Title: Nanoparticle-Based Therapeutic Applications and Detection of Carbon Monoxide Releasing Molecules

LUMC PI: Luis Cruz Ricondo, PhD
Department of Radiology

EU contribution to total project: EUR 1.000.000
EU contribution to LUMC: EUR 85.000
Call number: H2020-WIDESPREAD-05-2017-Twinning

Abstract:
Carbon monoxide (CO) has gathered increasing attention because of its role as a gasotransmitter with therapeutic and cell-protective effects. It is also recognised as a cell-signalling molecule where recent developments in the area of CO-releasing molecules (CORMs) and materials for controlled CO application have shown their importance with respect to delivery of such agents to their respective targets. However, despite their promise, their remains two major bottlenecks that may prevent these compounds from reaching the clinic. Firstly, the precise spatial-temporal CO release of CORMs is not target-specific. The CO molecule is highly diffusive and binds to haemoproteins, which are ubiquitous. Secondly, CORMs are made of metal carbonyl complexes and as organometallic compounds, there is the potential of heavy metal toxicity. Moreover, since CORMs are water-soluble they are distributed throughout the body, which can lead to further increased toxicities against healthy tissues. Our project aims to alleviate some of the problems of CORMs by a) developing a method to monitor CO release by MRI and optical imaging; b) reformulate CORMs by encapsulating inside nanomaterials (specifically the FDA approved PLGA as a nanocarrier) and c) provide targeting of the CORMs to their site of delivery by conjugating peptide targeting moieties to the surface of the PLGA nanoparticle. Through the completion of these activities, IMM will effectively contribute to research excellence and value creation in health at European level.

H2020 project website
Title: Analytics for Biologics

LUMC PI: Prof. dr. Manfred Wuhrer

Center for Proteomics and Metabolomics

EU contribution to total project: EUR 3.933.617
EU contribution to LUMC: EUR 510.748
Call number: H2020-MSCA-ITN-2017

Abstract:
Qualitative and quantitative analysis and purification of therapeutic protein species (TP-S) – coded by the same gene, thus chemically often very similar – is one of the most challenging problems in analytical chemistry today. This problem is of huge impact in the area of therapeutic proteins (TPs) – a rapidly growing market – causing a high demand in specialists in the field of TP manufacturing. This demand can currently not be met by single European universities. In an Europe-wide joint research and training network the graduate school A4B will offer a specific training program yielding the required specialists. A4B-PhD students will develop solutions for the most urgent problems in TP production and analysis.

Production of TPs is associated with the generation of poorly effective or even harmful species. For an effective removal of these species, A4B-students will develop improved purification methods based on advanced affinity and displacement chromatography. For controlling effectiveness and design of experiments, fast and reliable qualitative and quantitative detection methods are required. The development of these analytical methods will focus on the chemical composition of TP-S including their glycans and other posttranslational modifications (PTMs). We will use high-end electrophoretic, liquid chromatographic, and mass spectrometry approaches in combination with bioinformatics. The developed methods will be tested and used for improving protein production processes and therapy control.

All A4B students will receive a basic education in manufacturing and marketing of TPS. Through their research projects the students will develop in depth expertise in one of the areas covered by the consortium. This project will thus generate urgently needed new methods for an improved analysis and purification of TP-S, while at the same time ensuring that well qualified young researchers are available for this rapidly growing area of the pharmaceutical industry.

H2020 project website
Title: implementation and operation of the gateway for health into BBMRI-ERIC

LUMC PI: Prof. dr. Gert Jan van Ommen
Department of Human Genetics

EU contribution to total project: EUR 4,949,448
EU contribution to LUMC: EUR 162,686
Call number: H2020-INFRADEV-1-2015-1

Abstract:
BBMRI-ERIC: the Biobanking and BioMolecular resources Research Infrastructure - European Research Infrastructure Consortium, aims to establish, operate and develop a Pan-European distributed research infrastructure in order to facilitate the access to biological resources as well as facilities and to support high quality biomolecular and biomedical research.

The ADOPT BBMRI-ERIC proposal aims at boosting and accelerating implementation of BBMRI-ERIC and its services. Its main deliverables are designed to complete or launch the construction of key Common Services of the Research Infrastructure as required for ESFRI-projects "under implementation", reflecting the targets of the European Research Area (ERA). One of the challenges in the post-genomic era is the research on common complex diseases, such as cancer, diabetes and Alzheimer’s disease. Revealing these diseases will depend critically on the study of human biological samples and data from large numbers of patients and healthy individuals. The EU’s ageing population is will result in an increase in many of those diseases and consequently an increased healthcare expenditure for senior citizens.

BBMRI-ERIC is a specific European asset having become a fundamental component in addressing the ongoing and future requirements particularly of Europe’s health service frameworks, including competitiveness and innovativeness of health-related industries. Its implementation is essential for the understanding of the diversity of human diseases, biological samples and corresponding data, which are required for the development of any new drug or diagnostic assay and are, therefore, critical for the advancement in health research, ultimately leading to personalised medicine. BBMRI-ERIC will provide a gateway access to the collections of the European research community, expertise and services building on the outcome of ADOPT BBMRI-ERIC.

H2020 project website
Title: European Training Network on Antiviral Drug Development

LUMC PI: Prof. dr. Eric Snijder

Department of Medical Microbiology

EU contribution to total project: EUR 3.849.087
EU contribution to LUMC: EUR 510.748
Call number: H2020-MSCA-ITN-2014

Abstract:
Viral infections are a major cause of disease, mortality and economic losses worldwide. Antiviral therapy is an essential instrument to control virus infections. At present, however, licensed antiviral drugs have been developed only against a limited number of viruses (e.g. HIV, HCV, influenza, herpesviruses). There is a clear and unmet need for antiviral drugs to treat infections with other important human pathogens.

Europe needs well-trained experts with multidisciplinary skills to advance the antiviral drug development field. However, few, if any, European universities or research institutes have the ability to deliver an intersectoral training programme that covers the broad spectrum of disciplines important for antiviral drug development.

The ANTIVIRALS partnership has been established to fill this gap. It consists of six outstanding European academic partners and four industrial partners (two large R&D companies, of which one is specialized in antiviral drug discovery and development, and two SMEs), and two partner organisations (incl. one SME specialised in education). All partners are leaders in their field, ensuring state-of-the-art training possibilities, and their skills are highly complementary.

ANTIVIRALS aims to introduce 15 ESRs to state-of-the-art knowledge and technology applied in antiviral drug development through both local and network-wide training activities. Individual research projects, research training workshops and intersectoral secondments will be supplemented with complementary skills courses and dissemination activities to improve career development and perspectives. The industrial partners are actively involved in the entire programme and will organize an industry-oriented conference aimed at further bridging the gap between academia and industry. Thus, ANTIVIRALS offers talented researchers a multidisciplinary and intersectoral training programme and prepares them for a future leading role in antiviral drug development in Europe.

H2020 project website
Title: Aortic Valve Replacement using Individualised Regenerative Allografts: Bridging the Therapeutic Gap

LUMC PI: Prof. dr. Mark Hazekamp

Department of Thoracic surgery

EU contribution to total project: EUR 4.954.992
EU contribution to LUMC: EUR 541.126
Call number: H2020-PHC-2014-single-stage

Abstract:
65,000 aortic valve replacements (AVR) are performed in Europe each year to treat acquired and congenital aortic valve diseases. In affected patients, mortality without AVR is extremely high and 50% die within 2 years. Current AVR options are, however, limited for young patients - especially female patients - and those unwilling to accept life-long medical anticoagulation with its inherent risks. None of the currently available prostheses for AVR is tailored toward the individual patient or allows for individual regeneration. The ARISE project will bridge this therapeutic gap in a Phase II clinical study to determine the feasibility, safety and efficacy of regenerative heart valves for aortic valve replacement.

After extensive preclinical work, Haverich et al. have used decellularized allogenic heart valve matrices for AVR on the basis of compassionate use in 34 patients with tentative assessment showing auspicious initial clinical results. However, transferring this regenerative approach to routine clinical application necessitates controlled prospective clinical trials which are lacking to date.

The translation of research in regenerative medicine from bench to bedside is frequently hampered by lengthy and complex regulatory procedures. This holds especially true for regenerative solutions based on human cell or tissue products where regulatory paths at national level are often unclear. Making these products available across Europe adds a further level of complexity as regenerative products are not subject to harmonized procedures, such as those for pharmaceutical products within Europe.

The ARISE consortium will address these challenges, integrating a network of six leading centres for cardio-thoracic surgery, each with proven track records in clinical research, an innovative SME experienced in bringing human tissue products to the clinic and market and expertise in ethical and regulatory aspects of regenerative medicine.

H2020 project website
Title: Advanced Regenerative and RESTorative Therapies to combat corneal BLINDNESS

LUMC PI: Prof. dr. Martine Jager
Department of Ophthalmology

EU contribution to total project: EUR 5,993,177
EU contribution to LUMC: EUR 80,500
Call number: H2020-PHC-2015-two-stage

Abstract:
Over 30 million Europeans are blind or visually impaired, leading to reduced quality of life and a tremendous loss of productivity in society. Corneal blindness is the second largest cause of blindness globally and while treatable, millions remain unnecessarily blind due to issues of access to transplantable tissue, lack of standardized treatments, and the lag in translating new regenerative medicine therapies to the clinic. The objective of ARREST BLINDNESS is therefore to develop and validate new regenerative-based therapies addressing a spectrum of blinding disorders of the cornea. These conditions either have no effective current treatments, depend on a scarce supply of donor tissue, or non-standardized methods are hindering validation of promising regenerative treatments. To achieve our objective, we will implant GMP-fabricated collagen-based bioengineered scaffolds to replace or regenerate the corneal stroma in cases of stromal thinning, scarring, dystrophy or trauma; deliver therapeutic epithelial stem and endothelial cells to the cornea to restore its transparency; deliver regenerative factors to promote neural growth and function; and actively maintain corneal immune privilege in high-risk situations by targeted therapeutic approaches to regress blood and lymphatic vessels. We will additionally develop advanced methods to image and monitor therapy throughout the cycle from GMP-compliant cell and scaffold preparation through the pre- and intra-operative stages, to postoperative follow-up and evaluation. After proof-of-concept and preclinical validation of key enabling components, these technologies will be used by one or several partners in preclinical models and in phase I/II human clinical studies. ARREST BLINDNESS directly addresses the translation of regenerative medicine, bio-artificial organs, tissue engineered scaffolds, and advanced cell and gene therapies into clinical use and will help to alleviate the worldwide problem of corneal blindness.

H2020 project website
EU Horizon 2020 Grant – ASTONISH

Title: Advancing Smart Optical Imaging and Sensing for Health

LUMC PI: Dr. Alexander Vahrmeijer
Department of Surgery

EU contribution to total project: EUR 5,895,046
EU contribution to LUMC: EUR 194,750
Call number: H2020-ECSEL-2015-1-RIA-two-stage

Abstract:
The ageing population and related increase in chronic diseases put considerable pressure on both the healthcare system and the society, resulting in an unsustainable rise of healthcare costs. As a result there is an urgent need to improve efficiency of care and reduce hospitalisation time in order to control cost and increase quality of life.
Addressing this need, medical applications need to become less invasive and improve disease detection, diagnosis and treatment using advanced imaging and sensing techniques. ASTONISH will deliver breakthrough imaging and sensing technologies for monitoring, diagnosis and treatment applications by developing smart optical imaging technology that extends the use of minimally invasive diagnosis and treatment and allows for unobtrusive health monitoring. The project will integrate miniaturized optical components, data processing units and SW applications into smart imaging systems that are less obtrusive, cheaper, more reliable and easier to use than state of the art systems. This results into 6 demonstrators by which the technologies will be validated and which allow for pre-clinical testing in the scope of the project.
The overall concept within ASTONISH builds on the development and application of common imaging/sensing technologies. Smart algorithms, multimodal fusion techniques and biomedical signal processing will process the acquired data and advanced user interfaces will simplify the complex clinical tasks. These technology components will be integrated to build application specific solutions for physiological signs monitoring, tumour detection, minimally invasive surgery, brain function monitoring and rehabilitation.
The ASTONISH partners cover the full value chain, from semiconductor manufacturing to clinical centres testing the final application. The proposed innovations improve the global competitiveness of the European industry in the healthcare domain.

H2020 project website
Title: Beta Cell Generation by Stem Cell-Derived Implants in Diabetes

LUMC PI: Prof. dr. Bart Roep

Department of Immunohematology and Blood transfusion

EU contribution to total project: EUR 6.200.000
EU contribution to LUMC: EUR 600.000
Call number: H2020-PHC-2015-single-stage_RTD

Abstract:
Despite improved treatment, diabetes remains a chronic disease with major health risks and heavy burden on patients and society. Serious forms are caused by depletion in pancreatic beta cells and associated loss in insulin’s homeostatic control throughout life. Their cure requires restoration of a metabolically adequate beta cell mass. Implants of beta cell grafts prepared from human pancreases have shown proof-of-principle but also the need for developing a large-scale source for therapeutic cells. Our objective is to generate a functional beta cell mass by stem cell-derived implants in diabetes patients. A combined preclinical and clinical project will search recipient and implant conditions for formation and maturation of beta cells in subcutaneous implants of device-encapsulated pancreatic endodermal cells that are derived from human embryonic stem cells (hu-ES) and manufactured for clinical studies. We collected preclinical evidence for the therapeutic potential of this implant from comparison with clinically used human beta cell grafts. State-of-the art methods and markers have been developed to investigate the biology of implants and to monitor host immune and innate reactivity. This approach helps understand the basis for metabolic outcome and identify targets for improvement. Pilot studies examine the influence of the (auto)immune status of the patients. Data will determine transition to clinical efficacy studies, or indicate the need for further laboratory development. Implants in preclinical models will guide modifications in clinical protocols, and explore the biologic properties of grafts derived from human induced pluripotent stem cell (iPSc) as can also be prepared from diabetes patients. Our consortium joins innovating cells, methods, markers and minds in a unique combination of expert clinical, academic and industry activities that need each other to make progress in an ambitious program.

H2020 project website
Title: Boost Brittle Bones Before Birth

LUMC PI: Prof. dr. Dick Oepkes

Department of Obstetrics

EU contribution to total project: EUR 6.608.754
EU contribution to LUMC: EUR 568.656
Call number: H2020-PHC-2015-single-stage_RTD

Abstract:
Osteogenesis imperfecta (OI) is, in its severe forms, a devastating inherited disorder characterised by brittle bones. A person with severe OI is affected throughout their lifetime with repeated, multiple fractures, considerable pain and handicap. There is no curative or effective treatment for OI. Our preclinical studies and initial clinical cases have demonstrated that transplantation of fetal mesenchymal stem cells (MSC) is a promising approach for treatment of OI. We receive regular requests for MSC transplantation from patients and their physicians; patient organisations support our approach.

The principal objective of the BOOSTB4 project is to conduct a Phase I/II clinical trial of the safety and efficacy of pre- and/or postnatal MSC transplantation in the severest forms of OI (type III, severe type IV). Transplantation before birth at the onset of disease should lead to greater efficacy and engraftment with less rejection than transplantation after birth. Postnatal transplantation will be evaluated in cases where prenatal diagnosis was not made. The trial's primary outcome is safety; secondary outcomes relate to efficacy (fracture frequency, growth, bone mineral density and quality of life). All patients will undergo molecular diagnosis to confirm OI before inclusion in the trial. Non-invasive prenatal diagnosis will be developed and validated.

The BOOSTB4 consortium is led by experts in MSC, prenatal therapy and OI at the Karolinska Institutet (KI), which will also lead the international multicentre trial; five additional EU centres of excellence are included. Ethical and regulatory applications are underway to conduct this clinical trial. These are facilitated by the ethical and regulatory approvals for prenatal MSC transplantation in 10 cases of OI that have already been granted at KI.

Successful prenatal transplantation represents a major step forward in the management of patients with severe OI, and beyond, to a range of other inherited birth defects.

H2020 project website
Title: Personalised Postoperative Immunotherapy to improving Cancer Outcome and improving Quality of Life

LUMC PI: Luis Cruz Ricondo, PhD
Department of Radiology

EU contribution to total project: EUR 2,430,000
EU contribution to LUMC: EUR 162,000
Call number: H2020-MSCA-RISE-2017

Abstract:
During this RISE project we aim to develop nanoparticle-based encapsulated libraries of different immunotherapeutic biomolecules for treatment after surgery as part of a novel cancer management strategy. The current state-of-art for the management of cancer starts with surgery, after identification of an accessible tumour mass. Surgery remains an effective treatment option for many types of cancer today and it is considered curative treatment for most solid tumours. It forms part of a multidisciplinary approach used in conjunction with radiotherapy or chemotherapy. These approaches, however, have several limitations, including inability of surgical resection to affect distal metastatic disease, toxicity to healthy tissues with chemotherapy and lack of effectiveness of radiation therapy in more aggressive tumours. The observation that cancer can relapse months or years after initial surgery implies that micrometastases still resides within the body in a latent state. Our proposal is to take cancer therapy to beyond state-of-art by implementing techniques which will take us into new directions.
This includes a) new methods to identify immune gene profiles and biomarkers b) transgenic mouse models where the complex interactions that underlie immune function can be visualised as multiplexed events in real time and c) the use of nanoparticle-based libraries of immune modulating reagent combinations. There are three key objectives within this project: i) to use immune gene signatures to monitor disease progression and therapeutic efficacy of immunotherapy combinations on nanoparticle-based platforms, ii) to optimise the platform to encapsulate libraries of immune components for more personalised, accurate and timely delivery of the payload to its intended target and iii) to optimise the overall cancer management process of image-guided surgery followed by postoperative immunotherapy so that we can ultimately provide a lifetime of protection against cancer.

H2020 project website
Title: A Clinical Decision Support system based on Quantitative multimodal brain MRI for personalized treatment in neurological and psychiatric disorders

LUMC PI: Dr. ir. Thijs van Osch
Department of Radiology

EU contribution to total project: EUR 2.168.125
EU contribution to LUMC: EUR 345.000
Call number: H2020-PHC-2014-two-stage

Abstract:
A large number of neurological and psychiatric disorders lack objective criteria for primary diagnoses, early differential diagnosis with regard to subtypes in treatment response and disease progression or effective therapy monitoring resulting in a tremendous negative socio-economic impact. Scientific studies based on advanced MRI methods indicate that related patients show specific subtle changes in multiple MRI readouts that are only detectable by quantitative approaches. Existing tools for MRI data analysis are largely insufficient to maximise the use of advanced modality based, diverse and complex MRI data with deficiencies existing mainly in interoperability as well as data organisation, integration, analysis and exploitation in clinical decision making.

Hence, the development of a clinical decision support system for neurological and psychiatric disorders is envisioned that is based on multimodal quantitative magnetic resonance imaging, advanced feature extraction and multi-parametric classification. To that the quantitative analysis of structural, functional and metabolic MRI data (11 modalities) shall be fully integrated into a single software framework for the first time; support of large data, interoperability and access for non-expert users shall be enabled and a machine learning based classification module shall be developed. The quantification and feature extraction algorithms for metabolic, perfusion, diffusion and functional imaging shall be enhanced to access the full information content of the data independent of vendor specific scan protocols as required for future use in diagnostics, stratification and monitoring of patients. The envisioned clinical decision support system shall be tested, optimized and demonstrated for major depression and multiple sclerosis, but can be extended to additional disorders by enabling large scale clinical trials and more widespread use in neuroscience as a basis for the future clinical decision making.

H2020 project website
Title: Characterisation Of A Green Microenvironment And To Study Its Impact Upon Health and Well-Being in The Elderly As A Way Forward For Health Tourism

LUMC PI: Dr. Alexander Vahrmeijer
Department of Surgery

EU contribution to total project: EUR 2.430.000
EU contribution to LUMC: EUR 216.000
Call number: H2020-MSCA-RISE-2016

Abstract:
Our society in Europe is still under prepared for the demographic changing situation of an ageing population which began several decades ago. This is visible in the age structure of the population and is reflected by the fact that the population aged 65 years and over is increasing in every European country. The growth in the elderly population may be explained by increased longevity, but at the same time, we also see an increase in debilitating conditions. However, it is also clear that the elderly are afflicted by challenging health conditions as a direct consequence of being elderly which impact their quality of life (QOL), e.g. living alone, depression, recovery from illness, immobility. This is what we would like to address. Living longer should be a privilege but there has been a collective failure to address social implications and QOL issues, where social care and the way it is funded are already in crisis. Our aim in this project is to couple the need for new societal approaches in addressing this changing demographic with improving the economy of green microenvironment sites, where health tourism and creating new jobs in this sector would in turn fund and provide benefits with respect to the well-being of the elderly. The ultimate outcome, through this pan-European academic and industrial project, will be: a) to derive cross-disciplinary and inter-sectorial knowledge of how to improve physical and mental well-being in the elderly, b) to characterise the environmental geology of Nemi and to correlate the identified features with improvements in health, well-being and recovery, c) to train a new generation of specialists in the sector of recreation and health for the tourism industry, d) the training of specialists in social and therapeutic horticulture (STH) as a way to improve physical and mental health, e) to create a model for health tourism, and f) to produce a business plan with an economic impact analysis.

H2020 project website
Title: Regulated Assembly of Molecular Machines for DNA REPAIR: a Molecular Analysis training Network

LUMC PI: Prof. dr. Meindert Lamers
Department of Chemical Immunology

EU contribution to total project: EUR 3.097.183
EU contribution to LUMC: EUR 255.374
Call number: H2020-MSCA-ITN-2016

Abstract:
The European Training Network DNAREPAIRMAN aims to train a new generation of innovative young scientists in cutting edge biophysical research methodology to address central questions in biology concerning the mode of action of critical molecular machines with relevance for human health. The Network consists of a highly collaborative consortium consisting of 12 participants coming from academia, industry, and the creative sector. Participating laboratories in the Network are part of established research schools within renowned research organizations and Universities, with supervisors who are experts within their respective research field, publish regularly in high-impact journals and have received EURYI and ERC awards. This environment of excellence offers a multidisciplinary PhD program to 12 young researchers (ESRs), through training in the analysis of basic chemical and physical principles that underlie the correct timing and localization of events during DNA repair. In addition training will center around method development using methodology, equipment, software and experience provided first-hand by four small technology-driven companies. Individual research projects as well as personal training plans will be implemented for each ESR, incorporating a local training program, multiple rotations within partner laboratories, exposure to the non-academic sector and Network meetings. ESRs will follow scientific workshops, courses in transferable skills, career development and entrepreneurship, and will disseminate and communicate their projects to a diverse audience in close collaboration with the creative sector. DNAREPAIRMAN will result in a new generation of mature and innovative European scientists with a thorough understanding of fundamental quantitative principles underlying biology, with experience in technique development, and affinity for the academic as well as the non-academic research setting, providing a broad and promising career perspective.

H2020 project website
Title: European Network on Anti-Cancer Immuno-Therapy Improvement by modification of CAR and TCR Interactions and Nanoscale Geometry

LUMC PI: Dr. Mirjam Heemskerk
Departament of Haematology

EU contribution to total project: EUR 2,539,859
EU contribution to LUMC: EUR 255,374
Call number: H2020-MSCA-ITN-2016

Abstract:
The EN-ACTI2NG program (European Network on Anti-Cancer Immuno-Therapy Improvement by modification of CAR and TCR Interactions and Nanoscale Geometry) emanates from the recent clinical evidence that T cells expressing engineered tumor-specific immune receptors can eradicate certain tumors that do not respond to conventional treatment. To obtain T cells with reactivity to a wider array of tumors and to improve efficiency and on- and off-target toxicity are current challenges. Therefore the EN-ACTI2NG program aims 1) to train PhD students with expertise in development of new and improved T cell-mediated cancer immuno-therapies; 2) to endow the PhD students with the ability to establish efficient communication between the academic and industrial research environments and between scientists and the general public; 3) to improve T cell mediated anti-cancer immuno-therapy by the identification and development of new cancer-specific immune receptors and enhancing their function by identifying and modifying their molecular mechanism of action. To reach these objectives we have designed individual research projects ranging from biophysical analysis of immune receptors, via molecular modification of their structure and testing their tumor killing capacity in cell-based and pre-clinical assays to product development. Secondments will assure that each PhD student will be exposed to these complementary approaches and that there will be synergic feedback between the projects, producing innovative results that could otherwise not be achieved. Extensive training in research-specific skills, career development and a continuous training in communication skills will allow the PhD students to become facilitators of the process of transformation of scientific innovation into products with social and economic value. As such, the EN-ACTI2NG program should contribute to overcoming the more general challenge of converting the European Community into an innovation-driven society.

H2020 project website
Title: Interdisciplinary training network for advancing Organ-on-a-chip technology in Europe

LUMC PI: Prof. dr. Christine Mummery
Department of Anatomy and Embryology

EU contribution to total project: EUR 3,942,860
EU contribution to LUMC: EUR 531,239
Call number: H2020-MSCA-ITN-2018

Abstract:
EUROoC will create a trans-European network of industrially oriented specialists fully trained in development and application of the emerging Organ-on-a-chip (OoC) technology. OoC technology is advancing at breath taking pace due to its potential impact in drug development and personalised treatments of disease. New researchers entering this field must be equipped with a multidisciplinary background ranging from biology to microfluidic chip engineering. EUROoC will offer the first complete and coherent European training program on OoC by gathering multidisciplinary participants (biologists, physicists, chemists, engineers) in a multi-sectoral network composed of 4 companies (3 SMEs), 2 regulation entities and 10 academic institutions. EUROoC will qualify the next generation of interdisciplinary scientists for all aspects of OoC development and utilisation, including understanding of commercialisation pathways and regulatory aspects. EUROoC furthermore comprises a collection of innovative research projects addressing the development of advanced OoC systems with higher physiological significance going beyond current in vitro testing. The EUROoC project will create advanced OoCs, which closely recapitulate properties of the respective organ tissues in vivo regarding cell types, microenvironment, organ-specific tissue structure and function as well as concepts for the interconnection of individual OoCs. The various OoC models to be developed comprise heart-on-a-chip, bone-on-a-chip, retina-on-a-chip, lung-on-a-chip, adipose-on-a-chip, gut-on-a-chip to liver-on-a-chip. The OoC systems will be able to monitor and analyse tissue functionality and response in situ by integrating various novel sensing elements. The OoCs developed will be pre-validated with the regulatory partners through in vitro-in vivo correlations. The research and training program planned will increase European competitiveness sustainably in this emerging key technology.

H2020 project website
Title: European Consortium for Communicating Stem Cell Research

LUMC PI: Prof. dr. Christine Mummery
Department of Anatomy and Embryology

EU contribution to total project: EUR 600.000
EU contribution to LUMC: EUR 0
Call number: H2020-Adhoc-2014-20

Abstract:
The European Consortium for Communicating Stem Cell Research (EuroStemCell) unites 33 partner institutions, that collectively represent >400 stem cell research groupings across Europe. Our common goal is to provide trusted high quality information on stem cells accessible to citizens and stakeholders across Europe, through support and further development of the multi-lingual European Stem Cell Information Portal www.eurostemcell.org. To achieve our aims, EuroStemCell will adopt the highly structured system for coordinated information management established by the FP7 Coordination and Support Action (CSA) also called EuroStemCell. From this, we will implement an ambitious programme of online and direct stakeholder engagement with stem cell research and regenerative medicine, aimed at European citizens at all educational levels. This will include provision of resources tailored specifically for decision-making on stem cell-related questions and an extensive programme of dissemination and capacity building in science communications and public engagement. The proposed work centres on an information hub team, which will link to all project partners and to stakeholders in the stem cell and regenerative medicine arenas and wider society, working with these groupings to implement the project. All outputs will be delivered in 6 European languages, to ensure broad accessibility, and will be rigorously evaluated against measurable objectives throughout the project duration. The proposed consortium comprises leading stem cell labs across Europe, including new member states, together with experts in ethical and societal concerns and evaluating clinical outcomes. It thus provides unparalleled European expertise across the fields of stem cell biology and regenerative medicine and is uniquely placed to maintain and further develop www.eurostemcell.org as a world-leading stem cell information resource, thus meeting the challenge outlined in Topic HOA-6-2014.

H2020 project website
Title: European Registries for Rare Endocrine Conditions

LUMC PI: Prof. dr. Olaf Dekkers
Department of Internal Medicine

EU contribution to total project: EUR 398,768
EU contribution to LUMC: EUR 11,774
Call number: HP-PJ-06-2016

Abstract:
Endo-ERN covers an exceptionally large number of rare conditions across the age span. Whilst some conditions are covered in established international disease registries, there are several that are not. Collectively, the existing detailed disease registries display a number of qualities associated with good registry practice but the involvement of patients, participation by members of Endo-ERN and the research output of these registries is variable with a minimal capacity for interoperability. The central cause that has led to this variation is the lack of a core endocrine registry and the lack of core standards for registries. The overall objective of the European Registries for Rare Endocrine Conditions (EuRRECa) is to ensure that Endo-ERN achieves its mission of driving up standards of clinical care and patient-centred research through maximizing participation in disease registries. The project will do this by developing a new core endocrine registry that collects a core dataset that also includes objective markers of clinical outcome, runs an e-surveillance programme and signposts participants to high-quality, detailed, disease-specific and patient-centred registries that have been evaluated by EuRRECa. The project will achieve the above objective by building on the structure that has been created by Endo-ERN. EuRRECa will receive guidance from expert advisory groups that align with the thematic groups of Endo-ERN. Their guidance will flow through work packages that will review the needs of patients, parents and ethics, evaluate the quality and interoperability of datasets and combine them with patient-centred clinical outcomes. Clear policies that are acceptable to patients, researchers and industry for accessing data for research coupled with widespread dissemination and knowledge-exchange through closely affiliated professional endocrine societies, patient support groups and across all the ERNs will ensure that EuRRECa is sustained over the longer term.

H2020 project website
Title: An Integrated European ‘Flagship’ Program Driving Mechanism-based Toxicity Testing and Risk Assessment for the 21st Century

LUMC PI: Dr. Harry Vrieling
Department of Human Genetics

EU contribution to total project: EUR 27.798.299
EU contribution to LUMC: EUR 773.260
Call number: H2020-PHC-2015-single-stage_RTD

Abstract:
The vision of EU-ToxRisk is to drive a paradigm shift in toxicology towards an animal-free, mechanism-based integrated approach to chemical safety assessment. The project will unite all relevant disciplines and stakeholders to establish: i) pragmatic, solid read-across procedures incorporating mechanistic and toxicokinetic knowledge; and ii) ab initio hazard and risk assessment strategies of chemicals with little background information. The project will focus on repeated dose systemic toxicity (liver, kidney, lung and nervous system) as well as developmental/reproduction toxicity. Different human tiered test systems are integrated to balance speed, cost and biological complexity. EU-ToxRisk extensively integrates the adverse outcome pathway (AOP)-based toxicity testing concept. Therefore, advanced technologies, including high throughput transcriptomics, RNA interference, and high throughput microscopy, will provide quantitative and mechanistic underpinning of AOPs and key events (KE). The project combines in silico tools and in vitro assays by computational modelling approaches to provide quantitative data on the activation of KE of AOP. This information, together with detailed toxicokinetics data, and in vitro-in vivo extrapolation algorithms forms the basis for improved hazard and risk assessment. The EU-ToxRisk work plan is structured along a broad spectrum of case studies, driven by the cosmetics, (agro)-chemical, pharma industry together with regulators. The approach involves iterative training, testing, optimization and validation phases to establish fit-for-purpose integrated approaches to testing and assessment with key EU-ToxRisk methodologies. The test systems will be combined to a flexible service package for exploitation and continued impact across industry sectors and regulatory application. The proof-of-concept for the new mechanism-based testing strategy will make EU-ToxRisk the flagship in Europe for animal-free chemical safety assessment.

H2020 project website
Title: European Virus Archive goes global

LUMC PI: Prof. dr. Alexander Gorbalenya
Department of Medical Microbiology

EU contribution to total project: EUR 10.792.868
EU contribution to LUMC: EUR 296.372
Call number: H2020-INFRAIA-2014-2015

Abstract:
The overall objective will be to create and mobilise an International network of high calibre centres around a strong European group of institutes selected for their appropriate expertises, to collect, amplify, characterise, standardise, authenticate, distribute and track, mammalian and other exotic viruses. The network of EVAg laboratories including 25 institutions represents an extensive range of virological disciplines. The architecture of the consortium is based on the association of capacities accessible to the partners but also to any end-users through the EVAg web-based catalogue. This concept has been elaborated and tested for its efficiency during the successful EVA project (FP7). The project will integrate more facilities dedicated to high risk pathogen (HRP) manipulation (1 in EVA, 13 in EVAg) The access to products derived from those HRP will be enhanced and for instance the production of diagnostic reagents will be facilitated. The new project will also provide access to high containment biosafety facilities to carry out in vivo studies of infectious disease using natural or models hosts, to look at prophylactic or therapeutic control measures and to develop materials for the evaluation of diagnostic tests, meaning an extensive capacity to service and to training. EVAg will also link up with other network-based virus-associated programmes that exist globally. However, looking further ahead, EVAg is conceived ultimately to be an open entity aiming at developing synergies and complementarity capabilities in such a way as to offer an improved access to researchers. This project will generate the largest collection of mammalian viruses in the world and move beyond the current state-of-the-art to provide an increasingly valuable resource and service to the world’s scientific community, including government health departments, higher education institutes, industry and, through information systems, the general public.

H2020 project website
EU Horizon 2020 Grant – HBP SGA1

Title: Human Brain Project Specific Grant Agreement 1

LUMC PI: Prof. dr. ir. Boudewijn Lelievaeldt
Department of Radiology

EU contribution to total project: EUR 89.000.000
EU contribution to LUMC: EUR 144.000
Call number: H2020-Adhoc-2014-20

Abstract:
Understanding the human brain is one of the greatest scientific challenges of our time. Such an understanding can provide profound insights into our humanity, leading to fundamentally new computing technologies, and transforming the diagnosis and treatment of brain disorders. Modern ICT brings this prospect within reach. The HBP Flagship Initiative (HBP) thus proposes a unique strategy that uses ICT to integrate neuroscience data from around the world, to develop a unified multi-level understanding of the brain and diseases, and ultimately to emulate its computational capabilities. The goal is to catalyze a global collaborative effort. During the HBP’s first Specific Grant Agreement (SGA1), the HBP Core Project will outline the basis for building and operating a tightly integrated Research Infrastructure, providing HBP researchers and the scientific Community with unique resources and capabilities. Partnering Projects will enable independent research groups to expand the capabilities of the HBP Platforms, in order to use them to address otherwise intractable problems in neuroscience, computing and medicine in the future. In addition, collaborations with other national, European and international initiatives will create synergies, maximizing returns on research investment. SGA1 covers the detailed steps that will be taken to move the HBP closer to achieving its ambitious Flagship Objectives.

H2020 project website
Title: IN SITU IMAGING OF LIVING TISSUES WITH CELLULAR SPATIAL RESOLUTION

LUMC PI: Prof. dr. Andrew Webb
Department of Radiology

EU contribution to total project: EUR 3.216.250
EU contribution to LUMC: EUR 250.000
Call number: H2020-FETOPEN-1-2016-2017

Abstract:
The main objective of HISTO-MRI project is to develop the technologies that will enable the non-invasive visualization of individual human cells in vivo and in real time, based on a radical new Magnetic Resonance Imaging concept: High Frequency Pulsed MRI. To accomplish this ambitious objective, several new challenging multidisciplinary technologies will have to be developed: 1) new method for the production of magnet coils, based on additive manufacturing technology, in order to stand very high currents at very high frequencies; 2) novel high frequency high voltage pulse power sources, based of semiconductor switches, to feed those magnet coils; and new pulse sequencing and computer algorithms to deal with and analyse the enormous amount of data. Therefore, this project has a foundational character, establishing the basis for a new field of research, pulsed MRI in the high frequency regime, which will radically advance MRI performance to micron resolution. A Proof of Concept of the new technology will be accomplished through the visualization of a mouse brain at the neuron level. This new technology will enable transformative research in the fields of neurosciences, bioengineering, biophysics and experimental oncology.

H2020 project website
Title: Innovative training in methods for future data

LUMC PI: Prof. dr. Manfred Wuhrer

Center of Proteomics and Metabolomics

EU contribution to total project: EUR 2.864.761
EU contribution to LUMC: EUR 510.748
Call number: H2020-MSCA-ITN-2016

Abstract:
IMforFUTURE is an innovative multidisciplinary and intersectoral research training programme which addresses current shortcomings in omics research. We aim to open the new research horizon in integration of genetics, glycomics, and epigenomics datasets into systems biology by developing innovative methods for high throughput omics and for integrative analysis of omics data. We focus on ageing, which is the biggest single risk factor for many diseases. By application of our novel methods to emerging datasets representing inflammation and immunology, IMforFUTURE will contribute to understanding of the underlying biological processes involved in diseases and ageing. To be successful in future multidisciplinary environments in Academia or Industry, ESRs need to be able to act as bridge between several diverse disciplines. Our ESRs need to overview all steps from data production via data analysis to data interpretation. In our consortium 6 academic and 4 industrial partners - experimental and theoretical - participate in research and training via teaching, offering secondments and hosting ESRs. We offer courses in high throughput methodology, genomics and statistics. Secondments will be to partners with complementary disciplines and intersectoral. Emphasis will be data management, data stewardship, entrepreneurship, and complementary skills. Interdisciplinary collaborations among ESRs will be stimulated by working on the same studies, in which new data will be generated, integrated with other datasets, analyzed with novel methods and interpreted. At the end of the project the ESRs will present and discuss their research in an integrated workshop. Our ESRs will be ready and equipped for new-generation multidisciplinary researchers. They will significantly contribute to omics research in relationship to human disease and health and knowledge translation. A conference to disseminate our work to researchers in Academia and Industry, and to stakeholders will be organized.

H2020 project website
Title: Improving Genome Editing Efficiency

LUMC PI: Dr. Manuel Goncalves
Department of Molecular Cell biology

EU contribution to total project: EUR 2.068.409
EU contribution to LUMC: EUR 255.374
Call number: H2020-MSCA-ITN-2017

Abstract:
CRISPR genome editing technology is considered to become the greatest technological improvement in biomedical research since the invention of the polymerase chain reaction 25 years ago and pharmaceutical companies as well as academic research are eager to apply it. However, the efficiency of introducing defined changes into the genome by CRISPR is still low, currently limiting its application in basic research, industry and gene therapy. IMGENE unites expert European research groups of academia and industry to address by innovative and complementary approaches the low efficiency of precise genome editing using CRISPR technology. To our best knowledge, IMGENE is the only concerted approach to tackle the important problem of low genome editing efficiency of CRISPR in a multidisciplinary, intersectorial manner. The IMGENE consortium, consisting of 6 academic and 1 industrial beneficiary (AstraZeneca), 2 industrial partners (Taconic; MilliporeSigma), and the patient organization Genetic Alliance, aims to improve the genome editing efficiency of CRISPR by research training of 8 ESRs to unleash the full potential of this technology. Combining complementary knowledge on protein chemistry, molecular biology, cellular biology, viral vectors, transgenic mice, gene therapy, and bioinformatics present in the network, IMGENE will establish novel tools and protocols for improved CRISPR genome editing efficiency that will be of immediate benefit for health and life science research, the pharmaceutical industry, and the application of gene therapy. In addition, IMGENE addresses crucial ethical questions related to the application of genome editing technology in animals, plants, and humans, which have to be solved to gain acceptance by the society. By excellent research training of 8 ESRs on a scientifically and economically highly relevant topic and additional training in transferable skills, IMGENE will educate novel leaders with great career perspectives in industry and academia.

H2020 project website
Title: Infrastructure for NMR, EM and X-rays for translational research

LUMC PI: Prof. dr. Bram Koster
Department of Molecular Cell biology

EU contribution to total project: EUR 9.999.534
EU contribution to LUMC: EUR 223.562
Call number: H2020-INFRAIA-2014-2015

Abstract:
Structural biology provides insight into the molecular architecture of cells up to atomic resolution, revealing the biological mechanisms that are fundamental to life. It is thus key to many innovations in chemistry, biotechnology and medicine such as engineered enzymes, new potent drugs, innovative vaccines and novel biomaterials.
iNEXT (infrastructure for NMR, EM and X-rays for Translational research) will provide high-end structural biology instrumentation and expertise, facilitating expert and non-expert European users to translate their fundamental research into biomedical and biotechnological applications.
iNEXT brings together leading European structural biology facilities under one interdisciplinary organizational umbrella and includes synchrotron sites for X-rays, NMR centers with ultra-high field instruments, and, for the first time, advanced electron microscopy and light imaging facilities. Together with key partners in biological and biomedical institutions, partners focusing on training and dissemination activities, and ESFRI projects (Instruct, Euro-BioImaging, EU-OPENSCREEN and future neutron-provider ESS), iNEXT forms an inclusive European network of world class.
iNEXT joint research projects (fragment screening for drug development, membrane protein structure, and multimodal cellular imaging) and networking, training and transnational access activities will be important for SMEs, established industries and academics alike. In particular, iNEXT will provide novel access modes to attract new and non-expert users, which are often hindered from engaging in structural biology projects through lack of instrumentation and expertise: a Structural Audit procedure, whereby a sample is assessed for its suitability for structural studies; Enhanced Project Support, allowing users to get expert help in an iNEXT facility; and High-End Data Collection, enabling experienced users to take full benefit of the iNEXT state-of-the-art equipment.

H2020 project website
Title: Image-Guided Surgery (IGS) and Personalised Postoperative Immunotherapy To Improving Cancer Outcome

LUMC PI: Dr. Alexander Vahrmeijer  
**Department of Surgery**

EU contribution to total project: EUR 3.922.309  
EU contribution to LUMC: EUR 680.998  
Call number: H2020-MSCA-ITN-2015

Abstract:  
The basic concept of our proposal is to develop nanoparticle-based encapsulated libraries of different immunotherapeutic biomolecules for treatment after surgery as part of a novel cancer management strategy. The current state-of-art for the management of cancer starts with surgery, after identification of an accessible tumour mass. Surgery remains an effective treatment option for many types of cancer today and it is considered curative treatment for most solid tumours. It forms part of a multidisciplinary approach used in conjunction with radiotherapy or chemotherapy. These approaches, however, have several limitations, including inability of surgical resection to affect distal metastatic disease, toxicity to healthy tissues with chemotherapy and lack of effectiveness of radiation therapy in more aggressive tumours. The observation that cancer can relapse months or years after initial surgery implies that micrometastases still resides within the body in a latent state. Our proposal is to take cancer therapy to beyond state-of-art by implementing techniques which will take us into new directions. This includes a) new methods to identify immune gene profiles and biomarkers b) transgenic mouse models where the complex interactions that underlie immune function can be visualised as multiplexed events in real time and c) the use of nanoparticle-based libraries of immune modulating reagent combinations. There are three key objectives within this project: i) to use immune gene signatures to monitor disease progression and therapeutic efficacy of immunotherapy combinations on nanoparticle-based platforms, ii) to optimise the platform to encapsulate libraries of immune components for more personalised, accurate and timely delivery of the payload to its intended target and iii) to optimise the overall cancer management process of image-guided surgery followed by postoperative immunotherapy so that we can ultimately provide a lifetime of protection against cancer.

[H2020 project website](#)
Title: MELanoma GENetics - understanding and biomarking the genetic and immunological determinants of melanoma survival

LUMC PI: Dr. Remco van Doorn
Department of Dermatology

EU contribution to total project: EUR 3,988,365
EU contribution to LUMC: EUR 510,748
Call number: H2020-MSCA-ITN-2014

Abstract:
The MELGEN European Training Network (ETN) will create an environment for long-term, collaborative, inter-sectorial cancer genetics research with the ultimate aim of improving precision (personalised) medicine. In a 2012 report the European Science Foundation identified the importance of precision medicine and recommended that there should be 1) provision of comprehensive, accessible and interoperable datasets 2) improved models and decision-making processes, 3) interdisciplinary, public-private partnerships and translational research, and 4) dedicated funding including access to core technology and frameworks for education and training of professionals. This application addresses all four recommendations and applies them to melanoma. Considerable, but insufficient, progress has been made in understanding the genetic changes within melanomas that drive tumour progression, and how those drivers can be targeted to treat melanoma. Melanoma is also an especially immunogenic cancer and much more needs to be understood of how melanomas suppress host immunological responses. Understanding what controls immunity in melanoma will be potentially applicable to other cancers. Finally, we need prognostic and predictive biomarkers for selection of precision therapy. This ETN will recruit 15 early stage researchers (ESRs) to address these issues. It will bring together leaders in clinical research, genomics, statistics, bioinformatics, and the biotech industry to exploit the new genomic tools and tumour immunology. MELGEN’s commercial partners are developing immunological tests (ImmunID), bioinformatics (Eagle Genomics), commercial genomics (ServiceXS) and digital design/communications (Digitronix) and they will underpin an innovative, interdisciplinary training programme for the next generation of melanoma researchers.

H2020 project website
Title: Modulation of glycolytic flux as a new approach for treatment of atherosclerosis and plaque stabilization: a multidisciplinary study

LUMC PI: Prof. dr. Paul Quax
Department of Surgery

EU contribution to total project: EUR 3.086.435
EU contribution to LUMC: EUR 510.748
Call number: H2020-MSCA-ITN-2015

Abstract:
The mission of MoGlyNet is to define a joint doctorate educational training model in Drug Discovery and Development where Academia and Industry join their forces for:
- Creating a common platform of knowledge and language for early stage researchers (ESR) working in the Drug Discovery and Development area aiming to convey complementary pharma-skills.
- Exploiting this platform to train a new generation of cutting-edge researchers and professionals highly attractive for employment by the European Pharma-industry.
- Establishing structures for long-term cooperation, strengthening the relationships among the leading Universities and Pharma-enterprises and to continuously develop the research training platform that European industry relies on.

To achieve the above objectives the main tasks of MoGlyNet are:
- To attract/train 12 ESRs in optimization joint academic/industrial program of cutting-edge training-by-research, high quality supervision, complementary and transferable Pharma-skills training, inter-network secondments, and workshops/Summer Schools.
- To pursue an innovative research project that will tackle a timely and important scientific problem with a multidisciplinary approach (from molecular modelling to in vivo studies). Atherosclerosis is an aging-related disease and our research approach for a better therapy of atherosclerosis will be focused on the PFKFB3 enzyme, a key player in glycolysis/oxidative stress and therefore in pathological angiogenesis.
- To build a solid foundation for long-term European excellence in this field by disseminating MoGlyNet research/training outcomes and best practice into the partners Doctoral Schools, and by fostering long-term partnerships and collaborations that will outlast the Consortium.
- To transfer expertise/know-how among the Consortium participants and to external groups via networking activities, intersectorial exposure, secondments, workshops, sharing of learning material, public engagement and outreach activities.

H2020 project website
Title: Analysis, modelling and sensing of both physiological and environmental factors for the customized and predictive self-management of Asthma

LUMC PI: Dr. Jaap Sont
Department of Medical Statistics and Bioinformatics

EU contribution to total project: EUR 4.581.378
EU contribution to LUMC: EUR 400.250
Call number: H2020-PHC-2014-single-stage

Abstract:
myAirCoach aims to develop a holistic mHealth personalised asthma monitoring system empowering patients to manage their own health by providing user friendly tools to increase the awareness of their clinical state and effectiveness of medical treatment. This will be achieved through a multi-disciplinary approach aiming at the development of an ergonomic, compact and efficient sensor-based inhaler that will be in continuous communication with a mobile device. This sensing infrastructure will have the capability of automated monitoring of several clinical, behavioural and environmental factors in realistic conditions. A pipeline of advanced analysis, processing and computational modelling techniques, dealing with raw measurements, extracted features, indicators, and personal profile data representation will ensure clinical state awareness and a timely optimal treatment. Besides, a "personal mHealth guidance system" will empower patients to customize their treatment towards personalised preset goals and guidelines, either automatically or driven by healthcare professional in a telemedicine manner. In this context, myAirCoach will give to clinicians early indications of increasing symptoms or exacerbations, while making an important contribution in successfully self-management of asthma. The myAirCoach framework will be quantified and evaluated in two test campaigns with carefully designed cohorts of patients in three testing sites. Besides the obvious necessity of the test campaigns to ground the myAirCoach patient models and framework with data, the objective formal validation of the results is expected to lead to increased confidence in the myAirCoach approach and in ICT decision support and self-management systems in general. The impact of such a holistic and innovative approach is huge and the foundations laid here are expected to result in a widespread adoption of sensor-based self-management systems not only in asthma, but also in other respiratory diseases.

H2020 project website
Title: Novel Stromal Cell Therapy for Diabetic Kidney Disease

LUMC PI: Prof. dr. Wim Fibbe
Department of Immunohematology and Blood transfusion

EU contribution to total project: EUR 5,994,373
EU contribution to LUMC: EUR 523,568
Call number: H2020-PHC-2014-two-stage

Abstract:
Type 2 diabetes will affect >500 million adults by 2040 and its secondary complications will generate enormous socioeconomic costs - in particular, diabetic kidney disease (DKD), which is already the most common cause of chronic kidney disease. DKD is associated with greatly increased mortality and frequently progresses to end stage renal failure. Pharmacotherapy, dialysis and transplantation represent the mainstay treatments for DKD but are costly and provide only limited protection against adverse outcomes. Mesenchymal Stromal Cell (MSC) therapy is a promising approach to halting the progression of DKD toward end-stage renal failure and may also have ancillary benefits in Type 2 diabetes. In preliminary research, we have demonstrated that a single dose of MSC simultaneously improves kidney function (glomerular filtration rate and albuminuria) as well as hyperglycaemia in animals with DKD. NEPHSTROM will conduct a multi-centre, placebo-controlled clinical trial of a novel MSC therapy for stabilization of progressive DKD, leading to superior clinical outcomes and long-term socioeconomic benefit. A key enabler for this trial is a novel MSC population (CD362+MSC, trade name ORBCEL-M) which delivers higher purity and improved characterisation compared to conventional plastic-adherent MSC. The NEPHSTROM Phase 1b/2a clinical trial will investigate the safety, tolerability and preliminary efficacy of a single intravenous infusion of allogeneic ORBCEL-M versus placebo in adults with progressive DKD. NEPHSTROM investigators will also determine the bio-distribution, mechanisms of action, immunological effects and economic impacts associated with ORBCEL-M therapy for DKD. This research will critically inform the optimal design of subsequent Phase 3 trials of ORBCEL-M. Stabilising progressive DKD through NEPHSTROM’s next-generation MSC therapy will reduce the high all-cause mortality and end-stage renal failure risk in people with this chronic non-communicable disease.

H2020 project website
Title: Optimizing a deployable high efficacy malaria vaccine

LUMC PI: Dr. Shahid Khan
Department of Parasitology

EU contribution to total project: EUR 20.050.441
EU contribution to LUMC: EUR 1.175.000
Call number: H2020-SC1-2016-RTD

Abstract:
A highly effective malaria vaccine against Plasmodium falciparum should help prevent half a million deaths from malaria each year. New vaccine technologies and antigen discovery approaches now make accelerated design and development of a highly effective multi-antigen multi-stage subunit vaccine feasible. Leading malariologists, vaccine researchers and product developers will here collaborate in an exciting programme of antigen discovery science linked to rapid clinical development of new vaccine candidates.

Our approach tackles the toughest problems in malaria vaccine design: choice of the best antigens, attaining high immunogenicity, avoiding polymorphic antigens and increasing the durability of vaccine immunogenicity and efficacy.

We take advantage of several recent advances in vaccinology and adopt some very new technologies: sequencing malaria peptides eluted from the HLA molecules, parasites expressing multiple transgenes, multi-antigen virus-like particles constructed with new bonding technologies, delayed release microcapsules, and liver-targeted immunisation with vaccine vectors.

We enhance our chances of success by using a multi-stage multi-antigen approach, by optimising the magnitude and durability of well-characterised immune responses to key antigens, and using stringent infectious challenges and functional assays as established criteria for progression at each stage.

The consortium comprises many of the foremost researchers in this field in Europe with leading groups in the USA, Australia and Africa. We link to EDCTP programmes and harmonise our timeline to fit with the recent roadmaps for malaria vaccine development. We include a major pharma partner and several excellent European biotech companies helping enhance Europe’s leading position in the commercial development of vaccines.

This ambitious and exciting programme should have a high chance of success in tackling the major global health problem posed by malaria.

H2020 project website
EU Horizon 2020 Grant – POWER2DM

Title: Predictive model-based decision support for diabetes patient empowerment

LUMC PI: Dr. Jaap Sont
Department of Medical Statistics and Bioinformatics

EU contribution to total project: EUR 4,981,553
EU contribution to LUMC: EUR 831,020
Call number: H2020-PHC-2015-single-stage

Abstract:
The main objective of POWER2DM is to develop and validate a personalized self-management support system (SMSS) for T1 and T2 diabetes patients that combines and integrates (1) a decision support system (DSS) based on leading European predictive personalized models for diabetes interlinked with predictive computer models, (2) automated e-coaching functionalities based on Behavioural Change Theories, and (3) real-time Personal Data processing and interpretation. The DSS will be based on the complementary combination of proven predictive models for short term plasma glucose prediction, medium term diabetes progression, and long term risk scoring for diabetes complications. These models will be integrated in adaptive personalized behavior change interventions to increase adherence of the patients to their care program and improve their interaction with health professionals. A cloud-based Data Integration Service, collecting and processing data from personal devices and EHR/PHR in real-time feeds the DSS. The results of the SMSS with respect to clinical parameters, awareness, acceptance and empowerment of the patient to participate in the care process will be evaluated in three studies in NL, DE and ES.
The deliverables of the project will increase self-management capabilities and participation of the patient in the care process, resulting in better self-control and management of the disease. This will lead to better glucose management, thereby preventing severe episodes and long-term complications. POWER2DM will reinforce the prevention sector in healthcare by raising the acceptance of SMSS based on DSS that use predictive models fed by data from personal devices. POWER2DM will challenge individuals towards more frequent and long-term use of personal devices for self-monitoring, boosting the development of these devices. POWER2DM will thereby make an essential step forward in empowering the patient, advancing prevention and decreasing disease burden and costs.

H2020 project website
Title: Preclinical Intra-Operative Image-Guided Surgery and Post-Operative Radiotherapy of Tumours

LUMC PI: Prof. dr. Boudewijn Lelieveldt
Department of Radiology

EU contribution to total project: EUR 2.430.000
EU contribution to LUMC: EUR 486.000
Call number: H2020-MSCA-RISE-2014

Abstract:
The main objective and basic concept of our proposal is to improve intra-operative and post-operative targeted surgical probes and new detection systems for surgical intervention of cancer. The work revolves around the mobility of clinicians, scientists and technologists between twelve consortium partners and across four different countries. The goal is the implementation of interdisciplinary, inter-sector, cross-training of personnel. As a consequence, this will serve to accelerate the development of improved imaging technologies and hybrid fluorescence/radionuclide probes for the surgical intervention of cancer. The hypothesis is that if we can develop a hybrid probe for both targeted image-guided surgery and post-operative molecular radiotherapy, we would be implementing a revolutionary imaging and therapeutic approach for oncology surgeons to help their patients by improving better overall survival and quality of life for the patient. There are four key objectives within this project: 1) synthesis of a near infra-red fluorescence (NIRF)-dye conjugated to a peptide that is targeted towards a tumour associated antigen, 2) deliver a novel clinical optoacoustic handheld camera to detect the fluorescence probe in deep tissue, 3) validate the probe/target combination across the subcellular, cellular, endoscopic and macroscopic levels with state-of-art technologies, and 4) develop the probe further by targeting a radionuclide entity to the fluorescent construct for postoperative radiotherapy. Surgeons would have a more definitive reference for resection, if the tumour margin can be clearly defined. If this can be achieved, the impact would be (a) reduced recurrence rates in patients by lowering the risk of residual tumour tissue remaining after surgery and as a consequence improve survival, (b) minimised removal of healthy tissues, c) reduced patient morbidity and hospital stay and d) significant health cost benefits.

H2020 project website
EU Horizon 2020 Grant – RenalToolBox

Title: Developing novel tools and technologies to assess the safety and efficacy of cell-based regenerative medicines therapies, focusing on kidney disease

LUMC PI: Prof. dr. Ton Rabelink
Department of Internal Medicine

EU contribution to total project: EUR 4.071.175
EU contribution to LUMC: EUR 265.619
Call number: H2020-MSCA-ITN-2018

Abstract:
The RenalToolBox ITN comprises a team of world-leading clinicians, scientists and industrialists from academia and private enterprise whose common goal is to develop innovative medical devices and imaging technologies to expedite the translation of cell-based regenerative medicine therapies (RMTs) to the clinic. The target disease for RenalToolBox is kidney disease, the incidence of which is increasing annually. The ITN provides an excellent framework for training 15 early stage researchers (ESRs) in a range of technological, entrepreneurial and transferable skills that will not only enhance their career prospects, but will also boost European scientific excellence and business innovation. By the end of the programme, the ESRs will have benefitted from a comprehensive multidisciplinary and multi-sectoral training experience that will equip them to expedite progress in the emerging supradisciplinary fields of biomedical devices, bio-imaging, cellular therapeutics and regenerative medicine. The research training objectives are as follows: 1. Train the young researchers in the development of diagnostic devices and novel tracers for monitoring renal function. 2. Apply cutting-edge imaging technologies to evaluate the safety and efficacy of novel cell-based RMTs in a rodent model of kidney disease. 3. Assess the safety and efficacy of different sources of mesenchymal stromal cells and explore the mechanisms whereby these cells can ameliorate kidney disease. This comprehensive training programme will endow the young researchers with the necessary scientific and industrial skills to ensure their employability and readiness to engage and lead the next European generation of scientists-entrepreneurs.

H2020 project website
Title: Developing Genetic medicines for Severe Combined Immunodeficiency

LUMC PI: Prof. dr. Frank Staal
Department of Immunohematology and Blood transfusion

EU contribution to total project: EUR 6,926,313
EU contribution to LUMC: EUR 799,877
Call number: H2020-PHC-2015-two-stage

Abstract:
Severe combined immunodeficiency (SCID) is a devastating rare disorder of immune system development. Affected infants are born without functional immune systems and die within the first year of life unless effective treatment is given. Treatment options are limited to allogeneic haematopoietic stem cell transplantation and autologous stem cell gene therapy. Over the last 15 years, gene therapy for two forms of SCID (SCID-X1 and ADA SCID) has shown significant safety and efficacy in correcting the immunodeficiency and allowing children to live normal lives. Proof of concept of gene therapy for 3 other SCID forms has also been shown by members of the proposed SCIDNET consortium and is ready for translation into clinical trials. We are therefore in a position whereby, over the next 4 years, we can offer gene therapy as a curative option for over 80% of all forms of SCID in Europe. Importantly for 1 of these conditions (ADA SCID) we will undertake clinical trials that will lead to marketing authorisation of the gene therapy product as a licensed medicine. In addition, we will investigate the future technologies that will improve the safety and efficacy of gene therapy for SCID.

Our proposal addresses an unmet clinical need in SCID, which is classified as a rare disease according to EU criteria (EC regulation No. 141/2000). The proposal also addresses the need to develop an innovative treatment such as gene therapy from early clinical trials though to a licensed medicinal product through involvement with regulatory agencies and is in keeping with the ambitions of the IRDiRC. The lead ADA SCID programme has Orphan Drug Designation and clinical trial design is assisted by engagement with the European medicines Agency. The ADA SCID trial will act as a paradigm for the development of the technologies and processes that will allow gene therapy for not only SCID, but also other bone marrow disorders, to become authorised genetic medicines in the future.

H2020 project website
Title: Simulation Modeling of coronary ARTery disease: a tool for clinical decision support

LUMC PI: Dr. Arthur Scholte

Department of Cardiology

EU contribution to total project: EUR 4.800.858
EU contribution to LUMC: EUR 220.000
Call number: H2020-PHC-2015-single-stage

Abstract:
SMARTool aims at developing a platform based on cloud technology, for the management of patients with coronary artery disease (CAD) by standardizing and integrating heterogeneous health data, including those from key enabling technologies. The platform includes existing multiscale and multilevel ARTreat (FP7-224297) models of coronary plaque progression based on non-invasive coronary CT angiography (CCTA) and fractional flow reserve computation, refined by heterogeneous patient-specific non-imaging data (history, lifestyle, exposome, biohumoral data, genotyping) and cellular/molecular markers derivable from a microfluidic device for on-chip blood analysis. SMARTool models will be applied and validated by historical and newly acquired CCTA imaging plus non-imaging health data from the EVINCI project (FP7-222915) population. SMARTool cloud-based platform, through Human Computer Interaction techniques, 3D visual representation and artery models, will use heterogeneous data in a standardized format as input, providing as output a CDSS - assisted by a microfluidic device as a point of care testing of inflammatory markers – for:

- Patient specific CAD stratification - existing models, based on clinical risk factors, will be implemented by patient genotyping and phenotyping to stratify patients with non-obstructive CAD, obstructive CAD and those without CAD,
- Site specific plaque progression prediction - existing multiscale and multilevel ARTreat tools of CAD progression prediction will be refined by genotyping and phenotyping parameters and tested by baseline and follow CCTA and integrated by non-imaging patient-specific data,
- Patient-specific CAD diagnosis and treatment - life style changes, standard or high intensity medical therapy and a virtual angioplasty tool to provide the optimal stent type(s) and site(s) for appropriate deployment.

H2020 project website
Title: Soraprazan - a new regenerative therapy for Stargardt's disease

LUMC PI: Prof. Dr. Camiel Boon

Department of Ophthalmology

EU contribution to total project: EUR 5,792,425
EU contribution to LUMC: EUR 242,362
Call number: H2020-SC1-2017-RTD

Abstract:
Abnormal accumulation of lipofuscin in the RPE cells is a hallmark in Stargardt's disease. As lipofuscin cannot be removed from the RPE cells in the eyes neither spontaneously nor with existing therapies, the accumulation of lipofuscin in the RPE cells of the eyes results in the degradation of the RPE cells and consequently in worsening of visual acuity and could lead to blindness. Soraprazan was able to show removal of lipofuscin in RPE cells. Aim of the phase II trial in this project is to evaluate safety and efficacy or orally taken Soraprazan treatment compared to placebo.

H2020 project website
Title: Steps towards an European Forensic Science Area

LUMC PI: Prof. Dr. Peter de Knijff
Department of Human Genetics

EU contribution to total project: EUR 5,792,425
EU contribution to LUMC: EUR 242,362
Call number: H2020-SC1-2017-RTD

No abstract available

H2020 project website
Title: A novel 3D Stereoscopic e-learning Solution for theoretical Surgical Training

LUMC PI: Prof. dr. Marco de Ruiter
Department of Anatomy and Embryology

EU contribution to total project: EUR 2.973.867
EU contribution to LUMC: EUR 529.541
Call number: H2020-FTIPilot-2015-1

Abstract:
The SurgASSIST project aims to improve surgical care by changing the way surgeons are educated. The SurgASSIST project provides an online educational program, the INCISION Academy, that uses 3D visualizations (stereoscopic videos and animations) to teach surgical procedures step-by-step, based on state-of-the-art scientific research and best-practice surgical care. Surgery is a three dimensional trade and the use of 3D stereoscopic techniques creates a unique and realistic online environment in which residents and surgeons can learn, train and be tested on best-practice based surgical procedures and anatomy. With the INCISION Academy prototype, the value of this innovative educational approach has been demonstrated. To reach market introduction of the INCISION Academy, the SurgASSIST consortium will undertake activities to establish a strong value chain from production to distribution: (1) complete the INCISION Academy curriculum, (2) add 3D virtual reality online surgery to increase product value, (3) establish the LMS system for worldwide distribution, and (4) create the commercialisation strategy.

Potential users, surgical residents, surgical trainers, and surgeons, cope with an ever increasing workload and need tools to relieve work pressure and improve quality. After this project, the INCISION Academy will be available as worldwide surgical online training tool to train surgical residents with higher quality than before while saving time of surgical trainers. In addition, the INCISION Academy provides a timesaving online alternative for continued medical education of surgeons (CME). The European markets for training of surgical residents and CME amount to € 187,5 and € 158 million respectively. The easy-access, unparalleled high quality, and use of 3D technologies places the INCISION Academy in an excellent commercial position to acquire a significant market share in Europe and subsequently in the USA, China, Southern America and developing countries.

H2020 project website
Title: Advancing novel and promising TB vaccine candidates from discovery to preclinical and early clinical development

LUMC PI: Prof. dr. Tom Ottenhoff

Department of Infectious Diseases

EU contribution to total project: EUR 18.200.000
EU contribution to LUMC: EUR 936.937
Call number: H2020-PHC-2014-single-stage

Abstract:
The TBVAC2020 proposal builds on the highly successful and long-standing collaborations in subsequent EC-FP5-, FP6- and FP7-funded TB vaccine and biomarker projects, but also brings in a large number of new key partners from excellent laboratories from Europe, USA, Asia, Africa and Australia, many of which are global leaders in the TB field. This was initiated by launching an open call for Expressions of Interest (EoI) prior to this application and to which interested parties could respond. In total, 115 EoIs were received and ranked by the TBVI Steering Committee using proposed H2020 evaluation criteria. This led to the prioritisation of 52 R&D approaches included in this proposal.

TBVAC2020 aims to innovate and diversify the current TB vaccine and biomarker pipeline while at the same time applying portfolio management using gating and priority setting criteria to select as early as possible the most promising TB vaccine candidates, and accelerate their development. TBVAC2020 proposes to achieve this by combining creative “bottom-up” approaches for vaccine discovery (WP1), new preclinical models addressing clinical challenges (WP2) and identification and characterisation of correlates of protection (WP5) with a directive “top-down” portfolio management approach aiming to select the most promising TB vaccine candidates by their comparative evaluation using objective gating and priority setting criteria (WP6) and by supporting direct, head-to head or comparative preclinical and early clinical evaluation (WP3, WP4). This approach will both innovate and diversify the existing TB vaccine and biomarker pipeline as well as accelerate development of most promising TB vaccine candidates through early development stages. The proposed approach and involvement of many internationally leading groups in the TB vaccine and biomarker area in TBVAC2020 fully aligns with the Global TB Vaccine Partnerships (GTBVP).

H2020 project website
Title: Tools and TECHNOlogies for Breakthrough in hEArt Therapies

LUMC PI: Prof. dr. Christine Mummery
Department of Anatomy and Embryology

EU contribution to total project: EUR 5,968,850
EU contribution to LUMC: EUR 649,750
Call number: H2020-PHC-2015-two-stage

Abstract:
Cardiovascular diseases including myocardial infarction (MI), which entails the irreversible loss of heart muscle tissue, constitute a major socio-economic burden in global healthcare. With whole organ transplantation as the only treatment option for end-stage heart failure, MI patients could particularly benefit from advanced cell therapies aimed at the functional reconstitution of damaged hearts. Human induced pluripotent stem cells (hiPSCs) can be derived by reprogramming patients’ somatic cells. In contrast to adult (stem) cells e.g. from blood, bone marrow or the heart, hiPSCs have unlimited expandability and differentiation potential into all relevant cell types including cardiomyocytes, endothelial cells, pericytes and connective tissue-forming cells, making them highly attractive as a universal cell source for organ repair. However, technologies for the robust therapeutic scale production of hiPSC-derived progenies in line with GMP standards and at reasonable cost are currently lacking.

TECHNOBEAT’s ultimate objectives are 1) to advance therapeutic scale cell production through innovative bioreactor technologies and novel cell monitoring tools, and 2) to develop regulatory compliant bioprocessing of innovative iPSC-based cardiac μ-tissue. The clinical translation of cardiac μ-tissue will require 3) the development and application of tools for improved cell delivery and longitudinal in vivo monitoring of cell grafts, and 4) proof-of-concept for safety and functional integration in physiologically relevant preclinical models of cellular heart repair.

Through its interdisciplinary excellence, TECHNOBEAT’s consortium of leading European stem cell researchers, clinicians, tissue-, bioprocess-, and technical- engineers in industry and academia is ideally positioned to address these ambitious objectives. It will provide new treatment options for suffering patients and increase Europe’s attractiveness as a hub for innovative medical technologies.

H2020 project website
Title: Transfer of multivirus-specific T-cells following transplantation

LUMC PI: Inge Jedema, PhD

Department of Hematology

EU contribution to total project: EUR 6,000,000
EU contribution to LUMC: EUR 350,600
Call number: H2020-SC1-2017-RTD

Abstract:
Allogeneic stem cell transplantation (HSCT) is a curative treatment for a variety of diseases. Viral infections such as Cytomegalovirus (CMV), Epstein-Barr-virus (EBV) and Adenovirus (AdV) are major unsolved problems for patients receiving allogeneic HSCT. Refractory viral infections post-HSCT are rare, life-threatening conditions due to the deficient T-cell response post-SCT and lacking effective treatment options. Protective T-cell immunity could be restored by means of a procedure known as adoptive T-cell transfer. Although cellular immunotherapy is considered a major recent breakthrough in medicine, none of the cellular treatment approaches has yet become a standard treatment. The reason for this limited translation into daily clinical practice is the lack of controlled, prospective clinical trials investigating efficacy of immunotherapy. The objective of TRACE is to bring adoptive T-cell transfer into clinical routine as a life-saving, curative and safe treatment for refractory viral infection post-HSCT. TRACE is a multi-national clinical trial to prove efficacy and safety of adoptive T-cell transfer in immune-compromized individuals. For the first time, this trial will show that a unique individualized immunotherapy could be included into evidence based clinical routine in rare diseases. Regulatory and structural hurdles will be overcome by standardized GMP-procedures. It will be a major milestone in the development of medicine and health economics to bring such a unique personalized treatment approach into a clinical efficacy trial. The consortium provide excellence in immunotherapy through partners from basic, clinical and industrial research and GMP facilities, with proven qualification and expertise in the field of HSCT, GMP manufacturing and adoptive T-cell transfer. It will bring medicine towards physiological self-protection of the human body instead of cost-intensive toxic agents and will thereby improve survival and quality of life.

H2020 project website
Title: European Vaccine Research and Development Infrastructure

LUMC PI: Prof. dr. Tom Ottenhoff
Department of Infectious Diseases

EU contribution to total project: EUR 10,599,993
EU contribution to LUMC: EUR 555,000
Call number: H2020-INFRAIA-2016-1

Abstract:
TRANSVAC2 is the follow-up project to its successful predecessor project TRANSVAC, the European Network of Vaccine Research and Development funded under FP7. The TRANSVAC2 consortium comprises a comprehensive collection of leading European institutions that propose to further advance with the previous initiative towards the establishment of a fully operational and sustainable European vaccine R&D infrastructure. TRANSVAC2 will support innovation for both prophylactic and therapeutic vaccine development based on a disease-overarching and one-health approach, thereby optimising the knowledge and expertise gained during the development of both human and animal vaccines. This will be achieved by bridging the translational gap in biomedical research, and by supporting cooperation between public vaccine R&D institutions of excellence, related initiatives and networks in Europe, and industrial partners. TRANSVAC2 will complement and integrate with existing European research infrastructures in both the public and private sectors. TRANSVAC2 will function as leverage and innovation catalyst between all stakeholders involved in vaccine R&D in Europe and -by providing integrated and overarching vaccine R&D services- will contribute to the development of effective products to address European and global health challenges, to controlling the burden and spread of infectious diseases, and reinforce the economic assets represented by vaccine developers in Europe.

The impact of TRANSVAC2 will be maximised by two external advisory bodies. An independent Scientific & Ethics Advisory Committee will provide recommendations surrounding scientific-technical and ethical issues, whereas the coordination of TRANSVAC2 with other related initiatives and the further promotion of the long-term stability of a European vaccine R&D infrastructure will be supported by a Board of Stakeholders comprising representatives of policy and decision makers, industry associations and European infrastructures.

H2020 project website
Title: Training network in drug discovery targeting TRIM Ubiquitin ligases in disease

LUMC PI: Prof. dr. Huib Ovaa  
Department of Cell & Chemical Biology

EU contribution to total project: EUR 3.203.448  
EU contribution to LUMC: EUR 531.239  
Call number: H2020-MSCA-ITN-2018

Abstract:
The TRIM-NET innovative training programme will provide Early-Stage Researchers with the skills to identify novel therapeutic targets and develop the strategies to validate them in preclinical studies. Integrating complementary expertise and multidisciplinary approaches TRIM-NET aims to address this goal, focusing on the Tripartite motif (TRIM) family of Ubiquitin E3 ligases, which plays an important role in many physiological processes. The importance of the role of TRIM proteins in these processes is underpinned by their recognised involvement in many disease processes such as cancer, neurodegeneration and rare genetic diseases. As such, they are excellent targets for therapeutic manipulation. The TRIM-NET consortium created a critical mass with complementary and interdisciplinary expertise, from Life Science to Chemistry, around this family of proteins to identify and exploit common targeting strategies for translational applications. The consortium is designed to train a cohort of researchers in skills and expertise essential for biomedical research in the era of personalised medicine, focusing on determining how: i) TRIM proteins contribute to disease; ii) to develop strategies to modulate TRIM proteins activity; iii) to design high throughput screening assays for drug discovery. The training programme comprises 7 highly integrated work packages: 4 scientific and 3 dedicated to training, dissemination and management. The proposal consists of 12 individual research projects that will form the basis of the research training aspects for the ESR recruited to the programme. As the scientific work packages are highly integrated, recruited ESRs will avail of techniques and training opportunities, including secondments, across the work packages. Through a unique international partnership between academic and non-academic partners the TRIM-NET training programme will provide ESRs with skills that are essential for future biomedical research in industry and academia.

H2020 project website
Title: European Research Training to Decipher The Ub Code: identification of potential biomarkers and drug targets

LUMC PI: Dr. Alfred Vertegaal
Department of Molecular Cell biology

EU contribution to total project: EUR 3,407,194
EU contribution to LUMC: EUR 510,748
Call number: H2020-MSCA-ITN-2017

Abstract:
Essential role of protein modification by members of the Ubiquitin family: Post-translational modifications (PTM) by members of the Ubiquitin (Ub) family represent an efficient way to regulate protein function at several levels: to change their localisation, activity, their interaction with partner proteins or their stability at the right time and cellular compartment, according to the cell requirements. Defects in this homeostatic equilibrium result in pathologies such as cancer, neurodegeneration, inflammation or multiple infections. For this reason, this research area has become very attractive for fundamental scientists as well as for the pharmaceutical industry aiming to identify potential targets for therapeutic intervention. Ub family members hold a homeostatic equilibrium within the cell and are interconnected in various ways including the regulation of enzymes that control the modified status of target proteins. Interestingly, Ub and Ub-like (UbL) proteins can modify themselves, forming intricate and complex chains. This landscape has recently expanded with the discovery of the formation of heterologous chains among UbL molecules including SUMO or NEDD8 but also other PTMs such as phosphorylation or acetylation. This unsuspected complexity of what is now known as the «Ubiquitin Code», which is an unknown universal language that needs to be deciphered to understand protein homeostasis and its associated pathologies. To decrypt this complex code requires joint collaborative multidisciplinary efforts at all levels, including the use of distinct molecular systems and model organisms and the latest technological developments to explore chemical, biochemical, molecular, pharmacological and clinical aspects of protein modification by members of the Ub family. UbiCODE represents an unprecedented effort to understand this code in an integrated manner.

H2020 project website
EU Horizon 2020 Grant – UM Cure 2020

Title: New therapies for uveal melanoma

LUMC PI: Dr. Aart Jochemsen
Department of Molecular Cell biology

EU contribution to total project: EUR 6.183.456
EU contribution to LUMC: EUR 1.021.540
Call number: H2020-PHC-2015-two-stage

Abstract:
Uveal melanoma (UM) is a rare intraocular tumour with an incidence of 5 cases per million individuals per year. Up to 50% of UM patients develop metastases, most often in the liver, and these are invariably fatal. Despite new discoveries in the genetic and molecular background of the primary tumour, little is known about the metastatic disease; furthermore, there is no therapy to either prevent or treat UM metastases. In UM Cure 2020, we aim to identify and validate at the preclinical level novel therapeutic approaches for the treatment of UM metastases. For this purpose, the consortium brings together the major experts of UM in both patient care and basic/translational/clinical research, as well as patient representatives. An ambitious multidisciplinary approach is proposed to move from patient tissue characterisation to preclinical evaluation of single or combinations of drugs. This approach includes the characterisation of the genetic landscape of metastatic UM and its microenvironment, proteomic studies to address signal pathway deregulation and establishment of novel relevant in vitro and in vivo UM models. We also aim to validate accurate surrogate endpoint biomarkers to evaluate therapies and detect metastases as early as possible. Underpinning this will be the UM Cure 2020 virtual biobank registry, linking existing biobanks into a harmonised network, which will prospectively collect primary and metastatic UM samples. Together, our approach will lead to the identification of new therapies, allowing the initiation of UM-dedicated clinical trials sponsored by academia or pharma. Dissemination of results will include the building of a patient network across the countries as part of the consortium as well as a dedicated UM patient and caregiver’s data portal as part of the UM Cure 2020 website, in order to increase patient information and disease awareness.

H2020 project website
Abstract:
ZIKAlliance is a multidisciplinary project with a global "One Health" approach, built: on a multi-centric network of clinical cohorts in the Caribbean, Central & South America; research sites in countries where the virus has been or is currently circulating (Africa, Asia, Polynesia) or at risk for emergence (Reunion Island); a strong network of European and Brazilian clinical & basic research institutions; and multiple interfaces with other scientific and public health programmes. ZIKAlliance will address three key objectives relating to (i) impact of Zika virus (ZIKV) infection during pregnancy and short & medium term effects on newborns, (ii) associated natural history of ZIKV infection in humans and their environment in the context of other circulating arboviruses and (iii) building the overall capacity for preparedness research for future epidemic threats in Latin America & the Caribbean. The project will take advantage of large standardised clinical cohorts of pregnant women and febrile patients in regions of Latin America and the Caribbean were the virus is circulating, expanding a preexisting network established by the IDAMS EU project. I will also benefit of a very strong expertise in basic and environmental sciences, with access to both field work and sophisticated technological infrastructures to characterise virus replication and physiopathology mechanisms. To meet its 3 key objectives, the scientific project has been organised in 9 work packages, with WP2/3 dedicated to clinical research (cohorts, clinical biology, epidemiology & modeling), WP3/4 to basic research (virology & antivirals, pathophysiology & animal models), WP5/6 to environmental research (animal reservoirs, vectors & vector control), WP7/8 to social sciences & communication, and WP9 to management. The broad consortium set-up allow gathering the necessary expertise for an actual interdisciplinary approach, and operating in a range of countries with contrasting ZIKV epidemiological status.

H2020 project website