Multifunctional Nanoparticles for Magnetic Hyperthermia and Indirect Radiation Therapy (RADIOMAG)

http://cost-radiomag.eu/

Welcome to the June 2017 issue of the RADIOMAG newsletter!

NEWS

MANAGEMENT COMMITTEE MEETING (Bilbao, 27-28 April 2017)

The meeting at a glance

- 65 colleagues from 18 out of the 24 RADIOMAG countries and the COST Scientific Officer participated
- 4 invited lectures were given by medical doctors on thermal ablation, radiotherapy and hyperthermia
- WG progress was presented & plenary discussions held
- Mid-term Action review was discussed
- The following future scientific strategy was agreed on:
  - Continue with topics: SAR-test, Coil geometry, Brezovich Criterion
  - Decide on guidelines for nanoparticle fabrication
  - Set up cytotoxicity ring test
  - Start study on dosimetric effects of irradiated MNPs by Monte-Carlo simulations

The new Work + Budget plan, which expects 2 important meetings, 1 Training School and 11 STSM grants, was discussed and voted on.

Bilbao meeting, Local Organizing Committee

Bilbao meeting, April 2017

- Our colleague Sofia Costa Lima is the new webmaster of the RADIOMAG website. She will be supported by Olivero Gobbo. Congratulations and good luck!
- Soon, the RADIOMAG website will have a new "Documents" section containing publicly available documents produced within the remit of the action. Check the website regularly so you do not miss it out!
- RADIOMAG has reached its midpoint. There has been a lot of progress during the past two years, but we expect an even busier period ahead.
- The Work + Budget plan was approved by COST and the new Grant Period (05/2017 – 04/2018) is now open.
- New COST - Vademecum is in force from May 1st, 2017.
- The Action Vice Chair *Daniel Ortega* is invited to a "Get Together" event organised by the COST Association on the 7th of June 2017. This social event aims at bringing together EU and national policy makers, the European research funding community as well as COST governance, in order to engage with key stakeholders and to offer a platform for dialogue. Felicitations!

NEW MEMBERS

We have some new members joining our COST action. Welcome all!

- *Yuriy Raikher* (WG2) from the Institute of Continuous Media Mechanics UB RAS, Perm; Ural Federal University, Ekaterinburg (Russian Federation).
- *Davide Orsi* (WG2) from the Department of Mathematical, Physical and Computer Sciences, University of Parma (Italy).
- *Modesto T.L. López* (WG2) from Departamento de Física Aplicada, Universidad de Granada (Spain).
- *Neil Farrow* (WG4) from Nano Sciences Laboratories Ltd., University of Keele, Newcastle under Lyme (UK).
- *Hélène Elleaume* (WG3) from the French Institute of Health and Medical Research, Grenoble Institute of Neuroscience (France).
- *Dan Sun* (WG1) from the School of Mechanical & Aerospace Engineering, Queen's university Belfast (UK).
- *Binh Pham T.T.* (WG1) from the Key Centre for Polymers and Colloids (KCPC), University of Sydney, NSW (Australia).
- *Tailoi Chan-Ling* (WG3) from the Discipline of Anatomy and Histology, Sydney Medical School, the University of Sydney, (Australia).
- *Anna Laurenzana* (WG3) from the Department of Biomedical and Clinical Science, University of Florence (Italy):

  "I believe that participating in the RADIOMAG action will give me a great opportunity to interact with outstanding colleagues and foster connections for improving my knowledge of combined cancer therapies. RADIOMAG would represent for me a highly valuable experience for enlargement of international EU collaborations as well as for the development of new original proposals."

CONFERENCES AND EVENTS

- **MagNaStand** Stakeholder Workshop, organised by Uwe Steinhoff, PTB Berlin, Germany, 04th of July 2017.
- UK Colloids - International Colloid and Surface Science Symposium, 10-12 July 2017, Manchester, England.
- The next **RADIOMAG meeting** will be held at the University of Bialystok, Poland, in September 2017 (DTBD) and hosted by Dr Beata Kalska-Szostko.
- ECIS - conference of the European Colloid and Interface Society, 3-8 Sep 2017, Madrid, Spain.
- Magnetic Measurements - All aspects of measurement in magnetism 17-20 Sep 2017, Prague, Czech Republic.
- **RADIOMAG Training school** (From nanoparticle synthesis and characterisation to *in vitro* and *in vivo* experiments) will be organised and lead by Prof Eleni Efthimiadou, at the Institute of Nanoscience and Nanotechnology of NCSR "Demokritos", Athens, Greece (October 2017).
- MMM - Conference on Magnetism and Magnetic Materials 15-17 Nov 2017, Pittsburgh, Pennsylvania, USA.
- ISAMMA - 4th International Symposium on Advanced Magnetic Materials and Applications, 10-13 Dec 2017, Phu Quoc, Vietnam.

Editors: Sofia Costa Lima & Oliviero Gobbo

PUBLICATIONS

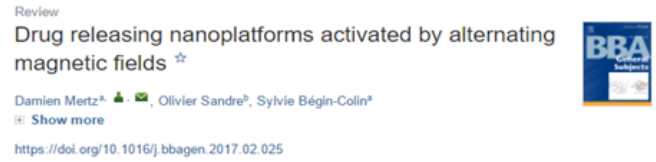
These are some of the most recent publications related to the general field of magnetic hyperthermia published by members of our action. If your publication is not listed here, feel free to submit it through the relevant section in the RADIOMAG website.

- Mertz D, Sandre O, Bégin-Colin S. Drug releasing nanoplatforms activated by alternating magnetic fields. Biochim Biophys Acta 2017 doi: 10.1016/j.bbagen.2017.02.025

- Sandre O, Genevois C, Garaio E, Adumeau L, Mornet S, Couillaud F. *In Vivo* Imaging of Local Gene Expression Induced by Magnetic Hyperthermia. Genes (Basel) 2017 doi: 10.3390/genes8020061

- Cruz MM, Ferreira LP, Ramos J, Mendo SG, Alves AF, Godinho M and Carvalho MD. Enhanced magnetic hyperthermia of CoFe2O4 and MnFe2O4 nanoparticles. Journal of Alloys and Compounds 703 (2017) 370-380. doi: 10.1016/j.jallcom.2017.01.297

SELECTED PUBLICATION HIGHLIGHTS


Review

Drug releasing nanoplatforms activated by alternating magnetic fields ☆

Damien Mertz[a], Olivier Sandre[b], Sylvie Bégin-Colin[a]

Show more

https://doi.org/10.1016/j.bbagen.2017.02.025

• A magneto-thermal effect is obtained by applying an alternating magnetic field on a magnetic carrier.

• This magneto-thermal effect is a relevant stimulus to trigger a drug release from magnetic carriers.

• A wide panel of nanomaterials allows to build drug releasing magnetic nanoplatforms.

• Efficiency of drug releasing magnetic nanoplatforms *in vitro* with cells and in vivo is reported.

BOOKS and THESES

• Magnetic nanoparticles for magnetic hyperthermia. Cruz MM, Ferreira LP, Alves AF, Mendo SG, Ferreira P, Godinho M, Carvalho MD, Nanostructures for Cancer Therapy, Chapter 19, 2017. Editors: Grumezescu & Ficai, Elsevier. ISBN: 9780323461443

• Thesis: Development of a doxororubicin-Loaded Dual pH- and Thermo-Responsive Magnetic Nanocarrier for Application in Magnetic Hyperthermia and Drug Delivery in Cancer Therapy by Aziliz Hervault (Supervisors: Professors Nguyễn, Maenosono and Pankhurst).

SHORT TERM SCIENTIFIC MISSIONS (STSM)

STSM offer the possibility of short exchange research placements, allowing members to visit a laboratory in another COST country. During the past 2 years, 32 STSMs were carried out. Dr Vlasta Zavisova will be handing over her STSM coordinator role to Dr Beata Kalska-Szostko. Thank you Vlasta and congratulations to Beata! Dr Beata Kalska-Szostko as the new STSM coordinator will provide information on future STSM opportunities and the application process. Information is also available in the STSM section at http://www.cost-radiomag.eu/STSM.

The next STSM call will be announced soon!

RELATED PROJECTS

RADIOMAG maintains firm links to other projects with common interests, opening doors for cooperation and dialogue. Here are some of these projects:

- EU FP7 **NanoMag** - *Standardization of Analysis Methods for Magnetic Nanoparticles*

- EU H2020 **NoCanTher** - *Nanomedicine Upscaling for Early Clinical Phases of Multimodal Cancer Therapy*

- EURAMET EMPIR **MagNaStand** - *Focusing European expertise for an ISO standard for magnetic nanoparticles*

- EU H2020 **EU-NCL** - European Nanomedicine Characterisation Laboratory. *The EU-NCL aims at fostering innovation in Nanomedicine by providing access to state of the art full characterisation of nanomaterials intended for medical applications, developed by public laboratories, spin-offs and innovative SMEs.*

RECENT RADIOMAG MEETINGS

REVISION OF THE BREZOVICH CRITERION (Belgrade, 6-7 April 2017)
This WG2, WG3 and WG4 meeting was concerned with the validity of the Brezovich criterion (BC) for actual magnetic hyperthermia procedures in preclinical and clinical experiments. The BC sets a threshold for limiting exposure to time-varying electromagnetic fields which is, nowadays, challenged by in vivo researchers and physicians. At the moment, the BC represents a dogma in regard to magnetic field safety. However, the experimental conditions described 3 decades ago, do not reflect the current procedures and apparatus. At the end of the meeting, it has been suggested that in the magnetic hyperthermia context, the BC should be revised and adapted to the new and future hyperthermia procedures (see the Belgrade minutes).

Belgrade meeting, April 2017

WILLING TO JOIN US?

If you are an expert in radiation physics, radiology or instrumentation for magnetic hyperthermia, you can still join us. Please email: *simo@meteo.be*, or *daniel.ortega@imdea.org*

Editors: Sofia Costa Lima & Oliviero Gobbo

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