodological Aspects and Medical Applictions",* Erice, April 2016 (co-organization with EBEA)

In its second year, COST EMF-MED gathers more than 200 researchers from 34 countries. To the best of our knowledge, it is the very first scientific initiative in the world to systematically approach the topic of beneficial effects of EMFs, on this scale.

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More about COST Actions in general
www.cost.eu

COST EMF-MED is an open network, welcoming new participants.

Send your inquiries to Action Chair:
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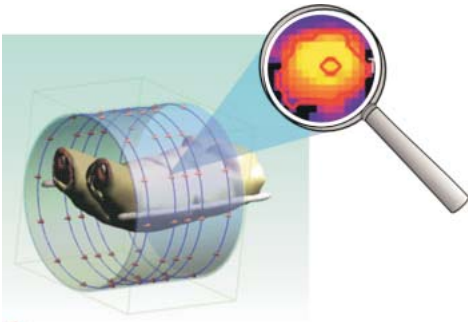
Working Group 1 (WG1) – Cancer EMF interactions and applications

WG1 Leader: Gerard van Rhoon

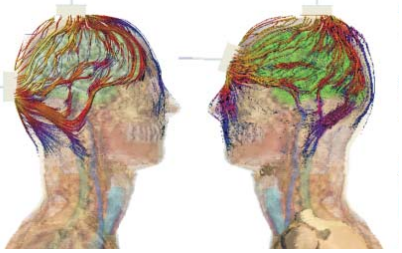


The main activity is concerting the research on treatment and diagnosis of cancer using EMFs and/or EMF-based technologies, with the following objectives:

- establish the scientific rationale of cancer treatments based on low level and high level EMFs;
- optimize the administration and control of EMF-based cancer treatment;
- develop and/or improve EMF-based cancer diagnostic modalities;
- develop the associated technology for clinical use.

Working Group 2 (WG2) – Non-cancer EMF interactions and applications *(continued from previous page)*

WG2 Leader: Lluis Mir



The main activity is concerting the research on non-cancer applications and procedures:

- based on applying EMFs to tissues and cells to produce direct effects of such stimulation;
- essentially and functionally based on EMFs.

The objectives of WG2 are:

- establish the scientific rationale of applications and procedures based on EM stimulation of excitable and non-excitable tissues and cells;
- optimize the administration and control of EM stimulation;
- develop and/or improve biomedical applications and procedures essentially and functionally based on EMFs;
- develop associated technology for clinical use.

Working Group 3 (WG3) – EMF dosimetry – in silico tools & measurements

WG3 Leader: Niels Kuster

The main activity is concerting the research on EMF computational (in silico) and measurement dosimetry, with the following objectives:

- understand and control the underlying physical, technical, and relevant biological (tissue) parameters during medical procedures and experimental studies;
- develop and/or improve validated multi-physics, multi-scale simulation tools and functionalized anatomical models;
- develop and/or improve dosimetric measurement equipment and exposure equipment;
- provide the technical support to WG1 and WG2.

Working Module topics proposed:

- EMF-based neural repair and regeneration
- Effect of stimulus waveform to nerve excitability
- Vagus nerve stimulation
- EMF modulation of acetylcholine-mediated plasticity in the mammalian cortex
- Cerebellar and spinal neuromodulation by transcutaneous current stimulation - from basic science to technical progress and clinical applications
- -Transcranial magnetic resonance guided focused ultrasound for noninvasive treatment of brain diseases
- Non-Invasive Brain Stimulation (NIBS) - application of EMFs in neuroscience
- Focused EMF hyperthermia with online guidance and improved dose models
- Microwave thermal ablation for cancer therapy
- Diagnosis and treatment of cancer with very low levels EMFs modulated at tumor-specific frequencies (non-thermal interactions)
- Pulsed EMFs as an innovative approach for functional tissue engineering of connective tissues
- The Role of Pulsed EMFs in the Regenerative Medicine of the Musculoskeletal System
- Drug delivery activated by EMFs
- Applications of low-intensity millimetre waves radiation for drug delivery purpose and mechanistic studies
- ELF magnetic fields and immune response modulation
- Genes and cellular mechanisms involved after ELF stimulation
- Induction of adaptive response by non ionizing radiation
- EMFs and molecular structures
- Sensors and sensing strategies in biomedical applications
- Neural tissue models
- EMF Microdosimetry
- Dielectric properties at low frequencies
- Electromagnetic-thermal dosimetry of the human brain
- The zebrafish embryo as an animal model

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