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Interview with
Manon Gantenbein:
Making translational
medicine a reality:
the LCTR-Fuerschungsklinik
Lëtzebuerg opens its doors
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A message from the CEO

Dear reader,

I am honoured to share with you the progress we have made in our mission to advance precision health in Luxembourg. With the focus of our work being translational, the LIH is targeting unmet medical needs and striving to improve patients' quality of life. Clearly, this cannot be achieved by researchers alone. Rather, a new approach has to gain traction in which scientists work closely with both patients and medical doctors. The LCTR Fuerschungsklinik Lëtzebuerg, inaugurated in 2022, is a dedicated space to foster just that. Medical doctors and scientists will devise new methods together from which patients can directly benefit through clinical trials. It is at the Fuerschungsklinik where the patient is being put at the centre of our activities, creating a concerted cooperation between research and care.

To move research activities toward the Fuerschungsklinik, our scientists, clinicians, technicians and administrative support teams have been working tirelessly on our key disease areas. In January this year we initiated a large program on precision medicine in immune related diseases, which we will introduce in coming newsletters. At the same time the fight against cancer has gathered momentum and we have sustained our committed to further understand the long term impacts of COVID-19.

All of these activities depend critically on your sustained help. I would like to express my heartfelt gratitude to our donors, public funders, stakeholders, collaborators, and most importantly, our patients, for their unwavering support that makes all of our achievements possible. Every donation to our cause is significant and helps us make an impact.

Warmest regards, Prof Ulf Nehrbass, CEO



# Our latest highlights

#### "Research is advancing, so is your treatment": Luxembourg Institute of Health strengthens collaborations with hospitals

The LIH has recently launched a nationwide public campaign to communicate its new positioning as a patient-centric research organisation, working hand in hand with clinicians in order to translate excellent research findings into tangible diagnostic and therapeutic solutions for patients. The institute's particular focus is on cancer and immune-related disorders, as well as neurodegenerative diseases. Through a series of posters and short videos, the LIH campaign portrays concrete examples of ongoing collaborative projects with Luxembourg hospitals including the Centre Hospitalier de Luxembourg (CHL), Hôpitaux Robert Schuman (HRS), and the Centre Hospitalier Emile Mayrisch (CHEM) - which will ultimately allow the early diagnosis of a variety of cancers, the selection of the most appropriate treatment for each individual patient, as well as the development of novel cancer immunotherapy approaches and drugs. Find out more about how each collaboration is improving patient care by scanning the QR codes and watching the videos!





#### Cancer patients have a say: Luxembourg launches large national survey to improve cancer care

The LIH and the Ministry of Health have launched Colive Cancer, a study aimed at improving the quality and efficiency of the current national cancer healthcare system in Luxembourg. Led by Dr Guy Fagherazzi of the Department of Precision Health (DoPH), the study aims to interact directly with current and former cancer patients via an online feedback system. The initiative is part of the Plan National Cancer 2, which focuses on working with patients to improve cancer diagnosis and treatment in Luxembourg. Participants can share their experiences and express their opinions about the current healthcare system in relation to cancer and their overall quality of life via an online survey, which is split into several short modules and available in four languages. By participating in Colive Cancer, patients can help researchers, healthcare providers, policymakers and all other relevant stakeholders identify what works well and what can be improved in the National Cancer Plan, thereby ultimately contributing to shaping the future of cancer care in the Grand Duchy.



#### The "Sound" of COVID-19: using the voice to monitor COVID-19

The Predi-COVID Cohort study, led by Dr Guy Fagherazzi of recordings of COVID-19 affected people could be used as a themselves with their smartphones while reading a set text and filling out a questionnaire about their symptoms and general health status. The researchers used this data to derive asymptomatic individuals with COVID-19. This new technology could revolutionise how patients are monitored and treated, while relieving some burden from healthcare



Dr Guy Fagherazzi

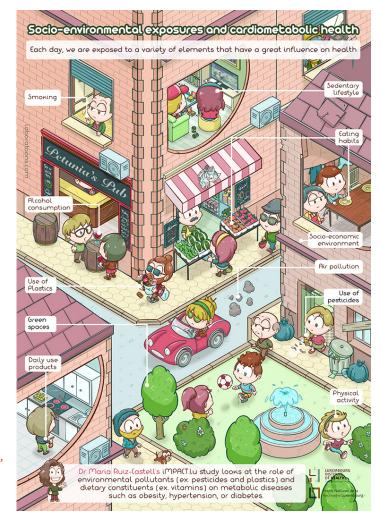
Such a vocal biomarker could be integrated into future telemonitoring solutions, digital devices, or in clinical practice. It offers an easily available, noninvasive tool to collect data that can be used from home", said Dr Guy Fagherazzi, Director of the DoPH and leader of the study.

#### Unlocking the exposome: exploring our environmental exposure

We all know about the genome and how much it determines one's health, but what about the "exposome"? The exposome refers to the environmental factors, such as chemical, lifestyle, psychosocial, and physical factors, that individuals are exposed to throughout their lives and how they interact with the genome to contribute to chronic diseases. A recent study led by Dr Maria Ruiz-Castell, in collaboration with Dr Brice Appenzeller of the Department of Precision Health, measured 175 environmental exposures in the general Luxembourg adult population, including chemical pollutants detectable in hair. The results showed correlations and patterns of exposures between and within specific groups. One concerning result is the detection of pesticides banned in the EU in many samples, showing the extreme longevity of some harmful chemicals. The study also saw differences in variables between men and women, with chemical concentration of pollutants, especially pesticides and herbicides, mostly higher in men and higher concentration of micronutrients and lower alcohol consumption in women. Overall, the study emphasizes the complexity and multidimensionality of the exposome and highlights the need for a complete overview to better interpret its role in health.



This research would not have been possible without the financial support of the Luxembourg National Research Fund, the Directorate and Ministry of Health, and the Ministry of Higher Education and Research. The study is also part of the FNR-funded CORE project "Micronutrients, Pollutants and Cardiometabolic Health in Luxembourg" (IMPACT.lu).



#### Allergies, an ally against cancer?

Glioblastoma (GBM) is a highly aggressive type of cancer that occurs in the brain and is currently incurable. Despite the range of available cancer treatments, GBMs are able to evade the immune system. However, an LIH study conducted by the Neuro-Immunology group, the Allergy and Clinical Immunology group, and the NORLUX Neuro-Oncology Laboratory, found that an allergic immune response in mice implanted with brain tumour cells can prevent their growth and progression, confirming evidence seen in patients. Indeed, the research team observed that allergies cause the brain's immune cells (known as microglia) to reprogram themselves into a more aggressive inflammatory state, combating the implanted GBM cells and preventing their proliferation. These findings, which were published in the European Journal of Allergy and Clinical Immunology, will pave the way towards the advancement of new therapies targeting microglia and their ability to mobilise the immune system against GBM. "Our study highlights the critical relationship between allergies and brain tumours and is the basis for further examinations into protective immunity" - Prof Markus Ollert, head of the Department of Infection and Immunity.

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This research would not have been possible without the financial support of Action Lions "Vaincre le Cancer" and FNRS-Télévie!

## Educating the next generation of young scientists: the LIH launches the "Precision Health" book

The LIH and the "Service de Coordination de la Recherche et de l'Innovation pédagogiques et technologiques" (SCRIPT), developed and published a book on precision health, designed specifically for high-school pupils. The book provides a comprehensive overview of current health, medicine, and research, as well as an insight into how these fields will evolve in the future, with a particular focus on the role of digital technologies, Artificial Intelligence and Big Data. Its primary goal is to raise young readers' interest in science and research and motivate them to pursue a career in this exciting and ever-evolving field, contributing to shaping the next-generation of healthcare. The lead author and director of the LIH Department of Precision Health (DoPH), Dr Guy Fagherazzi, presented the book during a ceremony at the Université Populaire in Belval in October 2022, along with Mr. Claude Meisch, Minister of National Education for Children and Youth and of Higher Education and Research, and the CEO of the LIH Prof LIIf Nebrhass

The book was created in partnership with SCRIPT, the Association des Ingénieurs et Scientifiques du Luxembourg, the Luxembourg Government, the National Research Fund (FNR), Schroeder & Associates, and Post Luxembourg. It is being distributed to high schools nationwide and is available for download in English, French, and German at http://precisionhealth.lu/

/06/ LIH, RESEARCH FOR HEALTH:

#### DOWNLOAD FREE BOOK



The book and additional materials are available in English, German and French on precisionhealth.lu





#### **FNR Awards:** Prof Dr Rejko Krüger

At the 14th edition of the Luxembourg National Research Fund (FNR) Awards in October 2022, Prof Rejko Krüger, director of Transversal Translational Medicine (TTM) at the LIH, and Ibrahim Boussaad of the Luxembourg Centre for Systems Biomedicine (LCSB), were presented the award for "Outstanding Scientific Achievement" proof-of-concept demonstration of precision medicine in the field of neurodegenerative disease. Precision medicine is already somewhat established in diseases like cancer, but not so much when it comes to neurodegenerative diseases. The awarded project from the TTM focused on patients suffering from a rare familial form of Parkinson's disease with a specific genetic defect. Prof Krüger and his team were able to identify a new potential target therapy for them and, for the first time, they managed to develop one that treats the cause of the disease instead of just the symptoms. For more information, watch this video about the project:







Members of the WHO Collaborating Centre at the LIH - DII, including Dr Judith Hübschen and Prof Dr Markus Ollert

#### World Health Organisation nominates Luxembourg lab as an official Collaborating Centre

The World Health Organization (WHO) has designated the LIH's Department of Infection and Immunity (DII) as a Collaborating Centre for Reference and Research on Measles and Rubella Infections. The lab, directed by Prof Markus Ollert and led by Dr Judith Hübschen of the Clinical and Applied Virology group, is the only WHO Collaborating Centre in the world that specialises in measles and rubella. The collaboration includes monitoring genetic changes in measles virus strains to track transmission chains, developing and optimising laboratory techniques, and building capacity in measles and rubella diagnosis and surveillance. The laboratory is also the national reference laboratory for measles and rubella in Luxembourg and one of three WHO European regional reference laboratories covering 23 countries. Its responsibilities include quality control and assessment, support and training of WHO laboratory network staff, measles and rubella virus characterisation, outbreak confirmations and investigations, and research studies. While Luxembourg has eliminated measles and rubella, the WHO collaborates with labs worldwide to monitor outbreaks, mutations, and vaccinations to prevent outbreaks or re-establishment of certain diseases.

# Thank you to our donors





Thank you to Fondation Cancer and the FNR for relentlessly supporting our fight against some of the biggest healthcare challenges of our times!

#### FNR 2022 CORE grants enable LIH research //

In December 2022, the Luxembourg National Research Fund (FNR) announced the successful funding of 48 projects from its 2022 CORE Call. Among those were four from the LIH, receiving EUR 2.9m in total:

- · PSEUDO: led by the LIH Department of Infection and Immunity (DII), it will focus on the use and pre-clinical validation of novel antibodies to target the bacterium P. aeruginosa, which causes lung-invasive infections such as pneumonia;
- EPICON aims to elucidate the main factors that can improve the efficacy of natural killer (NK) cells, one of the most effective killers of cancerous cells in the bloodstream. The project is **co-financed by Fondation Cancer**;
- 1cRedOx focuses on the prevention of colorectal cancer growth and metastasis by disrupting cancer cell survival mechanisms. It is co-financed by Fondation Cancer;
- · CaroFiber investigates the impact of dietary fibres on carotenoid bioavailability during digestion.

We are very grateful to the FNR and to Fondation Cancer for unwaveringly supporting our research efforts across our priority disease areas. The funded projects are expected to provide concrete results that will translate into more advanced treatment options and generate tangible benefits for Luxembourg patients", says Dr Frank Glod, Chief of Scientific Operations.

#### The Plooschter Projet continues to support the LIH //

The Luxembourgish non-profit association Plooschter Projet renewed its commitment to the Tumour Stroma Interactions (TSI) group of the Department of Cancer Research (DoCR) for the fourth consecutive time in January 2023, by making a generous donation of EUR 30,000 to the group. This grant follows three previous donations by Plooschter Projet to the TSI group in 2019, 2020 and 2021. The group, led by Dr Etienne Moussay and Dr Jérôme Paggetti, investigates the mechanisms that promote cancer progression. They focus in particular on chronic lymphocytic leukaemia (CLL), the most common form of leukaemia. The goal of the project supported by the Plooschter Projet is to accurately characterise the cellular microenvironment of the lymph nodes of CLL patients. The researchers use a high-throughput imaging technique known as Imaging Mass Cytometry to get a better understanding of how tumours escape the immune system. This will help determine potential targets for new innovative immunotherapies.

#### Thank you to Plooschter Projet Lux for contributing to our fight against leukaemia!



Plooschter Projet from left to right: Dr Etienne Moussay, Yannick Lieners (head of Plooschter Projet), Christiane Lieners-Reger,



Legs Kanning from left to right: Prof Marc Diederich (president of the "Action Lions Vaincre la Cancer"), Dr Pablo Morande, Cédric Weisse (BIL)



Thank you to Action Lions Vaincre le Cancer for their continuous commitment to cancer

#### Legs Kanning Prize awarded to LIH cancer researcher //

Dr Pablo Morande, a Marie Skłodowska-Curie Senior Post-doctoral Fellow from the Tumour Stroma Interactions group at the Department of Cancer Research (DoCR), received the 2022 Legs Kanning Prize from the "Action Lions Vaincre le Cancer" association for his achievements in cancer research. The EUR 7,500 prize was awarded during the 16th annual "Legs Kanning" conference at the headquarters of the Banque Internationale à Luxembourg (BIL). Dr Morande's talk, entitled "Evolution and cancer: a challenge for the design of novel therapies", covered the latest evolutionary approaches to understand cancer progression and the challenges that these perspectives represent for future therapeutic applications. He highlighted the importance of understanding cancer relapse as a Darwinian process of selection and adaptation of tumour cells and explained some of the main research questions being developed in reference centres around the world. Dr Morande expressed his honour and gratitude for the award and the opportunity to discuss the application of evolutionary approaches to cancer research.

#### Think Pink Lux "Marian Aldred Award" supports LIH cancer research //

In January 2023, Diogo Pereira Fernandes, a Master's student in 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 (TPL), amounting to EUR 25,000. The symbolic cheque was presented to the two recipients during a ceremony that took place at the LIH premises in Strassen in the presence of Carrie Cannon, Director of TPL, and Laurent Vanot from the TPL committee, husband of the late Marian Aldred. The generous donation will enable Diogo to explore the mechanisms involved in tumour immune resistance, with the aim of developing new strategies to restore anti-tumour immune responses in patients and improve the efficacy of current immunotherapies.

The TPL award provides funding to young scientists for their cancer research projects, having already donated EUR 141,000 to support several students at the LIH Department of Cancer Research under Dr Clément Thomas.



Thank you to Think Pink Lux for supporting our research on the development of more effective cancer therapies!





Think Pink from left to right: Laurent Vanon (from the TPL committee, husband of the late Marian Aldred), Dr Clément Thomas, Diogo Pereira Fernandes, Carrie Cannon (Director of TPL)

Watch the video to find out more about how the TPL donation will support Diogo's project!





 $igcolone{ ext{Thank}}$  Thank you to Fondation du Pélican for contributing to training the next generation of scientists!

#### The Pelican Grant rewards four LIH PhD students //

Four PhD students from the LIH have been awarded the Pelican Grant from the Fondation du Pélican de Mie et Pierre Hippert-Faber, under the aegis of the Fondation de Luxembourg. Mahsa Rezaeipour is assessing novel immunotherapeutic strategies against glioblastoma brain tumours. Alexandros Pailas is researching how the molecular mechanism of DNA repair confers chemoradiation resistance to glioblastoma tumour cells. Cyrielle Holuka is focusing on how early life from conception to age two relates to the development of chronic diseases. Pilar Moreno Sanchez aims to expand the library of patient-derived glioblastoma models of the NORLUX Neuro-oncology lab, which will subsequently be used to test new immunotherapies. The four awardees will use the Pelican grant to finance their research, including additional experiments, travel expenses to participate in conferences and training workshops, as well as short-term stays abroad.

### Donor testimonial

Interview with Guy Brandenbourger, Government and Public sector Leader, Health Industries Leader at PwC Luxembourg

PwC Luxembourg recently made a generous donation to the LIH. In this short testimonial, Guy Brandenbourger, PwC Luxembourg Partner presents his expert vision for the healthcare and research sectors and explains his/their motivation for supporting the LIH's research activities.



experience, I would say digital health, without a doubt. We recently carried out a study that looked at the adoption of telemedicine throughout Europe. The results revealed that digital health solutions, such as tools for remote patient monitoring or for remote diagnosis of minor afflictions, could greatly improve our current healthcare systems. Indeed, a 20% increase in the integration of telemedicine and e-health applications in routine clinical practice could in savings and improved access to healthcare for mobility. The integration of digital technologies, Artificial Intelligence and Big Data in public health will range of chronic disorders, thereby enhancing disease prevention and diagnosis. For this reason, I am fascinated by the relevance and far-sightedness of the research conducted at the LIH, as it will contribute to realising these benefits for Luxembourg

#### In this context, what are the major challenges that remain to be addressed in this respect?

G.B.: Despite the enormous potential benefits of digital health, there are still some crucial aspects that need to be further researched before this vision becomes the reality of clinical practice, and these pertain to data. Data originating from patients must researchers. The efficiency and efficacy of this flow overcoming the remaining hesitation and resistance pioneering projects such as Clinnova, involving the LIH and all other national and cross-border healthcare players, will be key.

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

G.B.: As a consultant whose work consists of assisting the public sector with the development and implementation of innovative healthcare policies, I see it almost as my professional duty to lead by example and support research institutions in their daily efforts to improve people's health. The donation is therefore a small gesture to show PwC's solidarity with the LIH and with all of the patients that will benefit from the institute's hard work. On a more personal note, having experienced the loss of a loved one to breast cancer, I feel particularly touched by this topic, and I have already supported several associations, including one working with children in the paediatric department of a hospital in the Greater Region. Donating to research is therefore my way and the PwC way to contribute to the development of new, effective therapies against cancer and many other afflictions that negatively affect the lives of many every day.

PwC Luxembourg regularly supports LIH Research and we encourage people to take part in any research study including blood sample collection, led by the common, aggressive, deadly, and treatmentresistant malignant form of brain cancer. Together... lëtz make it happen!

# A glance at the future

interview with Manon Gantenbein

### Making translational medicine a reality: the LCTR-Fuerschungsklinik Lëtzebuerg opens its doors

Co-managed by the LIH and the Centre Hospitalier de Luxembourg (CHL), the Luxembourg Clinical and Translational Research Centre (LCTR - Fuerschungsklinik Lëtzebuerg) was inaugurated in December 2022 in the presence of Mrs Paulette Lenert, Luxembourg's Minister of Health, and Mr Claude Meisch, Minister of Higher Education and Research.

#### Can you tell us a little bit about the new Luxembourg Clinical and Translational Research Centre (LCTR) and its aims?

M.G.: Like most "translational" "patient-oriented" initiatives, the Fuerschungsklinik stems from the tight collaboration between the LIH and all major national hospitals, namely the CHL, Hôpitaux Robert Schuman (HRS) and the Centre Hospitalier Emile Mayrisch (CHEM). Indeed, it is the first national research infrastructure that brings together clinicians, researchers and patients, with the aim of translating research findings into tangible personalised therapeutic and diagnostic solutions to improve the prevention, diagnosis and treatment of major chronic diseases – such as cancer, infectious diseases, and immune and neurodegenerative disorders, among others thereby addressing currently unmet patient needs.







cutting-edge research infrastructure, administrative and and management support from the Research Unit of the CHL and from the Translational Medicine Operations Hub (TMOH) of the LIH, and makes them available to researchers and clinicians from Luxembourg's hospitals and research institutions. This will offer them the opportunity to develop innovative translational and clinical research projects, creating a bridge between research and healthcare and promoting the integration of patient samples and real-life data in research, thereby enhancing the effectiveness of clinical trials and improving patient outcomes.

#### The LIH and LCTR put the patient at the heart of their activities. How will patients play a role in the LCTR specifically and how will they benefit from it?

M.G.: Indeed, the LIH is a patient-centred institute and, by association, so is the LCTR, which is positioned at the between juncture basic research epidemiological and clinical research. The LCTR will host numerous existing programmes focused on topics and diseases such as Parkinson's disease, cancer, digital precision health and COVID-19, among others. Eligible patients will have the opportunity to actively take part in these and in new ground-breaking epidemiological and translational research projects, as well as clinical trials, and provide biological samples and data. By doing so, they will be able to gain access to and directly benefit from novel drugs and innovative diagnostic tools, which would otherwise be unavailable to them. For this reason, the LCTR will be the cornerstone of what we call the translational "bed-to-bench-to-bed" cycle.



From left to right: Dominique Hansen, Manon Gantenbein, Gregor Baertz (LIH) and Caroline Turk (HRS).

#### How is the LCTR funded and what difference do donations make?

M.G.: Most research projects and infrastructures rely to a large extent on government funding, and the LCTR also benefits from the support of the European Commission through the European Regional Development Fund. However, despite these essential resources, research activities remain costly, which is why private donations constitute a crucial source of funding. This is particularly true in the case of the LCTR, which involves cutting-edge and, consequently, expensive equipment and infrastructure. For this reason, every donation, big or small, makes a significant difference, and we are particularly grateful for long-lasting commitments, which allow us to sustain our efforts in the longer term and ensure that we truly achieve meaningful outcomes for our patients.

#### **Luxembourg Institute of Health**

#### Research dedicated to life

The Luxembourg Institute of Health (LIH) is a public biomedical research organisation focused on precision health. It aims at becoming a European leader in translational research.

At the LIH we place the patient at the heart of all our activities. We are driven by a collective obligation to put scientific advancement into the service of patients. Under that premise our dedicated and passionate researchers strive for scientific excellence in immune related diseases and cancer and explore new ways to translate this excellence into impact on patients.

The institute embraces collaborations, disruptive data-based technologies, and process innovations as unique opportunities to advance the quality of life of patients and health in our society.



#### 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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