

RESEARCH FOR HEALTH: *help us make an impact!*

#4 - October 2023

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A message from the CEO

Dear reader,

As we enter the fourth quarter of the year, we want to introduce you to our latest concrete achievements, each of which holds potential to innovate treatment for unmet medical needs. Indeed, our scientific teams have made progress in the fight against cancer by discovering a mechanism to slow down the progression of leukaemia by “switching off” cancer genes. Similarly, in a collaborative joint effort with the LCSB and Japanese colleagues, we succeeded in developing a novel blood serum test for the diagnosis of neurodegenerative diseases, which will be a game changer for the early detection and management of these disorders affecting millions of patients worldwide. Not to mention the fascinating discovery that a high-fibre diet can protect us from developing food allergies by limiting the proliferation of mucus-degrading bacteria in the gut. This opens up innovative possibilities to employ the gut microbiota as a therapeutic or preventive target to tackle food allergies. The scientific excellence reflected in these and other findings has also been recognised through numerous awards and prizes bestowed to our researchers. This has also been critical in attracting highly competitive grants from the Luxembourg government and the European Union.

All these developments have undoubtedly stemmed from the expertise, passion and dedication of our staff, but they would not have been possible without the financial support of all our private and institutional donors. In this edition of the newsletter, we have included an additional section illustrating some of the specific needs of our researchers in terms of laboratory equipment, to give a better picture of the ways in which generous donations can make a real, tangible impact on our activities and, ultimately, on patient health.

As ever, I thank you for your continuous and unwavering support, and wish you an inspiring read.

Prof Ulf Nehrass, CEO



Our latest highlights

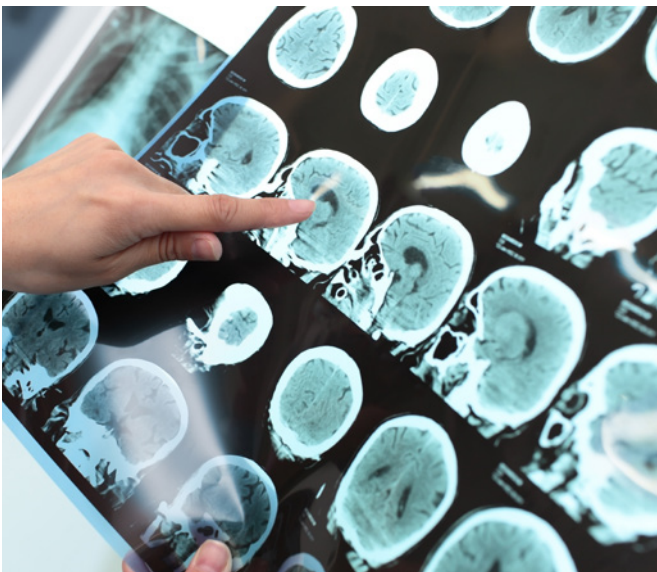
Food allergies: a “gut feeling”

A recent study by the Nutrition, Microbiome, and Immunity group in the Department of Infection and Immunity reveals significant links between diet, gut bacteria, and food allergies. Published in the journal “Nature Microbiology,” the study demonstrates that a low-fiber diet leads to the proliferation of specific gut bacteria called *Akkermansia muciniphila*. This bacterium is associated with a compromised gut mucosal barrier, inflammation, and heightened sensitivity to food allergens. The research shows the potential for targeting gut microbiota as a preventive or therapeutic approach to address the growing global problem of food allergies. It also highlights that alterations in the gut microbiome, triggered by low-fiber diets and a high-fat intake, are linked to food allergies.

The study’s implications also extend beyond food allergies, shedding light on potential connections between gut health and autoimmune diseases. The findings suggest the possibility of personalized dietary interventions to manage diverse ailments.



Novel Blood Test Shows Promise for Parkinson’s Disease Diagnosis



Researchers from Japan and Luxembourg, including the LIH, have achieved a significant breakthrough in Parkinson’s disease diagnosis. They discovered that abnormal proteins called alpha-synuclein seeds, found in the blood of patients, accurately indicate the presence of the disease. Parkinson’s is characterized by the build-up of these proteins in the brain, causing nerve cell damage and various neurological symptoms. The team developed a novel method, called IP/RT-QuIC, to detect these seeds in the blood, paving the way for a simple and effective blood test for diagnosis. Even more exciting is the fact that the researchers observed distinct patterns in the alpha-synuclein seeds that correspond to specific neurological disorders, not just Parkinson’s. This means that not only can this blood test detect Parkinson’s disease, but it also has the potential to differentiate it from other related conditions, easing the diagnostic process and improving patient outcomes. This development could lead to faster and easier identification of Parkinson’s and related neurodegenerative disorders. However, further research is needed before it can be adopted for widespread clinical use.

Promising Breakthrough in Chronic Lymphocytic Leukaemia Treatment

Researchers from the Tumor Stroma Interactions research group at the Department of Cancer Research have made a significant discovery in treating chronic lymphocytic leukaemia (CLL). They found that by targeting a specific process called mRNA translation, they can slow down the progression of the disease. CLL is the most common type of leukaemia, characterized by an abnormal increase in dysfunctional B-lymphocytes. In their study, the researchers used a drug called FL3 to stop a protein called MYC, which is linked to CLL. When they tested FL3 in mice with CLL, they saw positive results—fewer cancer cells and better survival rates. This exciting finding opens up new possibilities for treating CLL and may also help treat other cancers. The researchers believe that by targeting mRNA translation with drugs like FL3, they can develop better and more effective treatments for leukaemia patients. The study was published on the cover page of the journal “Blood” and was supported by grants from various foundations and research organizations, recognizing its significance in advancing cancer treatment.

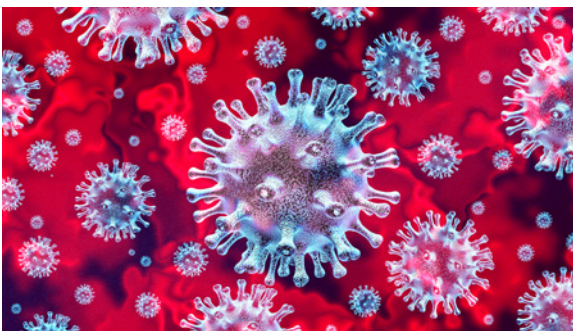


Inauguration of the Human Motion Lab



On April 28, the Luxembourg Institute of Research in Orthopedics, Sports Medicine, and Science (LIROMS) unveiled its cutting-edge Human Motion Lab (HML) at the Norbert Metz Foundation in Luxembourg. The inauguration ceremony was graced by the presence of Mrs. Paulette Lenert, the Minister of Health. The event also marked the introduction of the “Healthy Moves” project, a collaborative effort supported by the André Losch Foundation, the LIH, and the Centre Hospitalier de Luxembourg (CHL). The HML’s key objective is to offer an innovative and accessible diagnostic option that bridges the gap between research, innovation, and clinical practice. Equipped with advanced cameras and force platforms, the lab enables precise dynamic analysis of patients’ movements, revolutionizing treatment evaluation beyond traditional X-rays and MRI scans. Expert staff from the lab will closely collaborate with doctors from LIROMS, the LIH, and the CHL to devise personalized therapeutic solutions, including preventive strategies for secondary injuries. Moreover, the HML will serve as a research hub for the LIH’s Physical Activity, Sports, and Health and Human Motion, Orthopedics, Sports Medicine, and Physical Methods teams.

Shifts in human gut microbiome due to COVID-19



Researchers at the LIH and the LCSB (Luxembourg Centre for Systems Biomedicine) investigated the impact of mild COVID-19 on the gut microbiome—the helpful bacteria that live in our guts. The study analysed stool samples from people with mild COVID-19 and compared them to healthy individuals. Interestingly, the overall composition of gut bacteria was similar in both groups. However, the COVID-19 patients’ gut bacteria showed higher levels of which help bacteria invade the body, and “antimicrobial resistance genes,” making them more resistant to antibiotics. These findings suggest that even mild COVID-19 might alter gut bacteria composition, potentially increasing the risk of infections. Understanding this could shed light on lingering symptoms experienced by some patients and may aid future research on the topic.

♥ The study received funding from Research Luxembourg, with support from the Luxembourg National Research Fund and the Fondation André Losch.

LCTR Showcases Advancements in Translational Medicine



On June 20th, the LIH and the Centre Hospitalier de Luxembourg (CHL) welcomed H.R.H. Prince Guillaume, along with government officials, for a visit to the Luxembourg Clinical and Translational Research Centre (LCTR Fuerschungsklinik Lëtzebuerg). The centre, opened in December 2022 and jointly managed by the CHL and the LIH, aims to translate research findings into tangible therapeutic and diagnostic solutions. It offers cutting-edge research infrastructure and support to researchers and clinicians from Luxembourg's various hospitals and research institutions. The focus of the centre is on developing personalized medical solutions for major chronic diseases, such as cancer and neurodegenerative disorders. During the visit, key topics like digital vocal biomarkers, artificial intelligence in patient monitoring, and personalized digital health solutions were discussed. The LCTR's success has already been demonstrated by its participation in international projects and clinical trials and its contributions are expected to attract both established pharmaceutical companies and innovative start-ups to the Grand Duchy.

ECHoS: Uniting Europe in the Fight Against Cancer

The Establishing of Cancer Mission Hubs: Networks and Synergies (ECHoS) is a three-year European consortium, supported by the Horizon Europe Mission on Cancer. Comprising over 50 leading organizations from 28 countries, ECHoS aims to coordinate research, innovation, and healthcare actions on cancer with policy-making processes. To that effect, National Cancer Mission Hubs (NCMHs) will be established in each country to engage stakeholders from public and private sectors in collaborative initiatives and policy dialogues on cancer at various levels. In Luxembourg, the National Institute of Cancer (INC) and the LIH will collaborate with ECHoS to establish an NCMH, facilitating national and international collaboration and driving innovation in cancer care. Cancer is a significant global health challenge, and the incidence and mortality rates in Europe are projected to rise substantially by 2040. By bringing together proficiencies and capabilities from diverse sectors and involving citizens in cancer-related policy discussions, the project aims to foster pan-European cooperation and innovative approaches to cancer care. With the kick-off meeting held in May, ECHoS has set the groundwork for a brighter future for cancer care in Europe.



Researcher from the Department of Cancer Research receives EU funding

Dr Teresa L. Ramos of the Tumour Immunotherapy & Microenvironment Group has been awarded the European Commission's "Marie Skłodowska-Curie Individual Fellowships" to conduct a two-year research project called INCEPTOR. The project aims to study tumour escape mechanisms from immune cells, a major obstacle in cancer immunotherapy. As some tumours can evade immune detection by downregulating major histocompatibility complex class I (MHC-I), which is vital for immune recognition, INCEPTOR seeks to restore MHC-I expression using innovative drugs to enhance immune cells' ability to combat tumours effectively. Under the guidance of Dr Bassam Janji, leader of the group, and in collaboration with AC Bioscience in Switzerland, Dr Ramos will evaluate novel drug combinations to improve cancer immunotherapy. The project will explore immune checkpoint blockades and dendritic cell vaccines to address unmet clinical needs and pioneer ground-breaking approaches.



“The project aims to study tumour escape mechanisms from immune cells, a major obstacle in cancer immunotherapy.”

Awards, nominations and partnerships

Rosalind Franklin Society Award bestowed to LIH researcher



Dr Kathleen Mommaerts, a scientist at the IBBL/LIH, has received the Rosalind Franklin Society Award in Science for her article on induced pluripotent stem cells. The award, established by Mary Ann Liebert Inc. and the Rosalind Franklin Society, acknowledges outstanding papers by women or underrepresented minorities in science across the publisher's journals. Dr Mommaerts' winning article, titled "Method Optimization of Skin Biopsy-Derived Fibroblast Culture for Reprogramming Into Induced Pluripotent Stem Cells," was published in "Biopreservation and Biobanking" in February 2022. Her research focuses on refining processes for isolating,

culturing, and cryopreserving skin-derived fibroblasts, enabling their transformation into induced pluripotent stem cells.

"It was such a wonderful surprise to have been awarded this prestigious award. I am extremely grateful to the selection committee for selecting our paper, which is an excellent example of a collaborative project involving the key Luxembourg research institutes working on this topic. I am also grateful to my colleagues for providing their support and expertise", commented Dr Mommaerts.



LIH and Expon Capital Join Forces to Boost Digital Health Innovations

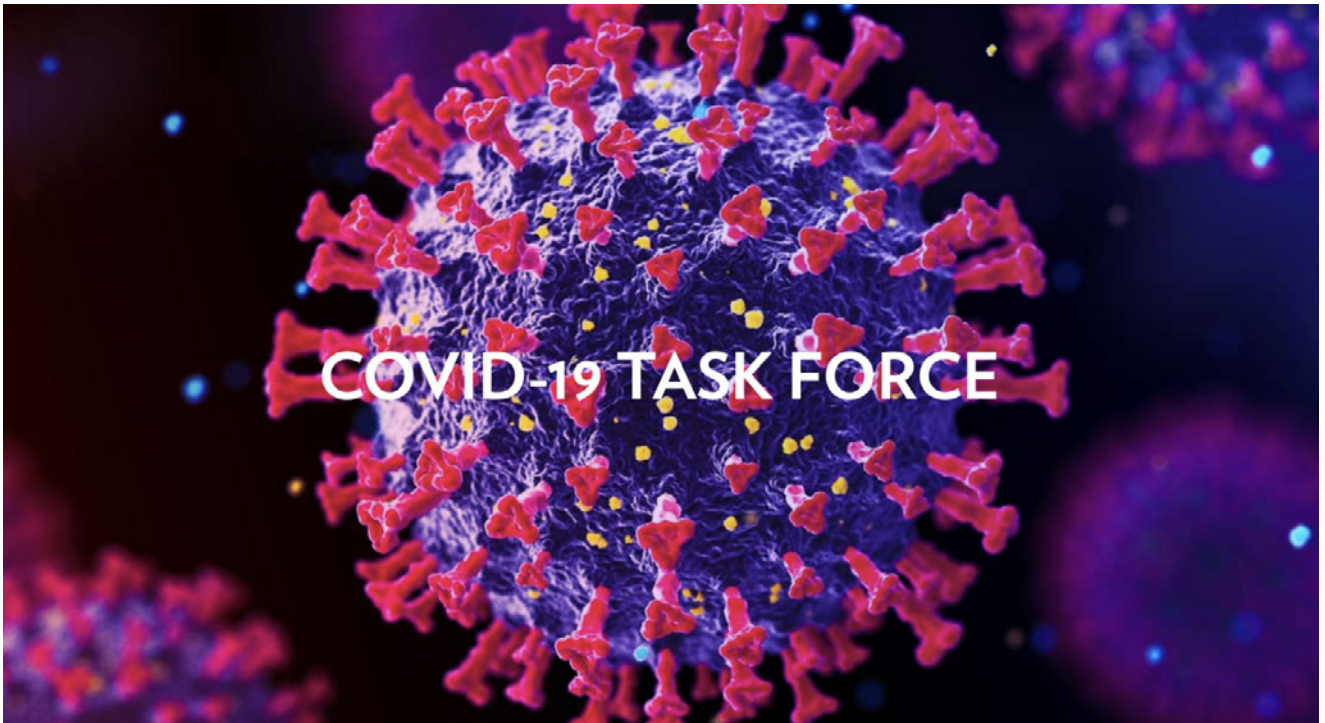
The LIH and Expon Capital, a venture capital investment firm based in Luxembourg, announced a collaboration in July to foster opportunities and synergies in the digital health sector. This partnership aims to leverage Luxembourg's rapidly growing health-tech scene, backed by government support and cutting-edge research infrastructure, to position the country as a leading translational e-health hub. The agreement focuses on identifying and developing specific projects and activities, including support for hackathons, competitions, spin-offs, and start-ups. Expon Capital will offer financial and investment expertise to LIH researchers, bridging the gap between research and the market. Likewise, the LIH will provide scientific support to Expon Capital and contribute to a joint strategy to develop partnerships between digital health companies and the financial and investor community. Prof Ulf Nehrbass, CEO of the LIH, expressed excitement about the partnership, emphasizing the potential for knowledge transfer and the commercialization of scientific findings into tangible healthcare solutions.

Ministry of Higher Education and Research honours Dr Christiane Hilger

On Monday June 19, the Ministry of Higher Education and Research (MESR) awarded 12 researchers in Luxembourg with the Grand Ducal Order of the Oak Crown for their years of service and continued commitment to education and research. Dr Christiane Hilger, group leader of the Molecular and Translational Allergology Group, was one of those selected and awarded by the Minister of Higher Education & Research Claude Meisch due to her 30 years of service at the LIH.



COVID-19 Task Force in Luxembourg Wins Science for Society Prize



The Research Luxembourg COVID-19 Task Force, spearheaded by the LIH, was honoured with the 2022 Science for Society Prize by the Science for Society Foundation under the Fondation de Luxembourg. Recognized for its role during the pandemic, the Task Force provided essential support to healthcare providers and the government, assisting in crucial decisions, including the launch of the large-scale testing program. Not only that, they also disseminated key COVID-19 research findings to the public. This proactive approach protected the vulnerable while keeping the country open. The OECD praised Luxembourg's pandemic response, crediting the creation of the Task Force at the onset of the crisis. Additionally, WHO acknowledged Luxembourg for having the lowest rate of excess mortality among European countries throughout the pandemic, a testament to the impressive work of the Task Force.



Leading LIH Researcher Appointed to Belgian Research Advisory Board

Prof Dr Dirk Brenner, Deputy Director of the Department of Infection and Immunity, has been appointed to the Scientific Advisory Board of the esteemed VIB Centre for Inflammation Research in Belgium. The VIB (Vlaams Instituut voor Biotechnologie) is a renowned non-profit organization specializing in cutting-edge research in life sciences and biotechnology. The VIB Centre for Inflammation Research is augmenting its research strategy and has gathered a distinguished panel of seven global experts in inflammation research. Prof Dr Brenner's appointment underscores his scientific expertise, particularly in immunology and cancer research. In his role on the board, he will help guide the VIB Centre for Inflammation Research's scientific strategy and research endeavours. This appointment reflects the growing global reputation of the LIH in biomedical research.

Thank you to our donors



LIH receives EU funding to tackle treatment resistance in brain tumours

Glioblastoma (GBM), the most aggressive type of primary brain tumour, continues to pose a significant challenge in the field of oncology. Despite the existence of treatments such as surgery, radiation, and chemotherapy, the majority of GBM patients succumb to the disease within 18 months, making GBM one of the most difficult cancers to treat. To understand the resistance mechanisms underlying GBM, the Horizon 2020 EU-funded TRANSCAN-3 programme has decided to fund a multinational project coordinated by the NORLUX Neuro-Oncology Laboratory at the LIH. The project, known as PLASTIG (Tackling tumor heterogeneity and PLASTicity as resistance mechanisms in Glioblastoma), aims to unravel the complex and elusive mechanisms that enable GBM to resist treatment, paving the way for the development of effective therapies. The work performed in Luxembourg under the project is specifically supported by the Fonds National de la Recherche (FNR) through the TRANSCAN-3 EU-funded initiative.

“The PLASTIG project aims to uncover therapeutic targets for next-generation treatments, as well as identifying biomarkers that can predict treatment response. We are extremely grateful and proud to have received such a prestigious and competitive European grant”, states Dr Anna Golebiewska, lead coordinator of the project and head of the NORLUX Neuro-Oncology Laboratory.

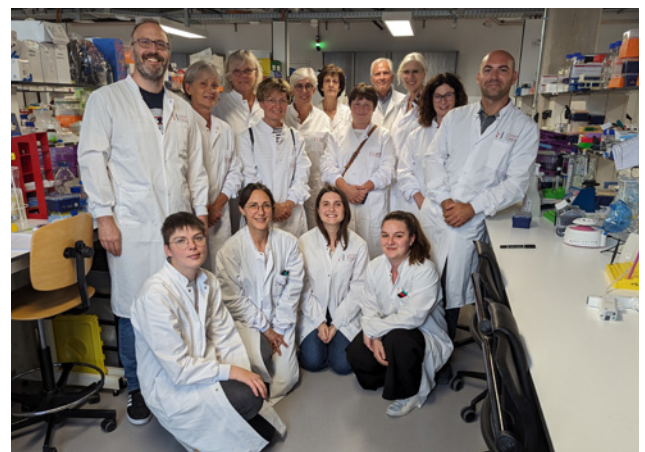
♥ Thank you to the European Union’s Horizon 2020 programme and to the FNR for this generous grant!

Plooschter Projet visits the LIH

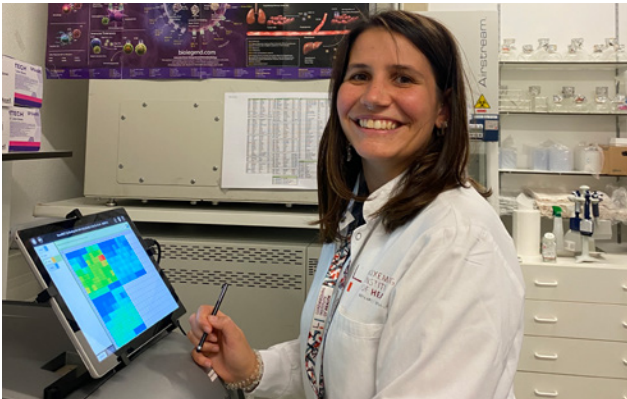
On June 29th, the Tumor Stroma Interactions (TSI) group welcomed the team from the Plooschter Projet for a visit to their labs for an overview and scientific demonstrations in which they participated. The Plooschter Projet is a Luxembourgish non-profit organization actively supporting cancer patients by partnering with national cancer foundations and research institutes and creating awareness among the general population about stem cell donations to treat leukaemia. The LIH is incredibly grateful for their continuing support, and earlier this year they provided a generous grant to the TSI group for the fourth time.

Christiane Lieners, spokesperson for the Plooschter Projet, said: *“On behalf of the whole Plooschter Project team, I’d like to thank you again for the warm welcome and the very interesting tour of the LIH.”*

♥ Thank you to Christiane and the entire Plooschter Projet team!



LIH Ph.D. Student Awarded Prestigious ERNEST Scholarship for Innovative Research



Giulia D'Uonnolo, a Ph.D. student in the Immuno-Pharmacology and Interactomics group at the Department of Infection and Immunity, has secured a EUR 2,300 scholarship from the European Research Network on Signal Transduction (ERNEST). This achievement enables her to embark on a 6-week Short Term Scientific Mission at the Institute for Molecular Cell Biology, University Hospital Jena in Germany, under the guidance of Prof Carsten Hoffmann. The focus of her mission involves unravelling the molecular intricacies of a specific chemokine receptor, pivotal for the effectiveness of anti-PD-1 immunotherapy treatment.

For her part, Giulia said

"I am extremely grateful to ERNEST for giving me this wonderful opportunity, which will allow me to advance in my Ph.D. research, as well as being beneficial in terms of personal development. My stay in Jena is a great opportunity to work in an internationally renowned pharmacology laboratory."

♥ Thanks to ERNEST for supporting our Ph.D. students!



SFD Grant Funds Hypoglycemia Prediction with Digital Biomarker

In February, the "Société Francophone du Diabète" (SFD) awarded EUR 30,000 to the Department of Precision Health's

The PIANISSIMO Project Receives Generous Support from the ONS

The Luxembourg charity "Oeuvre Nationale de Secours Grande-Duchesse Charlotte" has generously donated to the Department of Precision Health's PIANISSIMO project. This initiative, led by Drs Laurent Malisoux and Bernd Grimm, aims to enhance physical activity among individuals with degenerative joint diseases. By enlisting 100 volunteers with osteoarthritis or rheumatoid arthritis, the project will develop Colive Move, a smartphone-based solution for patient education and data collection, while exploring the link between daily activity and pain.

"We are extremely grateful to the Oeuvre for their generous support to a project which is perfectly aligned with the digital health and preventive medicine priority axes of our institute,"

said Frank Glod, Chief Scientific Officer at the LIH.

♥ Thank you to the Oeuvre Nationale de Secours Grande-Duchesse Charlotte!



Deep Digital Phenotyping (DDP) unit for the SFDT1-IH clinical study. Partnering with Abbott Diabetes Care, the DDP aims to develop a digital biomarker that will predict hypoglycaemia unawareness in type-1 diabetes (T1D) patients. Hypoglycaemia unawareness, which affects 40% of T1D patients, hinders diabetes control. The team plans to use continuous glucose monitoring data from 500 participants to train machine-learning algorithms, facilitating rapid risk assessment during consultations. The study, led by Dr Guy Fagherazzi, starts this fall and will last 18 months.

"We are extremely grateful to the SFD and to Abbott Diabetes Care for their generous support to our project, which holds great potential for the development and widespread adoption of digital technologies in healthcare," concluded Dr Fagherazzi.

♥ Thank you to the SFD for their generous backing!



Télévie Supports LIH-Led Cancer Research for Treatment Advancements

The 2023 Télévie initiative, a programme run by the Belgian Fund for Scientific Research (FNRS), has funded a range of LIH cancer research projects, which promise to enhance our understanding and treatment of cancer.

1 PIANO: Glioblastoma Exploration.

Dr Eric van Dyck and the DNA Repair and Chemoresistance group will investigate the impact of gene expression changes on glioblastoma progression and treatment response. A collaboration with the Laboratoire National de Santé and University of Liège will enhance the understanding of tumour heterogeneity.

2 RESTAGE: Boosting Immunity in Glioblastoma.

Drs Aurélie Poli and Alessandro Michelucci of the Neuro-Immunology group will target NR1D2 to reverse immunosuppression in glioblastoma. Focusing on myeloid cells, they aim to enhance immune response against tumours.

3 TNT2-CLL: Translating Leukaemia Treatment.

Drs Jerome Paggetti and Etienne Moussay of the Tumor Stroma Interactions (TSI) group will explore translation regulation in chronic lymphocytic leukaemia. A collaboration with the University of Liège aims to enhance anti-tumour immunity.

4 TiTLe: Tumour Immunity Enhancement.

The TSI team will investigate the role of AHR and HIF-1a in boosting anti-tumour immunity in CLL. Collaborating with the German Cancer Research Centre (Deutsches Krebsforschungszentrum – DKFZ), the project will identify new therapeutic targets.

5 ACTICAM: Immune Evasion Unveiled.

Dr Clément Thomas and the Cytoskeleton and Cancer Progression group will decipher how actin remodelling is involved in tumour recognition and extermination.

6 MOFIC: Microbiome Impact in Colorectal Cancer.

Dr Johannes Meiser of the Cancer Metabolism Group will contribute to uncovering the role of formate, a microbiome-derived oncometabolite, in colorectal cancer and its effects on the immune cell compartment.

In addition, funding has been renewed for three ongoing LIH projects:

1 IMPACT 21-2: Melanoma Immunotherapy.

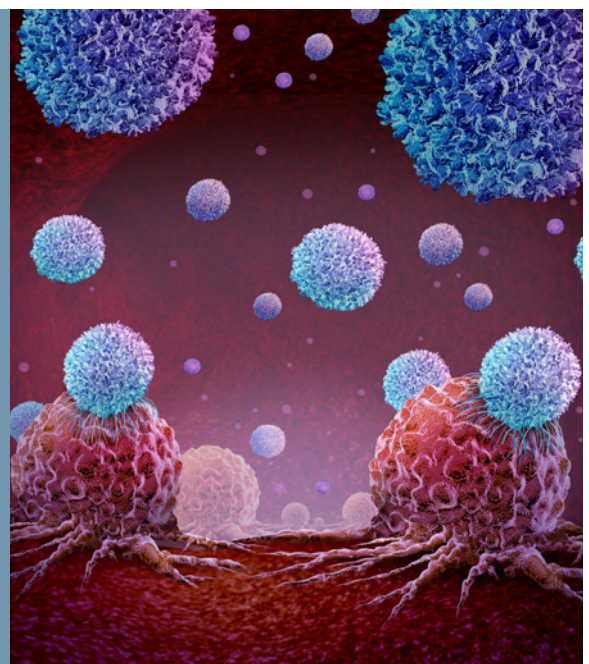
Dr Bassam Janji and the Tumor Immunotherapy and Microenvironment group targets hypoxia to improve melanoma immunotherapy.

2 EVceptor-2: Extracellular Vesicle Exploration.

The Immuno-Pharmacology and Interactomics group and the TSI group investigates the role of extracellular vesicles in leukaemia and lymphoma.

3 SUNRISE2: Glioblastoma Cell Propagation.

Dr van Dyck is collaborating with the University of Liège to understand cancer cell propagation in glioblastoma.



♥ Thank you to the FNRS for their support!

Call for *equipment donations!*

Years of study, prestigious academic qualifications, a highly-innovative and creative mind-set, passion and dedication are the ingredients that characterise LIH researchers, motivating them to improve patient outcomes on a daily basis. To do so, they need state-of-the-art laboratory equipment that allows them to perform all necessary experiments and therefore redefine the boundaries of biomedical science. Unfortunately, this top-notch equipment often comes with an equally top-notch price tag, making high-quality research costly. This is where our generous donors can play a fundamental role. Through a donation, big or small, you can support our scientific staff and contribute to giving them continuous access to the latest cutting-edge research technologies. Find out more about our equipment needs and their importance below, and help us make a positive impact on patient health!

Why do we need them?

Our scientists want to study the ecosystem of a tumour (the so-called tumour “microenvironment”) to identify and validate new targets and therapeutic strategies for the most frequent and aggressive types of cancer, such as brain cancers (glioblastoma, glioma, neuroblastoma), breast cancer, melanoma, colorectal cancer, blood cancers (e.g. chronic lymphocytic leukaemia), and metastatic cancers in general.

What will they be used for?

This equipment will be used in particular in the context of projects that are part of the doctoral training programmes supported by the FNR, such as “i2TRON” and “CANBIO2”, in partnership with the University of Luxembourg, the Luxembourg Centre for Systems Biomedicine (LCSB) and the Centre Hospitalier de Luxembourg (CHL). The equipment will allow the research teams to perform a variety of activities, from molecular and cell biology experiments, such as the isolation and purification of cells and tissues from biological samples, to the culture and treatment of cells and tissues, to visualisation of cells (imaging). These machines are therefore crucial for a broad range of applications, including oncology, immune-oncology and drug screening, i.e. the identification and assessment of the efficacy and safety of potential drugs before testing them in clinical trials.



A Trans-Blot® Turbo™ Transfer System, a rapid system to transfer proteins on membranes.
Budget required:

EUR 2,300

A Miltenyi QuadroMACS™ Separator, a magnetic system to purify cells and tissues.

Budget required:

EUR 2,300



INTEGRA Viafill, a rapid reagent dispenser with a user-friendly touch-screen interface.

Budget required:

EUR 12,000

Combo Evolution+Cryolis (Dry ice/Liquid Nitrogen):

“This cooling system allows us to efficiently isolate thermo-sensitive molecules of interest, such as RNAs, metabolites, enzymes and other proteins, from tissues by protecting them from heat damage. We can thus obtain intact, high-quality samples that are fit for the purpose of our research projects, ensuring accurate and reliable results”, explains

Dr Clément Thomas, Group Leader of the Cytoskeleton and Cancer Progression (CCP) group of the LIH Department of Cancer Research (DOCR).

Budget required:

EUR 16,000



Dr Clément Thomas



Nanolive 3D cell Explorer:

“This 3D/4D fluorescence microscope would enable our teams to visualise various cells, such as tumour and immune cells, in a non-invasive way, which is an essential aspect for most research projects”, says Dr Thomas.

Budget required:

EUR 80,000



INCUCYTE® S3 HD/2CLR SYSTEM PACKAGE,

a system for the live analysis of living cells, e.g. to assess the effect of potential drugs on the viability of cancer cells.

“Our current instrument is running at full capacity and we therefore need additional capacity to satisfy the needs of our projects”, says Dr Thomas.

Budget required:

EUR 140,000



Donor testimonial



Claudine Lorang

Interview with Mrs Claudine Lorang (Œuvre Nationale de Secours Grande-Duchesse Charlotte) and Dr Laurent Malisoux (LIH)



ŒUVRE
Nationale de Secours
Grande-Duchesse Charlotte

In February 2023, the Luxembourg public institution « Œuvre Nationale de Secours Grande-Duchesse Charlotte » (Œuvre) granted a generous EUR 254,719 donation to the LIH Department of Precision Health (DoPH) for the project “Personalised physical Activity promotion in arthritis patients using a smartphone-based solution” (PIANISSIMO) for 2023-2024. In this short interview, Dr Malisoux presents the project, while Claudine Lorang, senior project coordinator for social, environmental and sports & health projects at Œuvre, explains the reasons for supporting the research activities of the institute.

Mrs Lorang, could you tell us more about the mission of Œuvre and its involvement in health-related programmes?

C.L.: Œuvre Nationale de Secours Grande-Duchesse Charlotte is a public institution under the authority of the Minister of State, originally set up to help the victims of the Second World War. It now plays a leading role in organising and financing projects of general interest in Luxembourg. We support organisations who work in the following sectors: social, culture, environment, sports & health and remembrance & heritage. Within these defined areas, we identify and meet the needs in our society that are not being met by either public funding or private initiatives. More specifically, in the field of Sports & Health, illustrated by the motto “Healing through movement”, we aim to promote not only therapeutic sport, but also physical activity as a preventive measure for public health and as a tool for integration and collective well-being. In this context, the research carried out by the LIH, and in particular by the Physical Activity, Sport and Health (PASH) and Human Motion, Orthopaedics, Sports Medicine and Digital Methods (HOSD) research groups, is of great interest to us, as it is perfectly in line with our priorities for action.

Dr Malisoux, could you briefly introduce the PIANISSIMO project and its goals?

L.M.: The PIANISSIMO project – which I lead jointly with Dr Bernd Grimm of the Human Motion, Orthopaedics, Sports Medicine and Digital Methods (HOSD) research group – aims to promote physical activity in people with degenerative or chronic joint diseases through the participation of 100 volunteers with osteoarthritis or rheumatoid arthritis. Specifically, the study will develop Colive Move, a dedicated smartphone-based solution for patient education, data collection and promotion of physical activity, and will investigate the relationship between various aspects of daily-life physical activity (i.e., type, intensity, duration, etc.) and pain in real-world settings. The project will ultimately generate a database for future research and patient-specific physical activity recommendations.

How does the project align with the priority research areas of the LIH?

L.M.: PIANISSIMO is perfectly aligned with the digital health and preventive medicine priority axes of our institute, as it aims to promote personalised physical activity through a novel smartphone solution, thereby being an example of priority translational project with a direct impact on patient health. Moreover, it holds a great transversal component, as the Colive Move application which will be developed in the framework of PIANISSIMO will also benefit future national and international translational research initiatives such as CLINNOVA. We are therefore extremely grateful to Œuvre for their incredibly generous support over the 2023-2024 period.

What were your reasons for supporting the LIH through your generous donation?

C.L.: Œuvre aims to address specific unmet needs of the general population. The impact of osteoarthritis and rheumatoid arthritis on individuals and society as a whole is often underestimated, with people with arthritis living with pain, disability and fatigue, affecting their independence, ability to work, mental health and self-esteem. In fact, musculoskeletal conditions are the biggest cause of lost working days in the UK. At Œuvre, we were particularly impressed by the approach that the LIH team will take to reduce the burden of arthritis by promoting physical activity through an innovative digital solution that promises to make consumer wearables such as fitness trackers or smartphones – currently used mainly to monitor physical activity in the context of lifestyle or well-being in healthy populations – meaningful and useful in the context of disease prevention, slowing disease progression and improving disease management. We therefore believe that our financial support will enable the LIH research team to make a tangible and positive impact on the health of many patients.

The PIANISSIMO project will officially start in October 2023, with a post-doctoral researcher being recently recruited for the management of the project, the development of the patient educational content, the recruitment of the participants, the follow-up of the cohort and data analysis.

A glance at the *future*

An Interview with Dr Jasmin Schulz,
Strategic Programme Lead



Dr Jasmin Schulz

Paving the way for data-driven precision medicine in Europe: Clinnova kicks off

Clinnova, an international project involving clinicians and researchers from Luxembourg, France, Germany and Switzerland, was officially launched in Luxembourg on April 27th during a ceremony attended by the Ministers of Health and of Higher Education and Research. The aim of the initiative is to harness the benefits of precision medicine for therapeutic decisions through data federation, standardisation and interoperability. The project, jointly supported by the Luxembourg National Research Fund (FNR), the Grand Est region, the canton of Basel and the state of Baden-Württemberg, will establish a shared launch pad for the development of medical artificial intelligence (AI) algorithms at the heart of Europe.

Dr Schulz, what are the key issues that the project seeks to address?

Artificial intelligence (AI) holds enormous potential in healthcare, but there are challenges to its realisation, particularly in the context of data enabling and the ability to build appropriate clinical studies. To date, there are no straightforward methods available to decide which drug to prescribe to which patient. With the regular arrival of new drugs on the market, doctors and patients are faced with a real problem: the wrong therapy can prolong the burden of illness while incurring unnecessary costs for the social system. This is where Clinnova comes in.

How will it work in practice?

Clinnova will tackle these challenges on three levels. On the first level, it focuses on generating benefits for patients and physicians on three diseases, namely inflammatory bowel disease, rheumatoid diseases and multiple sclerosis. With an emphasis on data quality and standardisation, the goal is to develop effective AI algorithms that can support physicians in prescribing the right drug to an individual patient at the right time. Furthermore, these data can accelerate translational research into disease causes, which can further improve patient care. On the second level, Clinnova will bridge the worlds of biomedical research and healthcare by fostering critical infrastructure development in Luxembourg, ensuring data interoperability and integration. Finally, on the third

level, Clinnova will federate precision health data across borders. The Clinnova team in Luxembourg has teamed up with Universities and clinical centres in Baden-Württemberg in Germany, the Grand Est region in France, and the region of Basel in Switzerland to invest in similar Clinnova precision health programmes, thereby linking the established IT infrastructures. The Clinnova partners are essentially building a federated precision health network across Europe.

Can you tell us more about the partners involved and the funding?

The Luxembourg arm of the Clinnova project is led by the Luxembourg Institute of Health (LIH), in partnership with the University of Luxembourg, the Centre Hospitalier du Luxembourg (CHL) and the Robert Schuman Hospitals (HRS). It is part of the FNR's National Centres of Excellence in Research (NCER), a programme providing a framework and funding instrument to bundle research excellence around a mission of significant societal relevance by encouraging high-level transdisciplinary research and inter-sectoral collaboration. The funding of an NCER project by the FNR is contingent on a rigorous evaluation by a panel of international experts, and we are therefore extremely grateful and proud to have been allocated this financing. However, despite this generous financial support from the Luxembourg government, which runs for a maximum of 8 years, we need to diversify our sources of funding, which is why private donations constitute a crucial resource. For this reason, every amount donated, big or small, makes a significant difference.



Who we are

About the Luxembourg Institute of Health

The Luxembourg Institute of Health (LIH) is a public biomedical research organization focused on precision health and invested in becoming a leading reference in Europe for the translation of scientific excellence into meaningful benefits for patients.

LIH places the patient at the heart of all its activities, driven by a collective obligation towards society to use knowledge and technology arising from research on patient derived data to have a direct impact on people's health. Its dedicated teams of multidisciplinary researchers strive for excellence, generating relevant knowledge linked to immune related diseases and cancer.

The institute embraces collaborations, disruptive technology and process innovation as unique opportunities to improve the application of diagnostics and therapeutics with the long-term goal of preventing disease.



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