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

#2 October 2022

LUXEMBOURG INSTITUTE OF HEALTH

WHO *we are*

The Luxembourg Institute of Health -

Research dedicated to life

The Luxembourg Institute of Health (LIH) is a public biomedical research organisation 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.

Version française:
Deutsche Ausgabe:
English version:
www.lih.lu/page/makeadonation

A message *from the CEO*

Dear reader,

This year the LIH renewed its commitment to a precision health research strategy aimed at putting the patient at the center of our application-targeted research. Our activities are constantly evolving and facing up to the future challenges of biomedical research, taking advantage of unique opportunities to improve the application of diagnostics and therapeutics with the long-term goal of preventing disease.

Over the last year, the generous funding of our donors has helped to drive our dedicated scientists, clinicians, technicians and administrative support teams to make great strides in patient-centered research. Our initiatives continue to keep track of the ongoing COVID-19 Pandemic, understanding its evolution and long-term impacts on the community. Furthermore, we continue to prioritise the fight against cancer and immune related diseases, using cutting edge technologies to deliver precision healthcare solutions and innovative network structures that link caregivers and researchers so as to maximise the benefits seen by patients today.

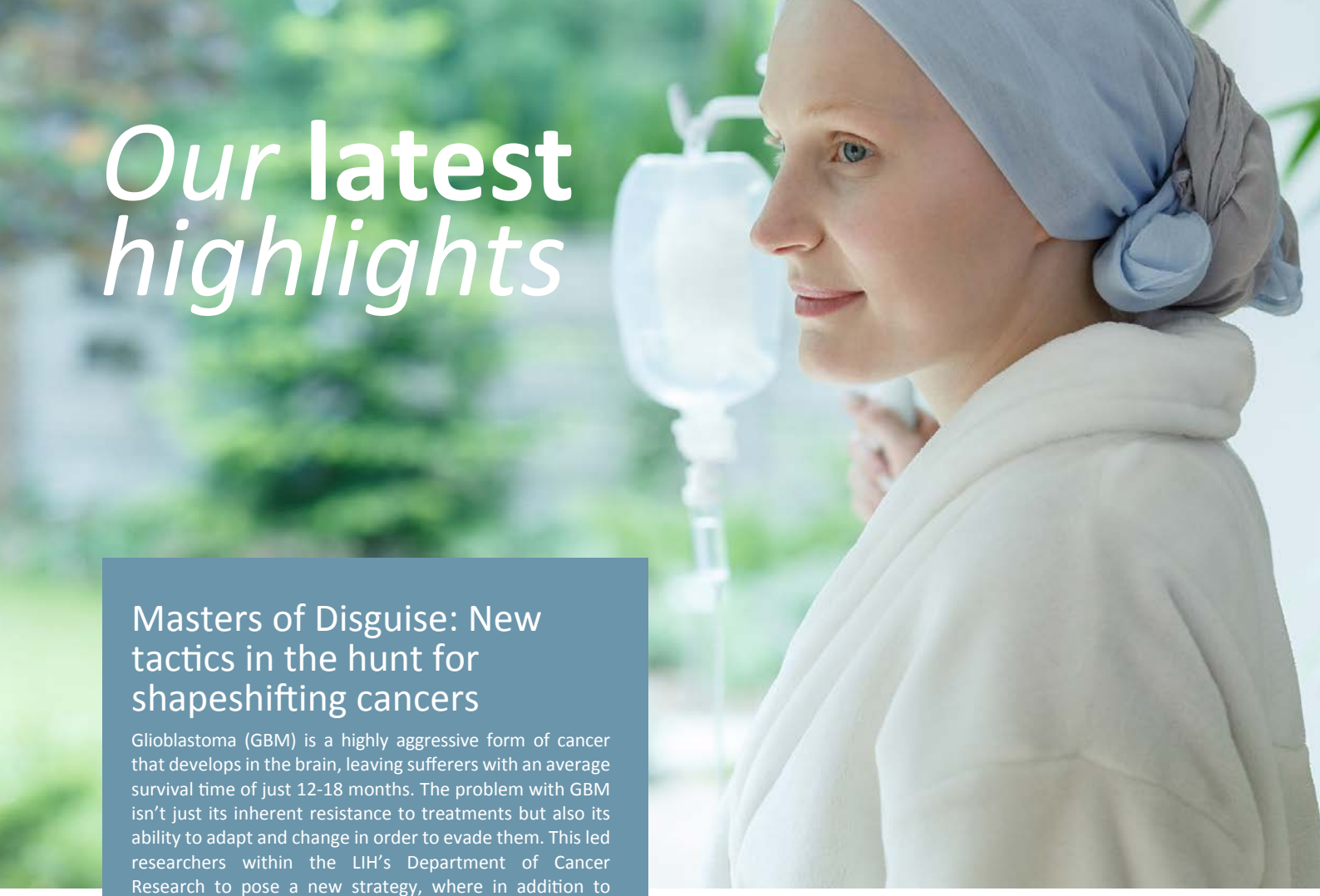
As we strive to ensure our research matters for people's health, we must acknowledge the unwavering support of our funders, stakeholders, collaborators, investors, and, crucially, our patients, who help to make all of our achievements possible. Every single donation to the cause helps us to make an impact.

I hope you find the following overview of our recent activities interesting and inspiring, and thank you whole-heartedly for your support.

Warmest regards,

Ulf Nehrbass, CEO

Our **latest** *highlights*



Masters of Disguise: New tactics in the hunt for shapeshifting cancers

Glioblastoma (GBM) is a highly aggressive form of cancer that develops in the brain, leaving sufferers with an average survival time of just 12-18 months. The problem with GBM isn't just its inherent resistance to treatments but also its ability to adapt and change in order to evade them. This led researchers within the LIH's Department of Cancer Research to pose a new strategy, where in addition to targeting the proliferation of cancer cells, researchers could target their ability to transform. This could leave the cells powerless to avoid other treatments and potentially open a gateway for new GBM therapies.

Professor Guillaume Vogin

Advancing personalisation of cancer radiotherapy treatment

Radiotherapy is an effective treatment applied in 50% of cancer patients, but despite its positive impact on survival, 10-15% of patients experience sequelae that can affect their quality of life. Deciphering the mechanisms and determinants that lead to these adverse effects could provide more tailored and personalised approaches to radiotherapy. In this context, December 2021 saw the LIH sign a collaboration agreement with the Centre François Baclesse (CFB), the National Radiotherapy Centre of Luxembourg, to address the issue. Under this collaboration the CFB's Director, Professor Guillaume Vogin, has been appointed 'affiliated clinician-scientist' to the LIH where he is developing a research programme focusing on the prevention of radiotherapy-induced toxicity at the LIH's Department of Cancer Research. Potential patient benefits include an improved prediction of radiation tolerance, technique adaptation, diagnosis and prediction of early treatment complications, as well as reversal of side effects.

A leading role in reducing Luxembourg's cancer burden

Dr Claudine Backes, Epidemiologist for the Luxembourg National Cancer Registry (RNC) at the Luxembourg Institute of Health, was recently appointed as the RNC's new Scientific Director. This illustrious position will allow her to use her clinical and epidemiological expertise to develop preventative research and improve the care of cancer patients in Luxembourg. The RNC officially collects national data on all new cancer cases, diagnosed and/or treated in Luxembourg for both residents and non-residents alike, in order to have an overview of all cancer patients being cared for. As a population-based cancer registry, the RNC is a multi-source system and a core component of cancer control strategies in Luxembourg.

Dr Claudine Backes

"I am honoured to take over this position at the RNC. My role as the Scientific Director of the RNC will enable me to maximize the potential of RNC data collection and cancer epidemiology to benefit cancer patients across Luxembourg, and to contribute to the National Cancer Plan and research projects." Dr Backes

LIH paves the way towards new approaches in cancer immunotherapy via EU funded projects

Immunotherapy aims to reactivate or boost the immune system but in spite of its enormous therapeutic potential to treat cancer, it remains successful only in limited numbers of patients. New strategies are required to define which patients may benefit from cancer immunotherapy and determine which innovative molecules, given in combination, could maximise its effectiveness. Two projects from the Tumour Immunotherapy and Microenvironment group, led by Dr Bassam Janji of LIH's Department of Cancer Research, recently approved for EU funding, will tackle these aspects with the aim to bring innovative cancer immunotherapy to standard clinical practice, sooner. The PreCyse project, in collaboration with Cytovation (Norway), will test the therapeutic benefit of immunotherapy based on immune checkpoint inhibitors, agents that can help the body's immune system recognize and attack cancerous cells, in combination with an innovative molecule that can specifically target tumour cells. Meanwhile the C2I project, in collaboration with AC BioScience (France), and the leading European cancer centre, Institut Gustave Roussy (France), will establish the preclinical proof-of-concept and assess novel immunotherapy approaches based on combining molecules that make cancer cells more easily accessed by the immune system.

‘Suffocating’ cancer: a new headway in melanoma immunotherapy

Hypoxia, an inadequate oxygen supply in bodily tissue, is a condition occurring frequently in all solid tumours, including melanoma skin cancer. Melanoma cells are not only able to survive oxygen deprivation, but also to use it to their own advantage, evading treatments and the body’s own immune response. Using gene editing techniques to target a key gene responsible for this cancer cell adaptation, LIH researchers in collaboration with the Gustave Roussy Cancer Center in France and the Thumbay Research Institute of Precision Medicine in the United Arab Emirates, were able to not only inhibit tumour growth, but also drive killer immune cells to the cancer tissue. This discovery provided a valuable new target to make resistant melanomas more vulnerable to available anti-cancer treatments.

This research could not have been possible without the combined financial support of multiple agencies and private partners including: National Research Fund (FNR), Fondation Cancer, Télévie-FNRS, Kriibskrank Kanner Foundation, Janssen Cilag Pharma, Roche Pharma, Action LIONS Vaincre le Cancer Luxembourg, Sheik Hamdan Bin Rashid Al Maktoum Foundation.

Return of the Doctoral Training Centres

Two of the LIH’s key doctoral training units (DTU’s) were renewed after being retained for funding in the FNR’s 2021 PRIDE call. The CANBIO2 and NextImmune2 programmes will launch the training of new doctoral students, generating exciting new findings while passing expertise on to the next generation of ground-breaking researchers.

The Nextimmune2 doctoral training unit will build on its predecessor, building our understanding of the immune system and its disorders. Future researchers will have to be highly interdisciplinary linking big data analysis with improved diagnostics and ultimately personalized options for intervention. This is especially important for research on such a multi-cellular and molecular network as the immune system, which when dysregulated, can cause a plethora of devastating disorders.

NextImmune2
Next Generation Immunoscience - Doctoral Training Unit

Building on the successful first Doctoral Training Unit in Cancer Biology (CANBIO) within the first FNR PRIDE program, CANBIO2 aims to continue state-of-the-art training for PhD students in cancer research in Luxembourg. While the research of CANBIO focused on tumour escape mechanisms (ways in which cancer cells avoid detection and destruction), the new programme aims to generate new insight into the tumour ecosystem and to harness this knowledge for improved treatment options. CANBIO2 is based on a tight collaboration with the University of Luxembourg and will support 19 PhD students in the upcoming 4-6 years.

CANBIO2
DOCTORAL TRAINING IN CANCER BIOLOGY

Novel treatment aims to slow down progression of Parkinson's disease

The Luxembourg Institute of Health (LIH) and the Centre Hospitalier de Luxembourg (CHL) recently announced the launch of the PADOVA Study, a clinical trial designed to evaluate the efficacy and safety of an injectable drug 'prasinezumab' in participants with early stage Parkinson's disease (PD). The trial will explore a novel treatment targeting the protein thought to be responsible for the nerve cell damage associated with the condition. The study, which is sponsored by Roche, is being conducted concomitantly in UK, Spain, Italy, Poland, US, Canada, Austria and France and will recruit a total of 575 patients across the 9 participating countries world-wide. Conducted at the CHL, the PADOVA relies on the clinical research expertise of the LIH Clinical and Epidemiological Investigation Centre (CIEC) and the department of Transversal Translational Medicine (TTM).

Dr Feng Hefeng

A Surprising Connection between Immune Balance, Ageing and a Parkinson's Disease Gene

The human body is a finely tuned machine; a fabulously complex balancing act of mechanisms that begin at the cellular level and keep us functioning despite changes in the world around us. Our bodies are so good at maintaining these equilibria that we only tend to notice them when part of the system becomes faulty. LIH experts and collaborators, led by Dr Feng Hefeng from the LIH's Department of Infection and Immunity, are working to restore this balance in dysregulated immune systems. The team are unravelling the complex links between a key Parkinson's disease protein and the functionality of specialised immune cells (T cells) with regulatory suppressive functions during ageing. The findings may provide a new target for therapies aimed at many non-communicable ageing-related diseases.

CoVaLux Study Identifies Multiple Types of Long COVID

The COVID-19 infection manifests itself through a diverse array of symptoms, though one outcome that has become increasingly clear over the past year is the onset of persistent symptoms widely referred to as 'Long COVID'. In the first results of its new CoVaLux study, the LIH and a consortium of Luxembourgish research institutions have not only linked the severity of Long COVID to the severity of the initial COVID-19 infection, but also identified numerous different types of Long COVID for the first time. These findings will help researchers to better understand this often debilitating disease with the potential to seek targeted treatments for its different forms.

Aurélie Fischer

"These results will ultimately help to better identify Long COVID in clinical settings and contribute to the definition of precision health strategies to improve the care of people with Long COVID,"

Aurélie Fischer, Scientific Coordinator in the LIH's Deep Digital Phenotyping Research Unit.

Find out more about the CoVaLux research initiative here!

LCTR

LUXEMBOURG
CLINICAL & TRANSLATIONAL
RESEARCH CENTRE

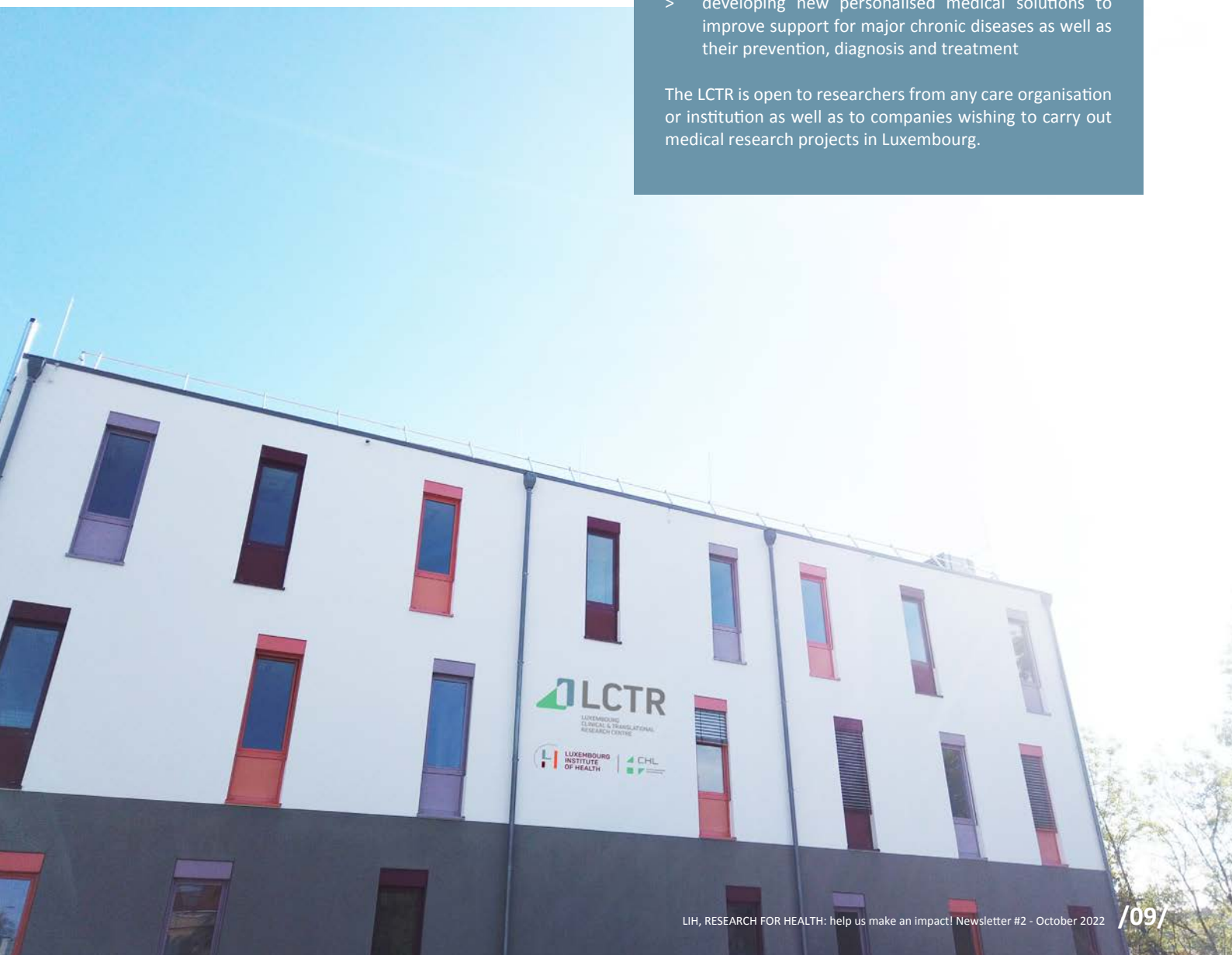
LUXEMBOURG INSTITUTE OF HEALTH | CHL Centre Hospitalier de Luxembourg

Luxembourg Clinical and Translational Research Centre

As a collaboration between the Centre Hospitalier de Luxembourg (CHL) and LIH, the LCTR aims to create a bridge between clinicians and researchers in the country, offering them the opportunity to develop their own translational clinical research projects, for the benefit of patients. The key aims of the center include:

> generating new scientific and medical knowledge in compliance with regulations as well as ethical and legal requirements,
> fostering technological innovation and its translation into current clinical practice,
> developing new personalised medical solutions to improve support for major chronic diseases as well as their prevention, diagnosis and treatment

The LCTR is open to researchers from any care organisation or institution as well as to companies wishing to carry out medical research projects in Luxembourg.



Our most recent awards

FNR ATTRACT: Sophie Pilleron

The Luxembourg National Research Fund's (FNR) ATTRACT programme is designed for researchers not yet established in Luxembourg, who demonstrate the potential to become leaders in their field of research. It is therefore with great excitement that the LIH looks forward to welcoming epidemiologist Dr Sophie Pilleron, who was recently awarded a 2M€ FNR ATTRACT fellowship, to its Department of Precision Health. Dr Pilleron's project will focus on cancer in the older population and is set to kick off in early 2023.

"In the next 5 years, we will work to improve cancer outcomes in older adults by tackling disparities at 3 key moments of the cancer continuum: Before diagnosis, around the treatment decision-making process and during the active treatment phase. The program will mix quantitative, qualitative, and machine learning methods, and use different data sources," Dr Pilleron.

FNR awards: Simone Niclou & Anna Golebiewska

The highly acclaimed Luxembourg National Research Fund (FNR) Awards 2021 saw numerous LIH researchers recognised for their world-class work. In a ceremony that took place in Belval, LIH researchers Prof Dr Simone Niclou, Director of the Department of Cancer Research and Group Leader of the NORLUX Neuro-Oncology Laboratory and Dr Anna Golebiewska, Group Leader of the NORLUX Neuro-Oncology Laboratory, received the highly prestigious Outstanding Scientific Achievement award. The judging panel appraised this new category according to the impact of the research on society and the corresponding contribution to the advancement of the respective scientific field. Among numerous applications and noteworthy projects, it was an immense accomplishment that their ground-breaking translational research in neuro-oncology claimed them the top spot.

Dr Anna Golebiewska (left) and Prof Simone Niclou (right) at the presentation of the FNR award for Outstanding Scientific Achievement

Mentor award: Pablo Elias Morande

The great value of a researcher is not solely focused on research findings, but also the way in which they go about their day to day work, being a member of a research team that is growing and evolving together. In light of this the FNR recently introduced a new category to their 2021 awards ceremony, recognising the role of mentors in the research landscape and the role they play in molding the future. With this, the LIH was proud to see its researcher Dr Pablo Elias Morande of the Tumour Stroma Interactions Group recognised with the Outstanding Mentor Award after being nominated by his peers. Upon bestowal, Dr Morande was commended for his great mentorship of PhD students in Luxembourg as well as for his contribution to a productive and healthy research environment in which every employee can thrive and develop to their full academic potential.

In addition to recognition of his mentoring skills, Dr Morande was recently awarded financial support in the framework of the European Commission's "Marie Sklodowska-Curie Individual Fellowships" funding scheme with an exceptional score of 99.2%. The grant will back Dr Morande's work on revealing some of the specific mechanisms underlying chronic lymphocytic leukaemia (CLL), a slow progressing cancer that affects white blood cells.

Dr Pablo Morande (fourth from left) celebrating his Outstanding Mentor Award with his teammates at the FNR ceremony

Prof Gérard Scacchi (left) and Prof Jean-Dominique de Kervin (right), member and President of the Académie Lorraine des Sciences respectively, during the investiture ceremony of Prof Brice Appenzeller as new member of the Academy

Committed to making science shine

In a recent development, Dr Brice Appenzeller, Group Leader of the Human Biomonitoring Research Unit at the LIH and Associate Professor adjunct University of Luxembourg, has been appointed a member of the Académie Lorraine des Sciences. The academy was founded in 1828 and is composed of just 50 members. Since its creation, the academy has been committed to maximising the public engagement with scientific topics, a feat that is expressed even in their motto: "Mettre en lumière les progrès des Sciences, promouvoir leur diffusion et contribuer ainsi à leur rayonnment" – Shine light on scientific progress, promote its diffusion and thus contribute to its radiance.

"The scientific world has this reputation for being inaccessible and hard to understand, but it doesn't have to be this way. I hope that this new appointment will give me more tools to show the world the extraordinary things that can only be revealed with scientific disciplines, to make science accessible to the many instead of the few." Dr Appenzeller.

Thank you *to* our donors

Thank you to the Fondation Cancer and the FNR for their generous and continuous support in tackling some of the biggest medical challenges of all time!

2021 Prestigious FNR CORE grants co-funded by Fondation Cancer //

As part of a series of co-funded studies by the Fondation Cancer and the FNR's CORE programme, the LIH has seen four important cancer research projects come to light in 2021. These studies cover a wide range of cancers, investigating their spread and resistance to conventional treatments in order to generate translational results with potential patient benefits. Follow the QR codes to find out more about the different projects underway and how this funding is being used to fight cancer.

HifReg: aims to enable the development of new therapeutic options for the treatment of solid tumours

1cFlex: aims to better understand the mechanisms that determine when, how and why cancer cells become metastatic, and using this to help prevent their spread

Diomedes: aims to study how tumour cells and their microenvironment change during treatment. Revealing signatures of treatment resistance could lead to more personalised treatments with carefully targeted drugs

SYNOPODIA: aims to identify molecular targets to prevent cancer progression and metastases and restore an effective antitumour immune response

Translational immune-oncology project supported by the 2021 Career Launchpad Award //

Dr Martyna Szpakowska, a leading scientist within the Department of Infection and Immunity and the Department of Cancer Research, was awarded a EUR 10,000 grant as part of the LIH Wolfgang Baertz Career Launchpad Award at the end of May 2021. The funding will allow her to develop an innovative protective protein that could force open gateways for killer immune cells into tumours, ultimately resulting in their recession. This transversal and translational project has the potential to significantly advance cancer immunotherapies.

Dr Martyna Szpakowska

"We are confident that our translational and transversal project will help improve survival rates and patient outcomes. In addition, it will allow us to strengthen our portfolio of patents in this field and develop a tool that can be used by the Department of Infection and Immunity as well as the Department of Cancer Research for a broad array of translational projects." Dr Szpakowska.

Laurent Vanot, Kathy Liebl from Think Pink Lux asbl
Takouhie Mgrditchian, Clément Thomas (LIH)

Thank you to Think Pink Lux for helping us develop better anti-cancer therapies!

Think Pink Lux 'Marian Aldred Award' awarded for LIH researchers //

On March 8th 2022, Takouhie Mgrditchian, postdoctoral researcher within the Cytoskeleton and Cancer Progression group of the LIH Department of Cancer Research, and Dr Clément Thomas, Leader of the research group, were awarded the 'Marian Aldred Award' by Think Pink Lux. The symbolic EUR 25,000 cheque was handed over to the two awardees during a ceremony that took place at the LIH premises in Strassen, in the presence of Kathy Liebl and Laurent Vanot from the Think Pink Lux committee. The generous donation will support the group's research on tumour immune escape mechanisms. Immunotherapy aims to reactivate or boost the immune system against cancer, but despite being one of the most promising anti-cancer therapies, it fails to elicit an effective and durable response in many patients. It is urgent to understand the causes of such failure and grants like this are an important means to achieve this goal.

Thank you to Télévie for helping us push the boundaries of cancer research!

Télévie Funding Boosts Key LIH Projects //

Over the last year, the LIH has gratefully received multiple Télévie grants supported by the RTL Télé Lëtzebuerg to fund projects with a further 4 PhD students, 6 Postdoctoral Researchers and a Technician, as well as operating costs. The objective of Télévie is to support research against life threatening cancers in children and adults. Of 16 submitted LIH proposals, an exceptional 11 were selected for funding after a competitive independent peer review process. The awarded innovative projects are developed in 7 specialized groups within the LIH Cancer Research Department covering the following topics:

> Innovations in immunotherapy
> Understanding the role of exposure as a preventable cause of cancer
> Regulating growth in brain tumours
> Unravelling the genetic pathways in cancer immune evasion
> Developing new tools and therapeutics for Leukaemia
> Developing AI for improved brain tumour imaging

Susanne Gonder

Andrea Scafidi

Catherine Delbrouck

Thank you to Fondation du Pélican for their long-lasting support!

Pelican grant: Three LIH students awarded //

Three LIH students were recently fortunate enough to receive additional funding towards their research from the Fondation du Pélican de Mie et Pierre Hippert-Faber, which is managed by the Fondation de Luxembourg. Susanne Gonder, Andrea Scafidi and Catherine Delbrouck were all awarded the Pelican Grants, marking over ten years since these were first offered to students to support training and mobility activities in the context of their research projects. The students are all members of the LIH's Department of Cancer Research, with projects aiming to probe fundamental aspects of the disease that could ultimately help lead to improved patient therapies and outcomes.

Thank you *to* our donors

A glance at the *future*

interview with Simone Niclou

A National Centre for Translational Cancer Research (**NCTCR**)

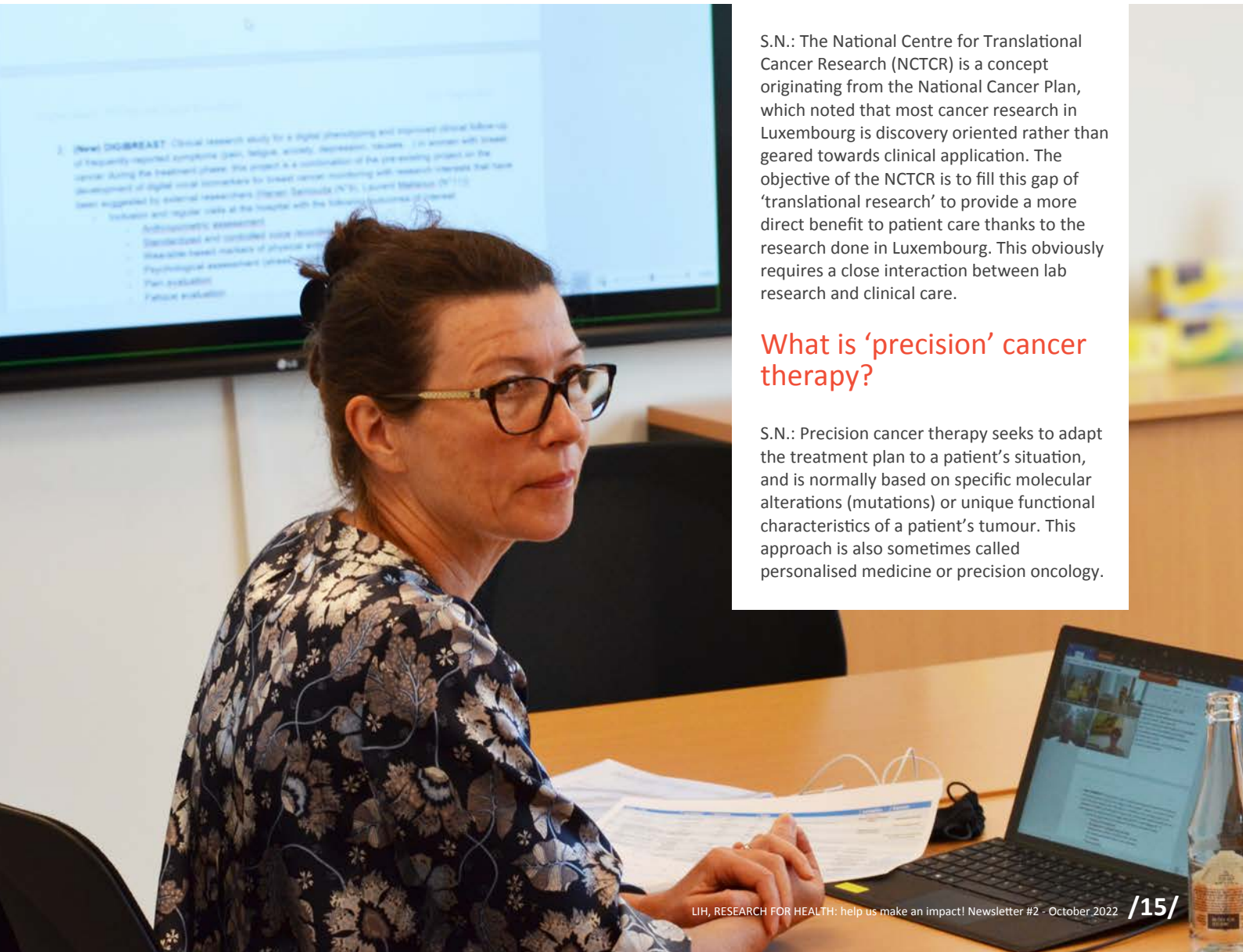
As a major addition to its cancer research strategy, the LIH has recently announced its coordinating role in a new National Centre for Translational Cancer Research (NCTCR). By its design, the NCTCR will ultimately seek to become a cornerstone for future precision cancer therapeutics in Luxembourg and drive patient-oriented research towards precision oncology.

Can you tell us a little bit about the new National Centre for Translational Cancer Research (NCTCR)?

S.N.: The National Centre for Translational Cancer Research (NCTCR) is a concept originating from the National Cancer Plan, which noted that most cancer research in Luxembourg is discovery oriented rather than geared towards clinical application. The objective of the NCTCR is to fill this gap of 'translational research' to provide a more direct benefit to patient care thanks to the research done in Luxembourg. This obviously requires a close interaction between lab research and clinical care.

What is 'precision' cancer therapy?

S.N.: Precision cancer therapy seeks to adapt the treatment plan to a patient's situation, and is normally based on specific molecular alterations (mutations) or unique functional characteristics of a patient's tumour. This approach is also sometimes called personalised medicine or precision oncology.



Why is translational research so important?

S.N.: Translational research aims to produce meaningful, applicable results that directly benefit human health. The goal of translational research is to translate (move) basic science discoveries more quickly and efficiently into medical practice.

Who is currently involved in the NCTCR?

S.N.: The NCTCR is a multi-institutional programme that will ideally involve all hospitals, diagnostic and research centers (LNS, LIH, UL) in Luxembourg, as well as funding and support agencies such as FNR, cancer foundations, the Ministry of Health, the Ministry of Research and the Institut National Cancer (INC). The NCTCR is coordinated by the Luxembourg Institute of Health (LIH) and has received start-up funds from the FNR and the Ministry of Health.

"Most cancer research in Luxembourg is discovery oriented rather than geared towards clinical application. The objective of the NCTCR is to fill this gap of 'translational research' to provide a more direct benefit to patient care thanks to the research done in Luxembourg."

What is happening in the project right now?

S.N.: Multiple inter-institutional working groups are currently establishing a long term 'business plan', defining the structural and scientific objectives, as well as the funding needs. For example we aim to set up a National Cancer Collection (NCC) that will provide tumor samples for research from patients on a nationwide scale. Other important objectives are a large scale molecular profiling initiative aiming to decipher the genetic makeup of each patient's tumour for precision oncology, and an innovative immunotherapy initiative, aiming to develop advanced experimental immunotherapies for patients in Luxembourg. All these objectives require extensive planning and careful coordination at multiple levels, including logistical, legal and ethical considerations.

NCTCR
National Centre for Translational Cancer Research

www.nctcr.lu

What difference do donations make?

S.N.: A huge difference! Cancer research is costly and relies to a large extent on private donations. This will be even more important for the ambitious NCTCR program for translational cancer research. We are grateful for every donation, big or small, and in particular we welcome long term commitments.

We thank our private partners for their generous support:

Action Lions Vaincre le Cancer asbl

André Losch Fondation

Fondation Cancer

**Foundations under the aegis of Fondation de Luxembourg:
Fondation Coeur-Daniel Wagner, Fondation Marie Jeanne et Edmond Schumacher,
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Télévie

Think Pink Lux asbl

... and many private donors

Thank you

August 2021-2022

Make a donation and support biomedical research

A donation can help our scientists to create innovative approaches that will enhance disease prevention, early diagnosis and effective treatments

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