COST Actions approved by the Committee of Senior Officials on 17 May 2024 Open Call - collection date 20 October 2023 (OC-2023-1)

Selected actions relevant to IOCB (28/5/2024)

Action N.	Proposal Title
CA23110	International networking on in vitro colon models simulating gut microbiota mediated interactions
CA23111	Searching for Nanostructured or pOre fOrming Peptides for therapY
CA23119	SENESCENCE2030: Targeting Cell Senescence to Prevent Age-Related Diseases
CA23132	Magnetic Particle Imaging for next-generation theranostics and medical research
CA23136	Magnetism and chirality: twisting spins, light, and lattices for faster-than-ever spintronics
CA23152	Building Consensus on Biofilm Regulatory Decision Making
CA23156	European Network for Sigma-1 Receptor as a Therapeutic Opportunity

CA23110
International networking on in vitro colon models simulating gut microbiota mediated interactions
(OC-2023-1-26491)

SUMMARY
Scientific literature is shedding light on the centrality of GI for human health and wellbeing. Indeed, the physiologic effects of nutrients, bioactives and even toxic compounds (including foodborne pathogens) are mediated by their absorption rate in the intestine and by their interaction with gut microbiota and its host ecosystem. Testing food, feed, supplements or drugs in clinical studies gives rise to ethical issues, and the transferability of animal data across species is often problematic because of differences in physiology, metabolism and chemical susceptibilities. According to a recent survey of European Commission (EURL ECVAM, 2021), complex in vitro models (CIVMs) approaches should be adequate not only for regulatory use-contexts, but also for application in the research field provided that standardized CIVMs are developed, enabling a consensus on their use. A new COST Action would fill the knowledge gap on in vitro colon models providing consensus protocols and robust data sets to improve our knowledge of the events taking place in the intestinal milieu, including the complex interactions between the microbiota and the host. Moreover, innovative educational tools will be suggested to increase knowledge on gut models in young researchers and widen to society to avoid any unhealthy consumer choices coming from misleading messages. Bringing together different experts in Gastroenterology, Microbiology, Physiology, Nutrition, Food Science, Biochemistry, Bioinformatics, Biotechnology etc., the new COST Action could represent an effective strategy for the development of healthy food and for the counteraction of diseases.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
1. Health Sciences: Nutrition and dietetics 2. Clinical medicine: Gastroenterology and hepatology 3. Biological sciences: Biological systems analysis, modelling and simulation 4. Clinical medicine: Bacteriology 5. Biological sciences: Metabolomics	1. in vitro gut microbiota colon models 2. 3R principles 3. personalised medicine 4. omics 5. bioinformatic tools

COST Members
Main Proposer: Italy
Network of Proposers:
Full Member: Albania, Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Serbia, Slovenia, Spain, Türkiye, United Kingdom
Main and secondary proposers: 25.33% YRI / 46.7% Women /54.17% ITC

International Cooperation
International Partner: Canada

Industrial Dimension
SMEs: France, Italy
Large companies: France, Italy

CA23111
Searching for Nanostructured or pOre fOrming Peptides for therapY
(OC-2023-1-26499)

SUMMARY
The COST Action SNOOPY will bring together a network of experts and young innovators from diverse disciplines (chemistry, biology, biochemistry, materials science, nanotechnology, medicine, physics) to overcome existing barriers to predict and implement bioactive peptides' ability to self-assemble into functional nanostructures, including those at the interface with membranes, potentially forming pores and channels. This is a fast-growing field with enormous potential for therapy (including targeted cancer therapy, drug delivery, amyloidosis inhibition, regenerative medicine, membrane channels, and antimicrobials), and for the development of nanotechnological tools that could include potential use in diagnostics, optics, catalysis, and bioelectronics. Theoreticians and experimentalists of the SNOOPY Action will synergize to enable in silico predictions of self- assembly behavior, as well as to develop new advanced characterization methods, and to produce them and test them too. The expertise gathered by the Action will be applied to train and build the career of younger members. The geopolitical balance of the Action is strategically set to level the gap between COST Members, and to make of its diversity a tactical asset to boost creativity and foster new ideas. The Action will have socioeconomical impact through the search for new diagnostic and therapeutic solutions to address some of the most formidable challenges of our society (e.g., advance our understanding of amyloidoses and antimicrobial resistance), to assist scientists and industry in the development of new technologies (e.g., peptide nanostructures as vaccine adjuvants) and to develop more sustainable processes (e.g., greener peptide synthesis, or using peptides as biodegradable substitutes to polluting alternatives).

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
1. Chemical sciences: Supramolecular chemistry 2. Nano-technology: Nano-technology for pharmaceutical applications 3. Biological sciences: Biophysics	1. peptides 2. nanostructures 3. antimicrobial 4. amyloids 5. self-assembly

COST Members
Main Proposer: Croatia
Network of Proposers:
Full Member: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, Germany, Greece, Italy, Latvia, North Macedonia, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Ukraine
Cooperating Member: Israel
Partner Member: South Africa

Main and secondary proposers: 52,22% YRI / 53,1% Women /66,67% ITC

Specific Organisations
European RTD Organisation: Instituto de Parasitología y Biomedicina López Neyra

Industrial Dimension
SMEs: Germany, Italy, Latvia, Slovenia, Spain
Large companies: Belgium

CA23119
SENESCENCE2030: Targeting Cell Senescence to Prevent Age-Related Diseases
(OC-2023-1-26592)

SUMMARY
Preventing or alleviating aging associated diseases, collectively rather than individually, is the challenge to extend the human healthspan. The knowledge on cellular and molecular mechanisms identified so far as "hallmarks of aging" allow experimental strategies to prevent aging anticipation and extend the healthspan. A body of evidence indicate that cell senescence is a targetable hallmark of aging, typically associated with metabolic disorders, cardiovascular diseases, neurodegeneration and cancer. The Action SENESCENCE2030 aims at rooting in Europe the vision of cells senescence and its targeting at center for the prevention of aging related disorders.
Through the engagement with international partners, SENESCENCE2030 generates an interdisciplinary and intersectoral network of experts in geroscience and senescence, facilitating the acquisition of new skills and knowledge among young researchers, medical personnel and innovators from Inclusiveness Target Countries. SENESCENCE2030 goes beyond the state-of-the-art by opening vibrant knowledge exchange on senescence and senotherapy, trying to overcome the difficulties that prevent in Europe the clinical application of these knowledge for the identification of feasible diagnostics paths, more efficient clinical trials, and effective interventions on lifestyle and nutrition.
SENESCENCE2030 will highlight the socio-economic impact of therapeutic approaches and cost-effectiveness of timing interventions to define innovative processes, measures and products of impact on industries, funders and policy makers interested in addressing healthcare and socioeconomic challenges related to the aging.
Overall, SENESCENCE2030 will empower the transition from a disease-centered therapeutic approach to a balanced preventive and personalized treatment to avoid aging anticipation and promote individuals healthspan extension for the next decade.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
1. Biological sciences: Cell signalling and cellular interactions 2. Basic medicine: Metabolism, biological basis of metabolism related disorders 3. Clinical medicine: Non-communicable diseases 4. Economics and business: Public economics, political economics diseases	1. ageing 2. healthspan 3. gero-diagnostic 4. senotherapies 5. cell senescence

COST Members
Main Proposer: Italy
Network of Proposers:
Full Member: Armenia, Austria, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Spain, Sweden, Türkiye, United Kingdom

Main and secondary proposers: 13.43% YRI / 44.8% Women / 52.38% ITC

International Cooperation
International Partner: Australia, Canada, United States

Specific Organisations
EU Institutions, Bodies, Offices and Agencies (EC/EU): Centre de Recherche des Cordeliers - UMRS1138

Industrial Dimension
SMEs: Canada, Italy, Netherlands

CA23125

The mETamaterial foRmalism approach to recognize cAncer

(OC-2023-1-26638)

SUMMARY

Early detection and effective treatment of cancer is of critical importance for increasing the chances of patient survival. The rapid development of machine learning (ML) and particularly deep learning has made significant improvements in the accuracy of cancer screening, detection, and monitoring a possibility. However, despite the advantages offered by ML, it has one significant disadvantage, that is the tremendous amount of computing resource required for analysis and interpretation of images. The TETRA Action brings together experts in biophotonics, computer science, imaging instrumentation, cell biology and pathology to explore the application of an alternative approach to automated cancer detection, based on the metamaterial formalism approach. This approach uses constructed artificial tissue-like metamaterials for phantom creation and requires much less computing resource. Members of the TETRA network will work together to optimise methodologies for experimental visualisation of biomedical tissues, develop new theories enabling digitisation and interpretation of biological tissues, and develop and test classification algorithms for automatic detection of cancerous zones. With the ultimate goal of the Action being the creation of the knowledge base needed for the future development of breakthrough technologies that exploit the metamaterial formalism approach for the fast and cost-effective detection of cancer, and the emergence of the novel field of material medicine.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
1. Computer and Information Sciences: Computing on unconventional substrates, e.g. DNA and molecular computation 2. Computer and Information Sciences: Machine learning algorithms 3. Clinical medicine: Oncology 4. Physical Sciences: Nanophysics: nanoelectronics, nanophotonics, nanomagnetism or classify	1. Metamaterial 2. Disorder 3. Artificial Intelligence 4. Machine Learning 5. Permittivity

COST Members

Main Proposer: Lithuania

Network of Proposers:

Full Member: Belgium, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Spain, Türkiye, Ukraine, United Kingdom

Main and secondary proposers: 16% YRI / 33.3% Women /52.94% ITC

Industrial Dimension

SMEs: Belgium, Finland

Large companies: Latvia

CA23136
Magnetism and chirality: twisting spins, light, and lattices for faster-than-ever spintronics
(OC-2023-1-26762)

SUMMARY
The ability to switch magnets between two stable states has become the fastest and most widely used means to store information on devices. For information processing however, the standard von Neumann architecture is rapidly becoming obsolete, driven by the modern demands of computational resources for ultrahigh-speed mobile networks, machine learning and artificial intelligence. Recent years have witnessed a strong surge in research on symmetry-driven phenomena in magnetism, concentrated on the effects introduced by chirality. Chiral magnetic states, with their flexibility and topological protection, have great potential to become the building blocks for processing and storage of information. However, the area of chiral magnetism is still in its infancy, with many fundamental challenges to be solved and numerous obstacles to overcome before applications can be realised. The ultimate challenge is to discover ultrafast and energy-efficient ways to control magnetic topological states, the main aim of CHIROMAG. This will be achieved using an open and inclusive approach that will join the existing expertise and capabilities of scientific communities across Europe dealing with ultrafast magnetism, spintronics, magnonics, photonics and advanced spectroscopy, and by sharing the new knowledge arising from the exchange between them. This Action will result in disruptive achievements in the area of ultrafast chiral magnetism in particular, and in the quality and effectiveness of research in Europe in general, by bridging the existing gaps between these areas. A new generation of scientists will be trained at the interfaces of the involved disciplines, translating scientific breakthroughs into innovative technological solutions.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
1. Physical Sciences: Magnetism (theory) 2. Physical Sciences: Spintronics (theory) 3. Physical Sciences: Nanophysics: nanoelectronics, nanophotonics, nanomagnetism or classify	1. Topological magnetism 2. Ultrafast magnetization dynamics 3. Chirality

COST Members
Main Proposer: Netherlands
Network of Proposers:
Full Member: Belgium, Croatia, Czech Republic, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye, Ukraine, United Kingdom
Cooperating Member: Israel

Main and secondary proposers: 28.26% YRI / 28.3% Women /50% ITC

Specific Organisations
International Organisation: INL - International Iberian Nanotechnology Laboratory

Industrial Dimension
Large companies: France

CA23152
Building Consensus on Biofilm Regulatory Decision Making
(OC-2023-1-26914)

SUMMARY
Regulatory science is the development of research equipment, in vitro and in vivo models, and methods that enable informed decision making. While every country has its own defined pathway for regulatory approval, all regulators rely on regulatory science tools to make decisions as to whether or not a product may enter the commercial market and what label claim the company who sells the product may make. As part of their decision making, regulators must consider how the product improves public health and its impact on the environment. Our challenge is that regulatory science has not stayed current, or even maintained, with what is now considered “standard practice” in research laboratories, creating a large gap between fundamental science and current regulatory guidelines. This COST action will establish a network of individuals from across the European Union from diverse academic biofilm research fields who can develop guidance on what is needed in terms of agreement on the scope and ontology for academic, industrial, and regulatory decision makers to close the gap between academic research and regulatory science.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
1. Medical engineering: Diagnostictools (e.g. genetic, imaging) 2. Industrial biotechnology: Applied microbiology (others) 3. Industrial biotechnology: Industrial bioengineering, bioreactors 4. Biological sciences: Computational biology 5. Biological sciences: Biostatistics	1. biofilm 2. methods 3. regulatory approval 4. biofilm control 5. biofilm management

COST Members
Main Proposer: Portugal
Network of Proposers:
Full Member: Albania, Belgium, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Latvia, Netherlands, Poland, Portugal, Serbia, Slovakia, Slovenia, Sweden, United Kingdom

Main and secondary proposers: 17.5% YRI / 50% Women /52.63% ITC

International Cooperation
International Partner: Singapore, United States

Industrial Dimension
SMEs: Germany, Sweden, United Kingdom
Large companies: Germany

CA23156
European Network for Sigma-1 Receptor as a Therapeutic Opportunity
(OC-2023-1-26928)

SUMMARY
The sigma-1 receptor (S1R) is a ligand-regulated endoplasmic reticulum chaperone protein and a target for innovative compounds for the treatment of neurodegenerative and inflammatory diseases, cancers and pain diseases. The SIGMA-1 EUROPE network will bring together disciplines and expertises across Europe to advance the exploration and identification of the role of the Sigma-1 receptor in physiology and pathologies, to design innovative S1R ligands for cellular biology and medicine, and ultimately to train young reserachers and innovators to revise our views of the diseases, to think out-of-the-box and explore novel and innovative therapeutic opportunities.

SCIENTIFIC SCOPE

Areas of Expertise	Keywords
1. Basic medicine: Pharmacology, pharmacogenomics, drug discovery and design, drug therapy	1. Pharmacology 2. Drug development 3. Translational training 4. Cytoprotection 5. Pain

COST Members
Main Proposer: France
Network of Proposers:
Full Member: Austria, Belgium, Croatia, Estonia, France, Georgia, Germany, Hungary, Italy, Latvia, Poland, Portugal, Romania, Slovakia, Spain, Sweden, United Kingdom
Cooperating Member: Israel

Main and secondary proposers: 10% YRI / 40.5% Women / 50% ITC

Industrial Dimension
SMEs: Hungary