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# BM1401

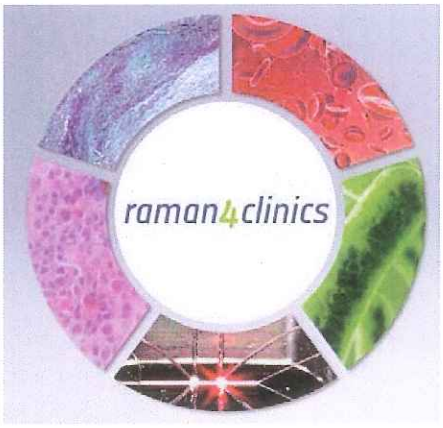
## European Network on Raman-based applications for clinical diagnostics (Raman4clinics)

### Objectives

The main objective of the Action proposal is to develop a collaborative network of top European experts working towards the progress of the emerging field of Raman-based applications for clinical diagnostics. Specific aims of the Action proposal include (i) to offer networking opportunities for the scientific and technical communities of instrumentation, spectroscopy, microscopy, fiber optics probes and chemometrics for efficient development of the emerging category of clinical Raman spectroscopy; (ii) to reach out to potential users within the medical and life sciences to push Raman spectroscopy beyond proof of principle measurements; (iii) setting up the framework for preclinical trials for such an innovative methodology and (iv) to attract the interest of the next generation of promising scientists and thereby ensuring that Europe remains at the frontline of biophotonic research in the increasing competition from Asia and America. Of major importance is that the leading experts in biomolecular diagnostics based on Raman spectroscopy all over Europe support this COST Action proposal aiming to establish a pan-European research program. Consequently, Raman4clinics will develop research proposals to be submitted for future calls.

### Abstract

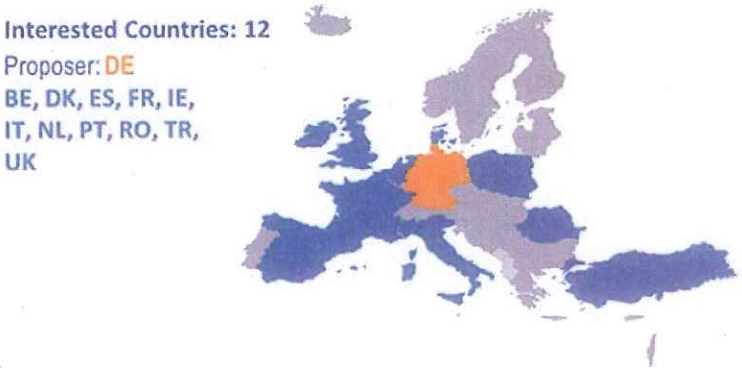
The aim of the Action proposal Raman4clinics is to develop a collaborative network of top European experts working towards the progress of the emerging field of Raman-based applications for clinical diagnostics. The Action proposal coordinates research run by diverse yet complementary research groups in Europe on novel, label-free and rapid technologies based on a wide variety of Raman spectroscopies for the clinical diagnostics of body fluids, bacteria, cells and tissues. International interdisciplinary networking opportunities are offered between scientists within biophotonics, chemometricians and physicians/clinicians. Main goal of the network is to give a major impetus in this vibrant field of research by aligning it to clinical requirements and application aspects (the unmet medical need) by means of COST as the best mechanism to progress the state-of-the-art. The Action proposal creates a platform for scientific communication, exchange, collaboration and for new research activities, combining the partners' expertise in technology, component, system and methodology development and medical application. As a result, novel technology portfolios for clinical diagnostics will emerge to the benefit of patients as well as to the economy. The interest of the next generation of promising scientists will be attracted, thereby ensuring that Europe will remain at the frontline of research into clinical diagnostics.




**Keywords:** Molecular microscopy, Raman-based applications for clinical diagnostics, fiber optics, microfluidics and chemometrics, characterization of body fluids, cells and tissues, early cancer diagnostics

### Working Groups

WG1 Therapeutic monitoring of anti-tumoral drugs and antibiotics in body fluids
WG2 Diagnosis of infectious diseases by detection of microbial pathogens
WG3 Cytopathology of single cells for cancer cell monitoring
WG4 Histopathology of cells and tissue sections and biopsies from cancerous and non-cancerous Pathologies
WG5 Fiber optic endoscopy for in vivo assessment of cancer and atherosclerosis
WG6 Outreach to public and industry



# BM1402

## Development of a European network for preclinical testing of interventions in mouse models of age and age-related diseases (MouseAGE)

### Objectives

The aim of this Action proposal is to form a unique well-coordinated network of scientists, clinicians, industrial partners and regulatory affairs experts from different European countries currently working on different aspects of preclinical intervention in ageing mice models and with complementary expertise in imaging, mathematical modelling, pathology, metabolic, endocrine, musculoskeletal, immunity, cognitive function and mouse welfare. This network will ultimately define best practice on how preclinical interventions in mouse models should be tested in Europe, with a view to accelerate the translation of any intervention to the clinic for patient benefit.

### Abstract

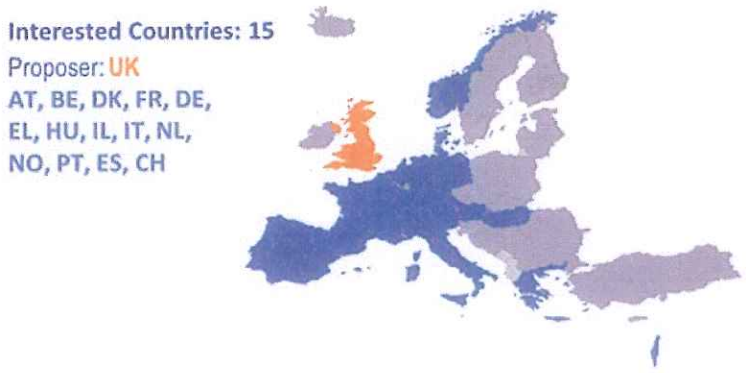
The number of people over 65 is predicted to double in the next 50 years. Age is the most important risk factor for stroke, heart attacks, cancers, diabetes, and many other chronic diseases. Tackling the effects of the ageing population in Europe has stimulated funding of research initiatives at both national and European levels. A key requisite to develop new interventions for age-related conditions and promote healthier ageing is the availability and use of preclinical murine models. There is currently a clear lack of such models and appropriate standardised methodologies to test interventions. Therefore, to improve the quality of European ageing research a coordinated interdisciplinary Action proposal is needed to standardise methodologies and animal welfare, and to define endpoints, as well as centralising information, models and technologies for the assessment of interventions. This Action proposal aims to set up a highly interactive and flexible European network, which will create a critical mass of cross-disciplinary scientists, clinicians and industrial partners to reach consensus on ways to test preclinical interventions in ageing mice. It will consolidate current best practice across leading European institutions and researchers, maximise resource efficiency, and provide a platform to help train the next generation of scientists.

**Keywords**: Ageing, mouse models, interventions, imaging, computational models

### Working Groups

| | |
|---|---|
| WG1 | Definition of Variables, Endpoints, Methods of Assessments |
| WG2 | Definition of Models |
| WG3 | Testing Novel Interventions |
| WG4 | Novel Technologies and Future Developments |

**Non-COST participant:** New Zealand, USA



# BM1403

## Native Mass Spectrometry and Related Methods for Structural Biology

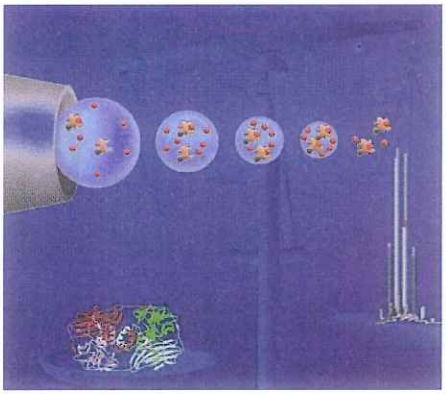
### Objectives

The aim of the Action proposal is to create a lasting expertise infrastructure in novel mass-spectrometry based approaches for the determination of protein structure and interactions, to enable better cures against disease.

### Abstract

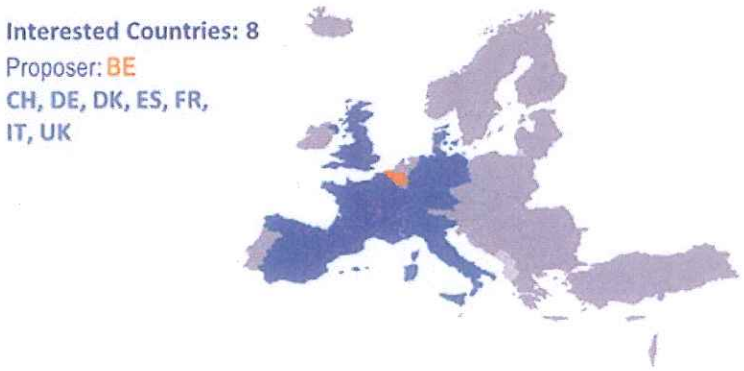
The aim of this Action proposal is to nucleate a group of researchers with a common interest, namely developing and applying new biomolecular mass spectrometry (MS) methods in order to make the characterisation of protein structure and dynamics more rapid and routine. Methods include non-denaturing MS approaches in combination with ion mobility, as well as hydrogen-deuterium exchange, chemical crosslinking and other labelling techniques together with computational approaches. This toolbox will be made available to the broader scientific community, and will greatly enhance our ability to design new drugs and ensure the quality and efficacy of biopharmaceuticals, thereby benefiting human health.

**Keywords**: Native mass spectrometry, ion mobility, structural proteomics, computational methods, protein structure and interactions



### Working Groups

| | |
|---|---|
| WG1 | Native MS/Ion mobility, experimental methods |
| WG2 | Crosslinking, HDX and other labelling techniques |
| WG3 | New fragmentation techniques |
| WG4 | Computational methods |
| WG5 | Data standards, access and dissemination |



# BM1404

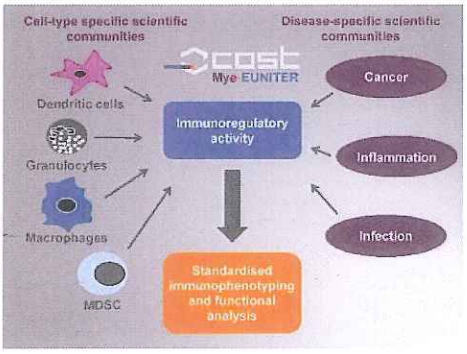
## European Network of Investigators Triggering Exploratory Research on Myeloid Regulatory Cells (Mye-EUNITER)

## Objectives

The main overall objective of the Action proposal is to provide gold standards for the definition and functional analysis of specific subpopulations of MRCs, to form the first European scientific network investigating and comparing MRCs in several common major immune-related disorders, namely cancer, infection, autoimmunity and inflammation, as well as to examine for the first time the role of MRCs in these diseases in experimental models, translating from mouse and monkey to man.

## Abstract

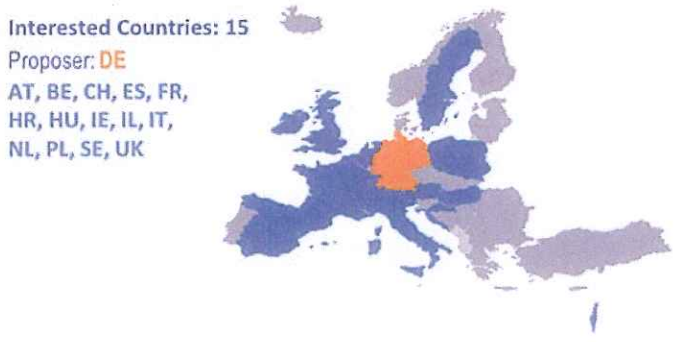
In cancer, infection and inflammation, the immune system's function can be dysregulated, contributing to disease pathology. As part of this process, instead of fighting disease, immune cells may suppress beneficial immune responses and increase pathology. Despite their pathophysiological importance, the identity and biology of the so called myeloid regulatory cells (MRCs) is poorly understood. Depending on the MRC subtype and the respective disease, conflicting results have been published. This Action proposal will form a network of researchers and clinicians which aims to establish a gold standard of common protocols and harmonizing guidelines for the analysis and clinical monitoring of MRCs. There is also a deficit in the translation of findings from animal models to humans, and Mye-EUNITER will build an analytical mouse-monkey-man correlation line. Standardized and validated tools for MRC analysis will aid the development of cellular biomarkers of disease and guide the design of novel therapies to manipulate the functions of MRCs.




**Keywords:** Development of standardized analysis tools for MRCs; comparative analysis of MRCs in cancer, infectious and inflammatory diseases in murine, simian, and human models; therapeutic targeting of MRCs; pan-European network of biomedical PhD schools; translational immunology.

## Working Groups

WG1 Immunomonitoring and definition criteria for MRC subtypes
WG2 Functional and molecular analysis of MRC; common protocols and signatures
WG3 Disease-specific MRCs
WG4 Animal models and translational research
WG5 Modulation of MRCs for therapeutic purposes



# CM1403

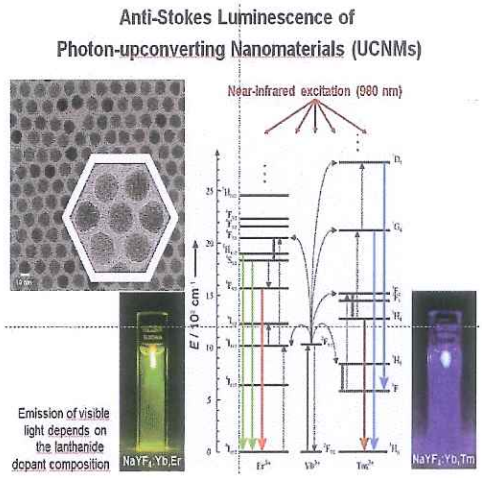
## The European Upconversion Network: From the Design of Photon-upconverting Nanomaterials to (Biomedical) Applications

## Objectives

The main objective of this Action proposal is the development and photophysical characterisation of highly luminescent UCNMs, the design of stable and tailor-made surface structures, establishing novel analytical/biomedical applications and developing instruments for photon upconversion. This Action proposal will enable scientists working on different aspects in this highly multidisciplinary field to exchange their knowledge and coordinate research efforts. The generation of standard materials and standardised methods is a key element in the synchronisation of research and the commercialisation together with industrial partners. Through this Action proposal, Europe can become a global player in the field of photon upconversion, hence creating new jobs in the biomedical industry and decreasing healthcare costs.

## Abstract

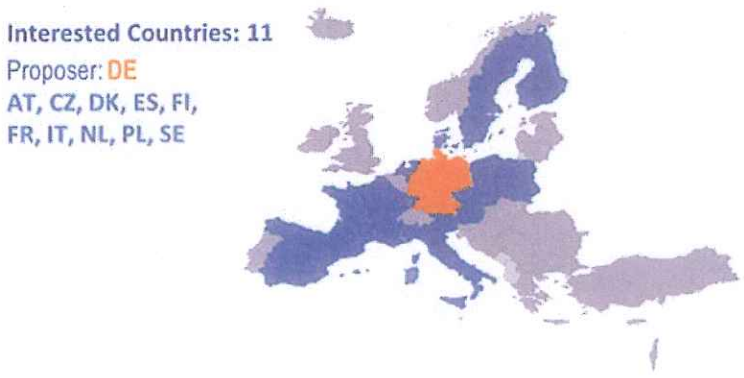
Photoluminescent upconverting nanomaterials (UCNMs) are lanthanide-doped nanocrystals that emit visible light under near-infrared excitation. The unique anti-Stokes emission enables background-free luminescent detection, which is essential for many diagnostic applications, bioimaging and chemical sensing. UCNMs are highly photostable and display narrow line-like emissions that enable long observation times and multiplexed detection. Research on photon-upconversion is highly interdisciplinary, but currently fragmented without synchronised research actions in Europe. Further progress in the field is severely restricted by the lack of unified methods for the synthesis, functionalization and characterisation of UCNMs. Missing reference materials and commercial instrumentation make it impossible to compare the results from different groups and precludes the commercialisation of bioanalytical assays, biosensors and diagnostic tools based on these highly promising materials. Consequently, a European network is required to coordinate basic and applied research on UCNMs, standardise procedures, and to make European scientists as well as the high-tech industry aware of this emerging technology. This COST Action proposal is based on a broad range of scientific disciplines to identify and solve numerous research problems such as upconversion enhancement, surface (bio)functionalisation, detection instrumentation, bioanalytical and diagnostic applications, as well as (nano)toxicity.




**Keywords**: photon-upconversion, rare earths, nanotechnology, point-of-care diagnostic tests, biodetection and bioimaging

## Working Groups

WG1 Materials Research and Photophysical Characterisation
WG2 Surface Functionalisation
WG3 Instrument Development
WG4 Assays, Sensors and Imaging



# FA1402

## Improving Allergy Risk Assessment Strategy for new food proteins (ImpARAS)

### Objectives

The main objective of the Action proposal is to build an interdisciplinary European network of scientists with a broad range of expertise (protein technology, gastro intestinal physiology, toxicology, biochemistry, immunology, food production and processing, allergy, risk assessment, etc.) to discuss, with an out-of-the-box view, new ideas and more predictive models and approaches to improve the current allergenicity risk assessment strategy. This will facilitate international collaboration in the development of more predictive tools to assess allergenicity.

### Abstract

Due to the continuing growth of the world population from 7 billion today to 9 billion in 2050, we will face a shortage of protein sources for human consumption in the near future. For this reason, Horizon 2020 included the topic: "Sustainable European bio-economy; bridging the gap between new technologies and their implementation" within their research program. Food safety assessment is an important requirement before new products can be brought to market. Such assessments include the investigation of microbiological and toxicological hazards as well as the risk of food allergy.
From an industry perspective, there is a need for a) relatively cheap, easy and reliable tools for screening for allergenicity of new or modified food proteins, b) early risk based decision-making during product development and c) an improved risk assessment strategy accepted by regulatory authorities.
The new multi-disciplinary scientific network will improve strategies to predict the allergenicity of novel or modified proteins or proteins from novel sources with novel and innovative approaches that have not previously been identified. This will allow the transfer of scientific advances to European food companies to develop safe products, advise food safety authorities on better risk assessment strategies and change public opinion on the safety of novel sustainable food.


Improving Allergy Risk Assessment Strategy for new food proteins

**Keywords**: food security, food safety, improved allergen risk assessment, food allergy, new or modified food.

### Working Groups

| | |
|---|---|
| WG1 | Physical/chemical properties of proteins impacting allergenicity |
| WG2 | In Vitro methods to predict sensitization |
| WG3 | In vivo methods to predict sensitization |
| WG4 | Risk assessment and dissemination |

# IS1405

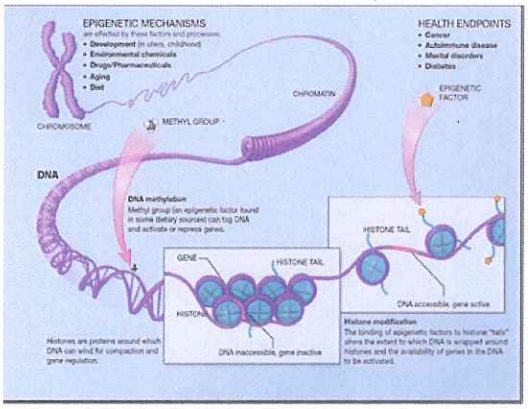
## Building Intrapartum Research Through Health: An interdisciplinary whole system approach to understanding and contextualising physiological labour and birth Structuring (BIRTH)

### Objectives

The main objective is to improve the wellbeing of women, babies and families, and the economic sustainability of maternity services in Europe, through advancing scientific knowledge about the normal physiology of labour and birth for populations and individuals in diverse social, political, and health care contexts.

### Abstract

Optimal maternal and infant health is critical to societal well-being. Reducing childbirth mortality and severe morbidity is a primary concern for most governments. However, this focus on pathology has been associated with an over-extension of clinical interventions to low risk women, with unexpected adverse clinical consequences, and rising health care costs. Part of the problem has been a scientific focus on understanding pathologies of pregnancy and childbirth from simple, clinical, linear perspectives, with a consequent lack of understanding of the range and limits of normal childbirth physiology in different populations, individuals, and contexts. The proposed Action proposal will advance scientific knowledge in this area from a whole-systems perspective, using the realist research framework of what works, for whom, in what circumstances.

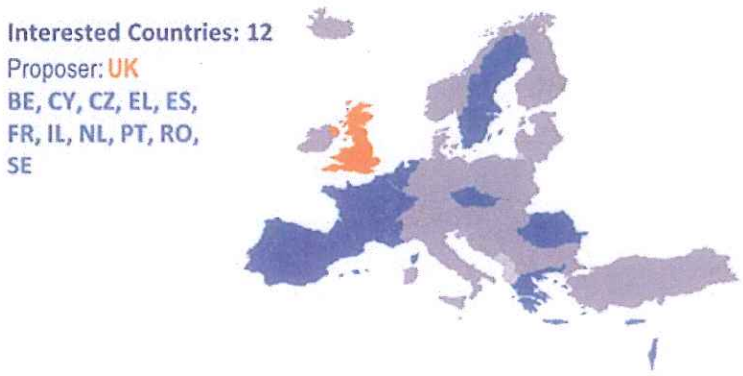



**Keywords:** childbirth, salutogenesis, whole-system, physiology, transdisciplinary

### Working Groups

| | |
|---|---|
| WG1 | Epigenetics and the hygiene hypothesis in relation to intrapartum events, and associations with longer term non-communicable diseases |
| WG2 | The mechanics and bioengineering of pregnancy and labour, including the nature and consequences of, and synergies between, maternal and fetal movement |
| WG3 | Socio-cultural phenomenon that contextualize labour and birth, including the effects of dissonance between dominant cultural social expectations and those of marginalized groups, such as migrant women |
| WG4 | Organizational characteristics, contexts, cultures and economic costs of variation in rates of interventions in childbirth |
| WG5 | Neuro-psycho-social characteristics and effects of labour events |
| WG6 | Synthesis and dissemination to scientific, clinical, managerial, opinion leader, policy maker and service user stakeholders |

**Non-COST participation:** Australia



# TD1402

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

### Objectives

The Action proposal aims to bring together and to organise the research outcomes from the different participating network members in a practical way to provide clinicians with the necessary input to trial a novel anti-cancer treatment combining magnetic hyperthermia and radiotherapy, also identifying future research objectives upon appraisal of the obtained results. Feedback between the different working groups here is essential, and is expected that the lifetime of this Action proposal will eventually result in a compendium of best practices for magnetic hyperthermia.

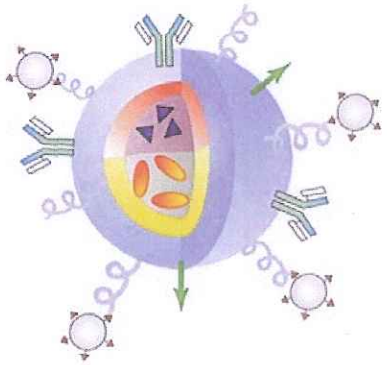
The RADIOMAG Action proposal will generate new and strengthen the existing synergies between technical advances (thermal imaging / MH), new treatment concepts (combined targeting radiosensitisation and magnetic thermotherapy) and biocompatible coating in order to achieve a breakthrough in the clinical application of magnetic hyperthermia. Due to the complexity of this aim, synergies can only be achieved on a longer time frame, by means of workshops, STSMs, joint publications, common Horizon 2020 research proposals and exchange with other COST actions (e.g. TD1004, TD1205).

### Abstract

In recent years, the emerging field of nanotechnology has paved its way into cancer treatment procedures with the use of nanoparticles for contrast media and therapeutic agents. The combination of conventional cancer therapies with nanotechnologies has shown to be promising in individual clinical studies and bears an enormous potential for the treatment individualisation tailored according to the patients' needs.

This Action proposal aims at teaming experienced scientists and young researchers from nanophysics, chemical sciences and medicine for improving the knowledge of combined cancer therapies. Particular attention will be paid to the increase of the radiotherapy efficiency and its combination with magnetic hyperthermia. These new findings, obtained under the coordination framework of this Action proposal, will results in a better dose optimisation confining cell damage to tumour regions only, under concurrent exploitation of sophisticated radio-surgical tools already available in hospitals. Furthermore, proper dissemination of scientific results to the broad public and possible stakeholders is another important concern of this Action proposal.

The improved knowledge resulting from the proposed coordinated, target-oriented interdisciplinary exchange will encourage industrial partners to produce a new generation of magnetic nanoparticles suitable for diagnosis, chemotherapy, radiotherapy and magnetic hyperthermia. Promoting the application of combined cancer treatments will contribute to a better individualised treatment planning for cost-efficient cancer therapies covered by state health insurances.

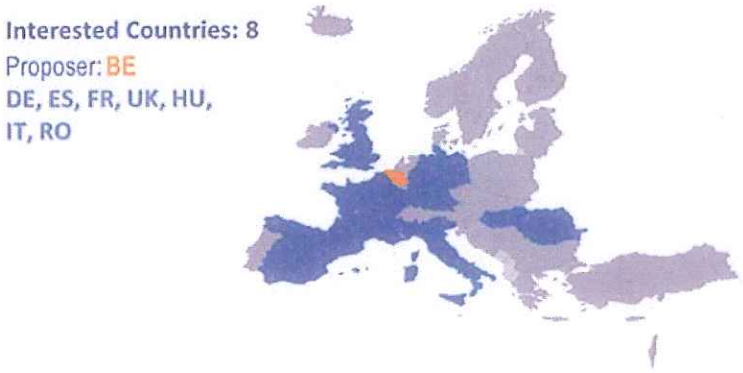


**Keywords:** combined cancer treatment, magnetic hyperthermia, radiosurgery, coating of bio-magnetic nanoparticles, magnetic and bio-relevant property characterisation

### Working Groups

WG1 Physical Chemistry of fabrication / coating / targeting
WG2 Physical aspects of hyperthermia: standardisation and testing
WG3 Combined radiosensitisation and magnetic thermotherapy: pre-clinical and clinical aspects
WG4 Instrumentation: aspects thermometry and development of hyperthermia devices
WG5 Public Relations

**Non-COST participation:** USA



# TD1404

## Network for Evaluation of One Health (NEOH)

### Objectives

The overall aim of NEOH is to enable appropriate evaluations of One Health activities and hence comparison of initiatives as well as informed decision-making and resource allocation. To this end, NEOH will deliver:

- A science-based, standardised framework for the evaluation of One Health
- A suite of example evaluations of One Health initiatives
- A networked community of experts collaborating to assess the value of One Health
- A pool of early-stage researchers trained in performing evaluations of One Health activities.

### Abstract

Human health and well-being are increasingly affected by global challenges such as malnutrition, emerging and endemic zoonotic diseases, antimicrobial resistance and climate change. A One Health approach has been proposed to tackle the challenges through accepting that their complexity requires interdisciplinarity, in particular applying natural and social sciences to human and animal health in the context of a sustainable environment. Several One Health initiatives have been implemented, such as the establishment of cross-sectorial coordination, communication and data sharing mechanisms as well as jointly executed risk assessments and disease control programmes.

However, no standardised methodology exists for quantitative evaluation of One Health activities; most One Health activities have not been evaluated or their assessments are qualitative. Therefore policy makers have insufficient evidence for making decisions on new policies and allocation of resources for a wider One Health approach. The overall aim of NEOH is to enable future quantitative evaluations of One Health activities by delivering:

- A science-based evaluation protocol for One Health activities
- Coordination of evaluations of existing One Health initiatives
- A networked community of experts collaborating to further the evidence base
- Researchers trained in performing evaluations of One Health activities.

The Proposers are experts and key players in the relevant fields and well-placed to assess the effectiveness and economic efficiency of existing One Health initiatives and to investigate the factors influencing performance. This will make NEOH a successful network capable of delivering the urgently needed evidence base for cost-effective policies in global health.

**Keywords:** One Health, impact assessment, standardised methods, metrics, evaluation, index, public health, animal health, human health, environment, infectious disease, emerging zoonotic disease, zoonosis, disease mitigation, risk management, prevention, surveillance, intervention, food safety, food security, economic efficiency, cost-effectiveness, multidisciplinary, interdisciplinary

### Working Groups

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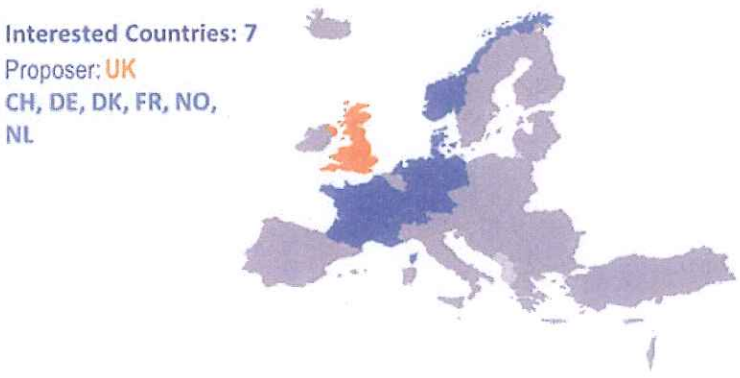
|---|---|
| WG1 | Protocol and index development |
| WG2 | Framework application |
| WG3 | Meta-analysis |
| WG4 | Stakeholder engagement, dissemination and policy |

**Non-COST participation:** Australia, New Zealand, USA



# TD1405

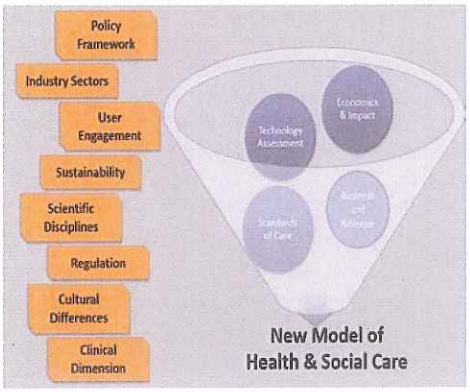
## European Network for the Joint Evaluation of Connected Health Technologies (ENJECT)

### Objectives

The term 'Connected Health' is increasingly being used to describe this new technology-enabled model of healthcare delivery, and it encompasses terms such as wireless, digital, electronic, mobile, and tele-health, and refers to a conceptual model for health management, wherein devices, services or interventions are designed around the patient's needs, and health related data is shared, in such a way that the patient can receive care in the most proactive and efficient manner possible. The dominant element of Connected Health is the acquisition of health-related data from the patient in the appropriate context and using aggregation and communication infrastructures to analyse and distribute it amongst the relevant stakeholders at appropriate times. Data may comprise objective results from standard biomedical tests, subjective reports of symptoms or feelings, or on-going monitoring of health-related behaviours in the home and community using body-worn or ambient sensor networks. Data are subsequently aggregated, stored, shared and analysed to derive actionable information triggering appropriate interventions in a proactive manner. A key feature of Connected Health is the potential to bring the patient into the management of their own care, through timely provision of relevant, health- related information and feedback.

### Abstract

Society needs to leverage advances in technology to drive the innovation required at a health and social care service level to meet the challenges posed by demographic changes and uncontrolled health care costs. ENJECT will bring together business and revenue modellers, clinicians, technologists, engineers, economists, ethnographers and health researchers to help society to answer one question – how to connect therapies, patients and care-givers to deliver optimum health results in an era of stretched resources and increasing demands. A true Connected Health solution must work across countries, continents and the globe to be technically and economically viable. ENJECT will deliver unprecedented access to an understanding of Europe's varied health systems, markets and demographics. Access to commercial players, datasets, market knowledge and policy makers across the continent will be ensured through the high profile, interdisciplinary and international experts included in this Action proposal. ENJECT will seed cross-border, interdisciplinary teams and partnerships leading to new collaborations, improved training and professional development opportunities, knowledge and staff exchange and a European communication platform for Connected Health research.




**Keywords:** connected health, standards of care, monitoring technologies, health informatics, business models, implementation & evaluation, policy, regulation

### Working Groups

| | |
|---|---|
| WG1 | Economics and Impact |
| WG2 | Technology Assessment |
| WG3 | Standards of Care |
| WG4 | Business and Revenue Models |

**Non-COST participation:** USA