



## CRP-SANTÉ | ACTIVITY REPORT 2012



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## CRP-SANTÉ | ACTIVITY REPORT 2012

# BOARD AND MANAGEMENT'S MESSAGE

**CRP-Santé** elected to change its 2012 activity report format: it is shorter, easier to read and visually more attractive. We do no longer provide an exhaustive list of each and every achievement of the year – most of these can be found on our continuously update website ([www.crp-sante.lu](http://www.crp-sante.lu)) – the present report highlights some outstanding achievements and examples of how CRP-Santé creates value for Luxembourg.

In 2012, CRP-Santé was highly successful in its scientific mission: we published the scientific results of our research in 107 articles in peer-reviewed international scientific journals, of which more than 30 in so-called high impact journals. There has been a steady improvement of our scientific output over the last years. In addition, we successfully contributed to student training at bachelor, master and doctoral level and organized technology transfer to private industry. The activities of our Clinical Investigation Center and of our Department of Public Health significantly progressed in 2012 with the initiation of many new clinical trials and the inception – with the collaboration of other actors from the health care sector - of strategic infrastructures for Luxembourg such as the national cancer registry. About two thirds of CRP-Santé's projects are developed in collaboration with national and international partners and 2012 allowed us to further strengthen our international networks. Finally, in the past year, CRP-Santé was able to reach its target for external funding, a challenging task in the current situation of economic downturn.

We would like to take the opportunity to warmly thank our colleague Marie-Lise Lair, who left CRP-Santé in 2012. Over the last years, she had built up the "Centre d'Etudes en Santé" in the Department of Public Health. She has also been a crucial member of the management board for many years, helping to navigate our organization, especially in difficult times. The importance of her visionary work in public health becomes increasingly obvious and we have now started to structure the department in a way that her work can be successfully continued by her successor. Convinced that public health research has to be further strengthened in Luxembourg, we are committed to recruit new senior competences in this field in the coming years.

CRP-Santé will face two main challenges in the next years. We must continue to consolidate our financial situation despite a difficult economic environment and slowing public investments in our sector. This means that we have to increase our external incomes by attracting competitive grants and through closer collaborations with industrial partners, which in the case of biotech and pharma industry are mainly found at a European or international level. With a clear value proposition, we are convinced that we can increasingly attract the interest of these international players.

The second major challenge is the lack of sufficient and adequate laboratory surfaces. Voted by parliament in 2004, the project of a new building for CRP-Santé has been put on hold for the second time by Government in 2012. If this is understandable in the current economic situation, it still puts CRP-Santé in an extremely difficult situation. We are trying to bridge the next years with interim solutions and are convinced that the Government will authorize the construction works for our final building shortly, setting the right priorities for the research sector in Luxembourg and thus extending the past support to CRP-Santé which our organization deserves as a successful leader in the field.

**Frank Gansen, President**

**The Management Committee**



*Thomas Lentz, Chief Financial Officer, Dr. Simone Niclou, Management Committee member and Dr. Jean-Claude Schmit, Chief Executive Officer of CRP-Santé.*





*The Laboratory of Experimental Hemato-Oncology*

# SELECTED SCIENTIFIC ACHIEVEMENTS

The main mission of CRP-Santé is to perform high quality, internationally recognized biomedical research in order to improve current therapeutic options for a variety of human diseases. In 2012, **154 scientific projects** were run at our institution, of which **62% were collaborative projects with national and international partners**. Eventually, CRP-Santé aims to translate knowledge into clinical applications impacting on healthcare and shaping personalized medicine. 2012 has been a productive year with a number of notable scientific achievements. Overall in 2012 CRP-Santé's research activities resulted in a total of 107 peer-reviewed publications in scientific journals with an impact factor above 2, representing a 16% increase compared to 2011. A selection of exceptional achievements is highlighted hereafter.

## BIOMARKER DISCOVERY

The **Luxembourg Clinical Proteomics Center** and the **Laboratory of Experimental Hemato-Oncology** continued a tight collaboration with the **Partnership for Personalized Medicine (PPM) in the United States on lung cancer**. The primary objective of this project, which originated in the 2008 Health Technology Initiative of the Luxembourg Government, is to identify protein biomarkers that assist in the choice of personalized treatment for lung cancer patients. In addition, disease progression and regression upon therapeutic intervention are monitored as part of a longitudinal study. Our US collaborators, the **Translational Genomics Research Institute (TGen)** in Phoenix, Arizona and the **Fred Hutchinson Cancer Research Center in Seattle**, Washington, focus on biomarker identification in a paired study with responders and non-responders to chemotherapy.

In 2012, a total of 160 lung cancer patients have participated in the sample collection for the project in Luxembourg. In addition to the demographic and pathological data, clinical and genetic information has been added through molecular diagnostics. On the proteomics side, up to 400 protein biomarker candidates identified during a previous study were selected for systematic screening of plasma from lung cancer patients in 2013. The five most promising candidates were selected for further investigation in an extended sample set. This state-of-the-art proteomic analysis is only feasible in Luxembourg due to the inception of the Luxembourg Clinical Proteomics Center financed via a PEARL grant of the Fonds National de la Recherche in 2010.

To create a more immediate clinical impact and to add orthogonal verification approaches, platforms based on tissue analyses are currently added through a research collaboration with the **Institute for Research in Immunology and Cancer (IRIC) in Montreal**, Canada. These include high-throughput immunohistochemistry and reverse protein arrays. The end products of this project, a panel of lung cancer biomarkers and their quantitative assays, are projected to be implemented in the clinic after an evaluation and validation phase.



## PUBLIC HEALTH

The projects '**National Cancer Registry**' and '**Luxembourg Cohort**' are two examples of how the **Department of Public Health** works towards the development of long-term infrastructures for the benefit of the general population and the use by health professionals, policy makers and the scientific community.

The **National Cancer Registry** was developed between 2011 and 2012 with the help of the **Directorate of Health** (Ministry of Health) and clinical and public health experts and will be operational from mid-2013. By linking clinical databases and administrative patient records according to internationally standardized methodologies, the National Cancer Registry creates a structured and accessible resource to track the occurrence of cancers in Luxembourg. With this infrastructure in place, Luxembourg will be able to participate in international medical comparisons of cancer indicators such as incidence and mortality.

The **Luxembourg Cohort**, currently in an early preparatory phase, aims at establishing a large long-term study on risk factors and disease occurrence in the general population. The project foresees to recruit up to 100'000 residents (adults and new-born babies) of Luxembourg in its first 10 years and follow their health status and exposure to risk factors through a combination of online questionnaires, storage of blood and urine samples and longitudinal monitoring of health outcomes via linkage to public health registers. The focus areas of the cohort will be chronic diseases in adulthood (cardiovascular disease, cancer, diabetes and mental health) and healthy growth and development in children. 2012 has served to prepare a detailed structural proposal for the cohort, to plan the informatics infrastructure and to inform and build a network of partnerships and collaborations. Provided the project obtains the final support of the Government, the cohort will initiate recruitment of participants in 2014.



RNC press conference in the presence of the Minister of Health, Mars Di Bartolomeo





NESCAV press conference in the presence of Dr. Danielle Hansen-Koenig, Director of Health, Ministry of Health

Both these projects lay an infrastructural foundation for future public health services and information, as well as biomedical and public health research. They complement each other through the linked development of systems for the collection and connection of information according to state-of-the-art and internationally recognized methodologies and principles.

In 2012, the **Centre for Health Studies** of the Department of Public Health also completed a three-year collaborative study on risk factors for cardiovascular disease in the Greater Region. **The NESCAV (Nutrition, environment and cardiovascular health) study** included several thousand inhabitants from Luxembourg, Wallonia and Lorraine. One focus of the

study was the human exposure to pollutants. The analysis of hair samples revealed the presence of several different chemicals (e.g. pesticides, industrial waste components, indoor contaminants) for each individual. The presence of these chemicals, some of which have been banned for years or even decades, clearly demonstrates simultaneous exposure, whether it be due to diet, air contamination or occupation. These studies pave the way for investigating the potential role of pollutants in the onset of chronic diseases including cardiovascular disease. These aspects are currently investigated by the **Laboratory of Analytical Human Biomonitoring** and the **Centre for Health Studies**.

The **Sports Medicine Research Laboratory** within the Department of Public Health conducts research in the field of sports injury prevention and risk factors. In the framework of this research, the lab developed the '**Training and Injury Prevention Platform for Sports**' (TIPPS) - an internet-based electronic training database available to the general public ([www.tipps.lu](http://www.tipps.lu)). The database allows to upload and review training and sports injury-related data over time by different protagonists according to their profile (leisure-time or competitive athlete, trainer, medical staff, project manager).

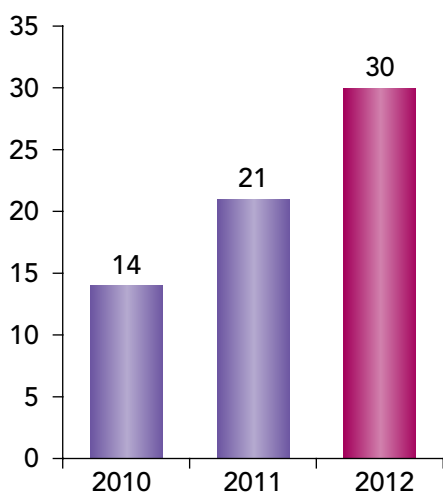
The athlete can declare episodes of pain and injury characteristics for each practice session in a 'Sports Injury Module'. This module has internal cross-check procedures, as well as extensive features and filters that can be used by the coordinator of the injury surveillance project and local medical staff to ensure a close follow-up of their athletes. An 'Injury



prevention module' can additionally anticipate the occurrence of a sports injury and limit the negative consequences of an existing one for enrolled participants.

In addition to these practical features, the TIPPS platform is an efficient and convenient research tool and has been used in several scientific investigations on sports injury prevention by the Sports Medicine Research Laboratory.

**Scientific publications with Impact Factor above 5**  
(Total CRP-Santé, per year)



## FOCUS ON THE HEART

The **Laboratory of Cardiovascular Research** at CRP-Santé aims to understand the biological mechanisms responsible for heart failure after acute myocardial infarction. The study of these mechanisms will help to identify novel biomarkers and therapeutic targets for patients suffering a heart attack. 2012 saw the completion of a registry of patients with acute myocardial infarction (**LUCKY registry**), an important investigational tool for cardiovascular research in Luxembourg and beyond.

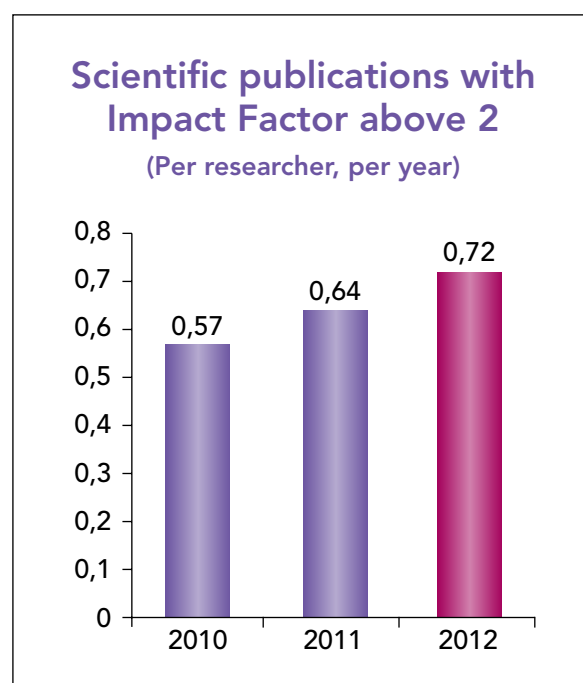
The LUCKY registry was initiated seven years ago at the **Department of Cardiology of the Centre Hospitalier de Luxembourg** and the **Luxembourg Heart Institute INCCI**. All patients admitted to the hospital for acute chest pain and referred for primary percutaneous coronary intervention were enrolled in the registry. Appropriately consented blood samples were obtained, processed and stored and a database gathering demographic and clinical data for each patient was generated. Patient follow-up was performed by dedicated research nurses for up to one year after acute myocardial infarction. The LUCKY registry has been closed in 2012 after including more than 950 patients. Its exceptional success was largely based on a tight collaboration between the three neighboring institutions CRP-Santé, INCCI and Centre Hospitalier de Luxembourg.

Multiple studies at the Laboratory of Cardiovascular Research benefited from this registry and gave rise to many peer-reviewed scientific publications. Several ongoing analyses are carried out with the expert help of the **Competence Center for Methodology and Statistics** at CRP-Santé. For instance, the combined effect of risk factors such as diabetes and increased expression of biomarkers, on patient survival is currently being investigated.

## FIGHTING ALLERGIES

In 2012 the **Laboratory of Immunogenetics and Allergology** has achieved an important breakthrough in the identification of novel animal allergens, including those from dog, fish and guinea-pigs. The aim of the research unit is to isolate and characterize new allergen

molecules which will improve *in vitro* diagnosis and clinical management of patients with **respiratory or food allergies due to allergens of animal origin**. Major high impact publications have been generated in 2012 and the group has received a new grant to investigate the use of a novel allergen-based diagnostic approach for patients with fish allergies. The team at CRP-Santé previously identified two new fish allergens from patient sera that were relevant for their diagnosis. Salmon-allergic patients could only be diagnosed using the new salmon homolog purified at CRP-Santé. A panel of fish allergens additionally allowed to distinguish between three patient clusters based on their IgE-reactivity, clearly showing the added value of the allergen-based diagnostic approach compared to commercially available tests. Such findings have a direct impact on patient care and quality of life. The final aim is to identify those patients that tolerate certain types of fish but not others, allowing them to reintroduce these into their diet.



# ECONOMIC VALUE CREATION AND TECHNOLOGY TRANSFER

## PATENTS

A second important mission of CRP-Santé is creating economic value for Luxembourg. The research teams at CRP-Santé are supported in this effort by an internal technology transfer office, which works in close collaboration with a Luxembourg-based Venture Capital company located in the same premises.

Since the beginning of the current performance contract in 2011, four patent applications have been submitted and one business development plan is currently under review. Two typical examples of economic value creation are detailed below:

Heart attacks remain among the leading causes of death and morbidity worldwide. However, to date no biomarker displays sufficient sensitivity and specificity to predict outcome of patients presenting with acute myocardial infarction at an early stage after chest pain onset.

Taking advantage of the recently completed national registry of acute myocardial infarction (LUCKY registry) and of a collaboration with a hospital in Leicester (UK), the **Laboratory of Cardiovascular Research** has identified two novel protein biomarkers in the blood that may aid to predict patients with acute myocardial infarction. In addition, small RNA molecules (called “microRNAs”) with prognostic potential were found in the blood.

**Three international patents** have been filed to cover the use of these proteins and microRNA biomarkers for diagnostic and/or prognostic purposes. One patent has already been granted in the US (patent N° US7319017) and in Europe (Patent N° EP1782068). Two others, filed in 2009 and 2012, are under examination by patenting authorities. Two of these three patents have been licensed to a Novartis spin-off company. The business deal has also led to a scientific collaboration between the company and the Laboratory of Cardiovascular Research.







Recent achievements include the development of assay kits to measure the patented biomarkers in human biological fluids. These kits will be tested in large EU-funded patient cohorts to determine the ultimate clinical value of the biomarkers.

### INDUSTRIAL PARTNERSHIPS

In 2009, the **Laboratory of Retrovirology** has initiated a lasting **collaboration with a world leading healthcare company** in diagnostics. In 2011, the company signed a framework service agreement with CRP-Santé, to provide the company with scientific expertise, support and services by CRP-Santé staff in the field of infectious diseases. These include analyses of clinical specimens, technical performance evaluation and verification studies of diagnostic tests, systems and assays developed or provided by the company. Seven studies have been performed since 2009, including two complete external evaluations of two diagnostic kits in virology to obtain the EU-in vitro diagnostics conformity label and one platform comparison for the company's US site according to the

ICH-GCP quality guidelines and regulations of the Food and Drug Administration (FDA). This successful partnership was made possible thanks to the high level expertise of the research engineers and technicians of the laboratory and to the close relationship with the **Laboratory of Microbiology** and the **National Service of Infectious Diseases** at the **Centre Hospitalier de Luxembourg**. Such studies increase the international visibility of CRP-Santé and Luxembourg, demonstrating the quality of our research teams and bringing competitive funding to further support fundamental research.





The Department of Immunology of CRP-Santé



# EDUCATING THE NEXT GENERATION OF SCIENTISTS

**CRP-Santé** takes pride in educating bachelor, master and doctoral students and has a long history of successful PhD (doctor in sciences) thesis defenses.

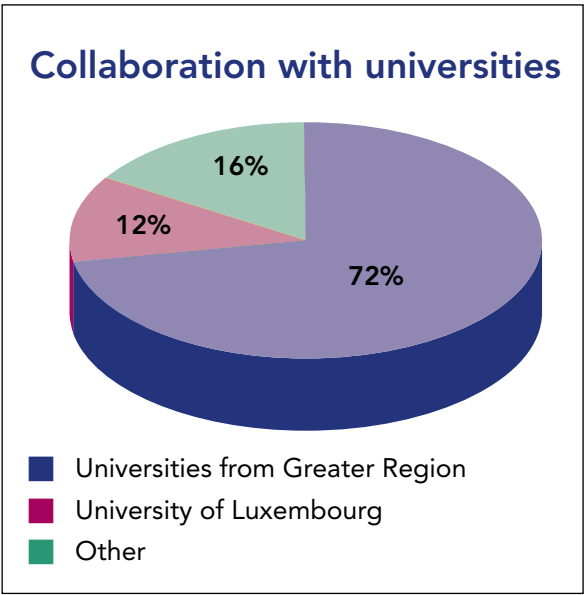
In 2012, CRP-Santé extensively contributed to the implementation of the BioMed **Doctoral School** within the **Life Sciences Department of the University of Luxembourg** in order to strengthen the PhD training in Luxembourg. Moreover, CRP-Santé is formally linked to the Life Sciences Doctoral School of the University of Strasbourg to exchange competences and improve the skills of its PhD students. Overall our institute welcomes 40-45 PhD students in biomedical research. In 2011 and 2012, 18 new PhD students have been recruited, while during the same period 17 successfully completed their PhD thesis. Our doctoral trainings are carried out in close collaboration with all universities of the Greater Region (Liège, Lorraine, Saarland, Strasbourg and Trier; 72% of students), with the University of Luxembourg (12%) and many other universities in Europe (16%). One of the most active departments of CRP-Santé in doctoral training is the Department of Immunology:

With more than 20 years of experience in the education of next generation scientists the **Department of Immunology** has trained **forty PhD and 20 medical students** since its creation in 1992. PhD students work within a team of about 35 scientists, including postdocs, engineers, research technicians and fellow PhD students. In addition to leading an ambitious research project, the students learn to publish their results in international peer-reviewed journals and to present at scientific conferences, develop project proposals and learn to raise

funds. Regular working groups, lectures and seminars, international collaborations with research institutions, universities, the World Health Organization and EU organizations are other important aspects of the training. A special focus is put on soft skills, an essential asset for professional career development. The excellent training offer attracts outstanding students to the department. 65% of the Department's doctoral students have continued a scientific career in academia or research institutes including such prominent organizations as the Imperial College London, the US Centre for Disease Control and Prevention, Atlanta and the German Cancer Research Centre, Heidelberg. 30% of former students work in industry or as medical doctors.

In addition the Department welcomes 8 to 12 undergraduate students per year to complete their Bachelor or Master thesis, or summer student placements and participates in numerous outreach events for the general public, high school pupils and the Science Club Luxembourg.







# COLLABORATING WITH NATIONAL PARTNERS

**CRP-Santé** is a leading actor of biomedical research in Luxembourg. In order to achieve its objectives, we collaborate closely with other national partners active in the field of biomedicine. 62% of our research projects are collaborative, half of them include a national actor (e.g. public administrations, hospitals, public research centers, the University of Luxembourg, foundations). The Department of Public Health and the Clinical and Epidemiological Investigation Centre (CIEC) are a major interface for national collaborations at CRP-Santé.

## PUTTING CLINICAL RESEARCH ON THE MAP

Clinical research is a challenge for Luxembourg as international competition in this area is very high. In a few years CRP-Santé has successfully developed expertise in this field and its **Clinical and Epidemiological Investigation Centre (CIEC)** was able to establish **close links with national hospitals** and to assert its knowhow even beyond Luxembourg borders.



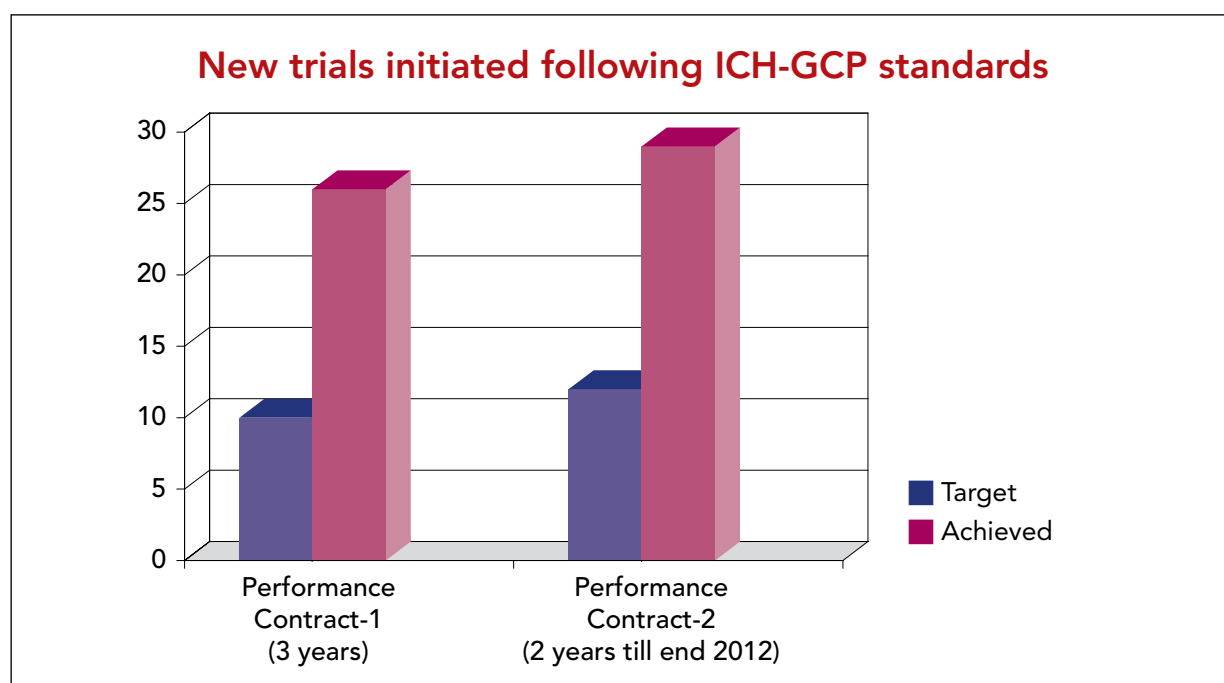
## COLLABORATING WITH NATIONAL PARTNERS

One of the missions of the CIEC is to provide patients access to newly developed medications in various therapeutic areas such as pulmonology, infectious diseases or oncology through the means of **clinical studies**. In 2012, a total of **1'370 patients** from Luxembourg were able to participate in 19 ongoing international multicenter clinical trials and various local research projects. Eight new studies were initiated in 2012. As part of a European FP7 project coordinated by CIEC and involving 800 patients in Luxembourg, 80 general practitioners in Luxembourg participated in a survey evaluating the quality of care in general practice in Europe (QUALICOPC).

A growing number of **physicians** participate in clinical trials in Luxembourg, an interest which also extends to partners in the **pharmaceutical industry** and has a positive impact on the management of patient care and **hospitals** and on public health in general.

An example is the **Lung Cancer Study**, a project initiated in collaboration with all major hospitals in Luxembourg aiming to provide personalized oncology treatment and to discover and validate novel biomarkers. Other projects initiated by local physicians and coordinated by CIEC, include biomarker validation in colorectal cancer and diabetes, immunotherapy in allergic disease, telemedicine in oncology as well as a registry and medical devices in neurosurgery.

In 2012, CRP-Santé also conducted several projects in collaboration with the **Integrated Biobank of Luxembourg (IBBL)**, which collects, stores and analyses biological samples. This fruitful relationship will be further intensified in the coming years as the new law on public research, currently under review by parliament, foresees an integration of IBBL in CRP-Santé.





## CLINICAL RESEARCH DAYS

In 2012 CIEC involved hospitals in Luxembourg in the celebration of the **International Clinical Trials Day** where CIEC was present in the five main national hospitals to meet patients and their medical and nursing staff. CIEC also organized the **4<sup>th</sup> edition of the Day of Clinical Research** devoted to developments in clinical research in Luxembourg with the active participation of not only national physicians and researchers but also international key opinion leaders. The conference has been acknowledged by the European Accreditation Council for Continuing Medical Education (EACCME) - Institution of the European Union of Medical Specialists (UEMS). CIEC additionally organizes **presentations** for physicians, nurses and



researchers to report new molecules currently in development in different therapeutic areas and discusses the feasibility of clinical protocols in Luxembourg. Last but not least, CIEC trains study nurses, clinical research associates and physicians in clinical research throughout the country.



## COLLABORATIVE ANNIVERSARY

**A**nother type of long lasting collaboration between CRP-Santé and national partners is exemplified by the partnership of the Laboratory of Retrovirology with the National Service of Infectious Diseases and the foundation **"Fondation Recherche sur le SIDA"**:

On the occasion of the World AIDS Day on 1<sup>st</sup> December 2012, the **Laboratory of Retrovirology** organized a **photo exhibition** at the Centre Hospitalier de Luxembourg to celebrate its **20<sup>th</sup> anniversary** and to highlight the efficient and long lasting collaboration with the **National Service of Infectious Diseases** and the AIDS Research Foundation **"Fondation Recherche sur le SIDA"**. Created in 1992 under the supervision of a microbiologist from the National Health Laboratory and a clinician of the National Service of Infectious Diseases, the Laboratory of Retrovirology has worked ever since with the National Service of Infectious Diseases to provide highly specialized technical support for the clinical follow-up of the patients. Initially encompassing routine diagnostic assays, research is now extended to the development and validation of novel techniques and assays. This clinically orientated research is carried out in collaboration with five clinicians and is supported by special funds from the "Fondation Recherche sur le SIDA" and recently gained operational support from CIEC. The laboratory is also the national focal point for **HIV reporting** to the Ministry of Health, the World Health Organization and the European Center for Disease Control and Prevention in Stockholm.





*From left to right: Dr. Carole Devaux, Associate Head of the Retrovirology Laboratory, Dr. Jean-Claude Schmit, CEO of CRP-Santé and Head of the Retrovirology Laboratory, Grand Duchess of Luxembourg Maria Teresa*







*Prof. Claude P. Muller, Head of the Department of Immunology and Jean-Claude Juncker, Prime-Minister of Luxembourg*



# INTERNATIONAL COLLABORATIONS

**CRP-Santé** collaborates with a large number of international partners around the world. Some of these collaborations received special attention in 2012.

## IMPACT ON DEVELOPING COUNTRIES

The Government of Luxembourg has a long-term relationship with the People's Democratic Republic (PDR) of Lao to develop its infrastructure in clinical medicine and in public health. An important activity of the **Department of Immunology** at CRP-Santé focuses on public health problems caused by infectious agents in developing countries. The Department has developed considerable expertise in implementing research projects in such countries to build sustainable laboratory capacity adapted to the emerging needs of the country. As a result, the Department set up and runs the **LaoLuxLab**, a surveillance laboratory



for particular viral infections in humans and animals at the **Pasteur Institute in Vientiane**, the capital of Laos. In November 2012, the **Prime Minister of Luxembourg** Jean-Claude Juncker, the Minister of Cooperation Marie-Josée Jacobs, the Minister of Education Maddy Delvaux-Stehres and their delegation visited the LaoLuxLab in Vientiane. The **President of France** François Hollande also came to the LaoLuxLab during a visit of the **Institut Pasteur du Laos** in November 2012.



*On the left: Prof. Claude P. Muller with French President François Hollande (on the right)*



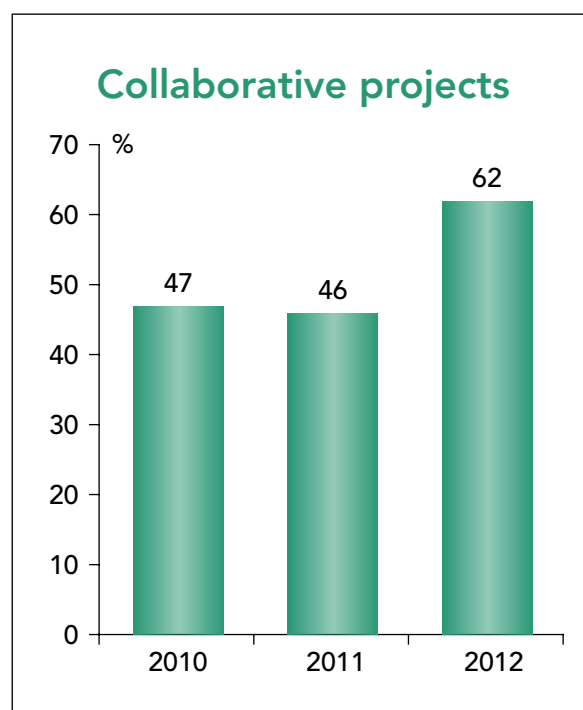
From left to right: Mrs. Yachan Li, Director of the European Division of SATCM, Prof. Rolf Bjerkvig, Dr. Ning Wang, Prof. Karl-Henning Kalland, Professor at the University of Bergen (Norway), Dr. Martine Mergen, Luxembourg Parliament, Dr. Xiaopin Wang, Director, Department of International Cooperation SATCM, Beijing, Dr. Jean-Claude Schmit, Dr. André Steinmetz, Prof. Xinmin Liu, IMPLAD - PUMC Beijing, Mr. Yong Peng, Assistant Director, IMPLAD Beijing

## CHINESE MEDICINAL HERBS OUTREACH

Between 2009 to 2013, the **Laboratory for Cellular and Molecular Oncology** coordinated an FP7-supported international **Collaborative Research and Research Staff Exchange Project called TCMCANCER**, involving four laboratories from **Europe and China**. The project aimed to identify novel lead compounds with anti-cancer activities from Chinese medicinal herbs and foster staff exchange and competence building via short stays in a partner laboratory. Partners included the Institute of Medicinal Plant Development at Peking Union Medical College in Beijing, the Modern Research Center for Traditional Chinese Medicine at the Second Military Medical University in Shanghai and the Gade Institute, University of Bergen in Norway.

CRP-Santé hosted 12 researchers and PhD students from China for testing plant extracts and purified compounds in various cancer cell lines, while four scientists from CRP-Santé visited Chinese partner labs. Over 600 compounds were tested at CRP-Santé and the University of Bergen for anticancer activities in various cancer

cell lines and about 30 components with high anti-cancer activity in at least one cancer cell line were identified. Mechanisms underlying these activities have been studied for the three most promising compounds. Exchanges and research activities were discussed at workshops in Shanghai, Luxembourg and Beijing. Future collaborations will be discussed at an upcoming workshop in Bergen (Norway) in 2013.





### TORONTO - LUXEMBOURG CLOSING IN ON BRAIN TUMORS

In the context of mission by the **Ministry of Economic Affairs and Foreign Trade** of Luxembourg in May 2012, a scientific delegation from CRP-Santé discussed its research projects in **Canada** and met Prof. James T. Rutka, Director of **The Arthur and Sonia Labatt Brain Tumor Research Centre in Toronto**. This was the beginning of a new and promising partnership leading to the signing of a framework agreement in early 2013 to conduct joint research projects and establish a network of scientific excellence within the field of neuro-oncology.

The Arthur and Sonia Labatt Brain Tumor Research Centre of the Hospital for Sick Children at the University of Toronto unites basic scientists and clinicians studying brain tumors.



The center has achieved excellence in the molecular and genetic high throughput analysis of different tumor types of the central nervous system.

This collaboration agreement is a major step forward in CRP-Santé's history and highlights the international recognition and scientific expertise of its **Norlux Neuro-Oncology Laboratory** and its partner organization in Bergen, Norway. Together, they represent one of the largest research centers focusing on brain tumors in Europe ([www.norlux.lu](http://www.norlux.lu)). As pointed out by Prof. Rutka during his visit to CRP-Santé, this collaboration will undoubtedly generate unexpected opportunities for economic value creation in the future.



# CONFERENCES AND VISITS

**CRP-Santé** regularly organizes high level scientific conferences with internationally recognized keynote speakers. These conferences are open to CRP-Santé collaborators as well as to national and international scientists and students.

## THE COSTS OF PERSONALIZED MEDICINE

**P**ersonalized medicine offers the promise of improving cancer care by allowing clinicians to tailor treatments based on patients' molecular and epidemiologic profiles. Because of the new paradigm of personalized medicine and its application in health care, finding efficient and effective ways to evaluate and adopt these technologies poses particular challenges for health systems, clinicians and politicians alike.



*Dr. Andrzej Rys,  
European Commission,  
Director of Public Health*



*Prof. Scott Ramsey,  
Fred Hutchinson Cancer Research Center*

In June 2012, CRP-Santé organized the first **Annual Workshop on Health Economics in Personalized Medicine** where internationally renowned leaders presented the latest research results and commentaries on the most pressing needs at the intersection of these two disciplines. The objective of the symposium was to identify research priorities, policies and programs to facilitate the development of evidence that could support the adoption of high value personalized medicine technologies for oncology in Europe. In a highly interactive format, key opinion leaders identified and discussed policies and programs that could facilitate the adoption of such innovative technologies.





## FUNDAMENTALS OF THE IMMUNE RESPONSE

An international scientific meeting entitled **"Antigen Processing and Presentation in Health and Disease"** was organized in Luxembourg in November 2012 by the **Laboratory for Immunogenetics and Allergology**. This conference brought together 130 leading international experts and researchers from CRP-Santé to discuss the latest developments in the field of antigen presentation, related to immunodeficiencies, allergies, cancer and infectious diseases. The conference was generously sponsored by the Fonds National de la Recherche and by several private companies. Several CRP-Santé scientists presented their results to the scientific community and a poster session provided younger scientists the opportunity to actively participate in the congress.

## TALKING SPORTS

Sports medicine is a rather recent field in Luxembourg, with clinical activities having started in 2004 and systematic scientific research at CRP-Santé in 2007. The aim of the **"Colloques médico-sportifs d'Eich"** is the local dissemination of state-of-the-art knowledge in this field and to create a platform to update, inform and make recommendations to stakeholders within and outside this area: researchers, medical doctors, physical therapists, trainers and coaches, decision makers and others. These seminars are also an opportunity to present the research undertaken at CRP-Santé to a non-scientific, sports-oriented public. This activity is organized once a month, in collaboration with the Sports Clinic & Orthopaedic Centre at the Centre Hospitalier du Luxembourg. The presenters are of international reputation and the subjects presented are related to the wide-ranging aims of sports medicine.





### ZOOMING IN ON MEASLES

On October 23, 2012, Mr. Wayne A. Madden, the worldwide President of Lions International together with the Minister of Health Mars Di Bartolomeo paid a visit to Department of Immunology to learn about the progress of the global measles elimination initiative led by the World Health Organization (WHO). This initiative is destined to eradicate measles and congenital rubella throughout the world. The Department of Immunology is a WHO Regional Reference Center responsible for 21 countries in Europe and the New Independent States (the former Soviet Republics) and thus a very prominent player in this measles initiative.

On December 13, 2012, Dr. Margaret Chan, Director General of the WHO also visited the Department of Immunology to discuss measles elimination strategies and health policy. She thanked the Department of Immunology for the excellent and trustworthy work carried out for the WHO.



# BEING RECOGNIZED FOR WHAT WE DID - AWARDS

The **Fonds National de la Recherche** granted **Dr. Etienne Moussay** and **Dr. Guy Berchem** from the **Laboratory of Experimental Hemato-Oncology** the **2012 Award for “Outstanding Publication”** for their work on chronic lymphocytic leukemia (CLL) published in the scientific journal *Proceedings of the National Academy of Science in the USA*.

CLL is the most common hematologic malignancy affecting adults in Western countries. Diagnosis of the disease is often delayed due to lack of symptoms in the early stages. Dr. Etienne Moussay's study, which was carried out in collaboration with the **Institute**

**of Systems Biology in Seattle, USA**, suggests that levels of small RNA molecules (microRNAs) in CLL plasma samples could be used as a biomarker for the diagnosis and stratification of CLL. In addition, the group identified another molecule called ZAP-70 as a marker of poor prognosis in CLL patients. This molecule may become an attractive candidate to specifically target cancer cells in future therapeutic strategies.

It is the second time that CRP-Santé has been awarded the prize for outstanding scientific publication by the FNR, highlighting again the quality of research conducted at CRP-Santé.



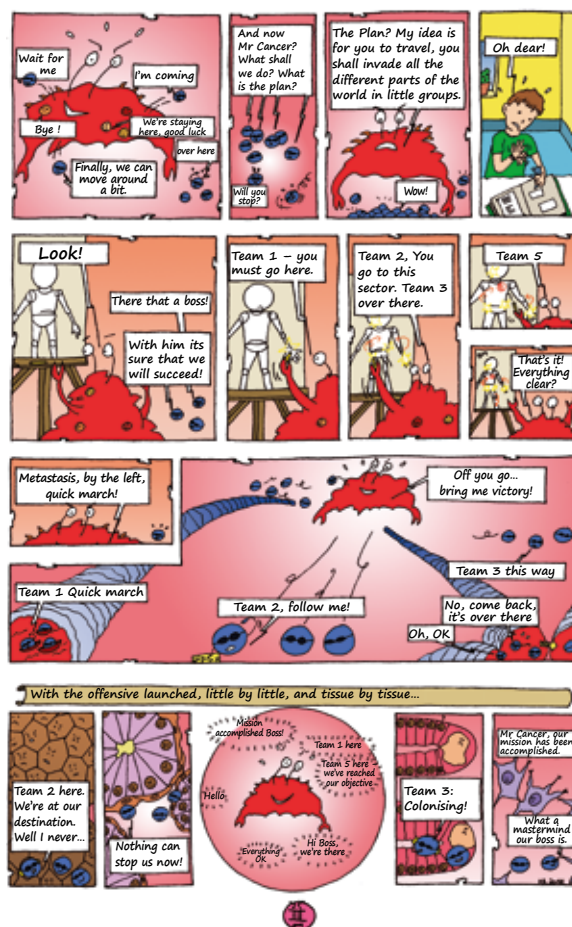
From left to right: Dr. Marc Schiltz, Secretary General of Fonds National de la Recherche (FNR), Dr. Guy Berchem, Head of the Laboratory of Experimental Hemato-Oncology, Dr. Etienne Moussay, Researcher at the Laboratory of Experimental Hemato-Oncology, Dr. Jean-Claude Schmit, CEO of CRP-Santé and Yves Elsen, Chairman of the FNR Board



Together with her colleagues from the **Norlux Neuro-Oncology Laboratory**, **Amandine Bernard**, a research engineer and highly creative staff member, received the **2012 FNR Award for "Outstanding Promotion of Scientific Culture"** for her self-made comic on cancer entitled *"The cell that wanted to become immortal"*.

Originally presented in the context of several fund raising initiatives (Relais pour la Vie, Fondation Cancer, Télévie), this exceptional comic dealing with cancer research and with the personal story of a family affected by cancer has seen a huge success: numerous requests for the comic have been received from all parts of the population including parents, children, cancer patients, associations, schools and staff members. More than 7'000 copies have been distributed so far and a second edition had to be printed in 2012. The comic is now available in five languages (French, Luxembourgish, German, English and Portuguese) and a dedicated website has been created: [www.crp-sante.lu/bd](http://www.crp-sante.lu/bd).

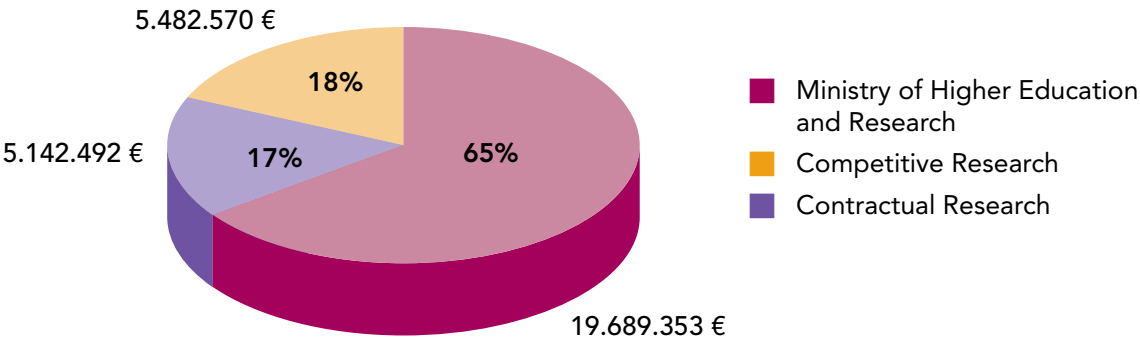
The comic fulfills several important roles in science communication: it allows people of all backgrounds to exchange on a topic that is both important and sensitive, enables the transfer of scientific knowledge to the lay public, provides insight into the daily work of laboratory scientists and last but not least generates hope for patients and their relatives affected by cancer.



Amandine Bernard, engineer and highly creative staff member of the Norlux Neuro-Oncology Laboratory with Dr. Simone Niclou, Head of the Research Unit.



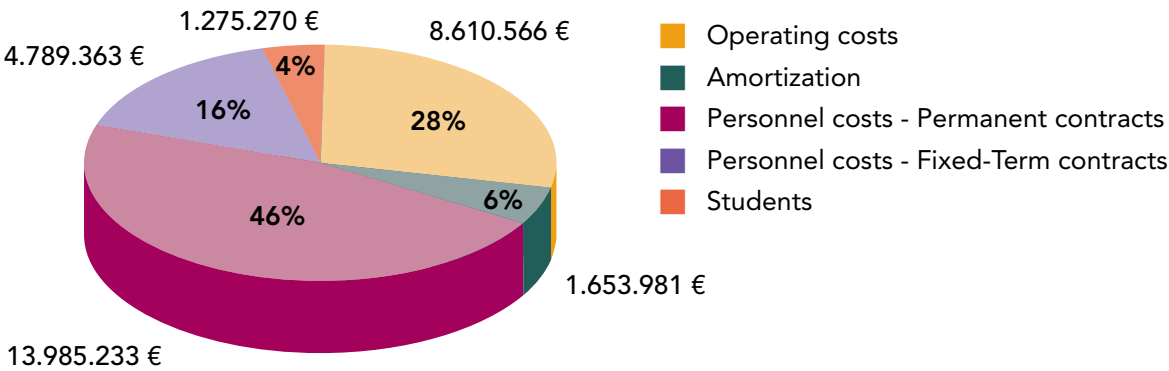
## % Sources of funding



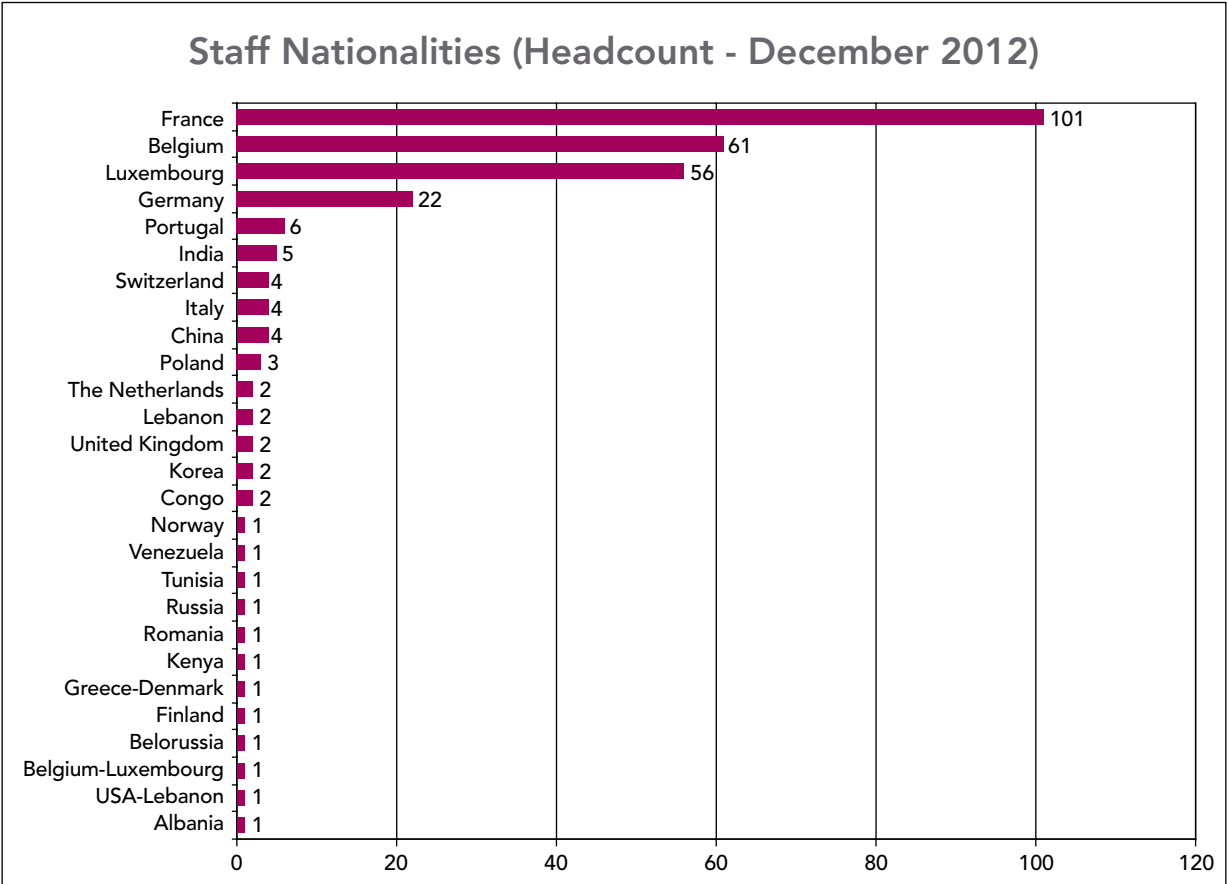
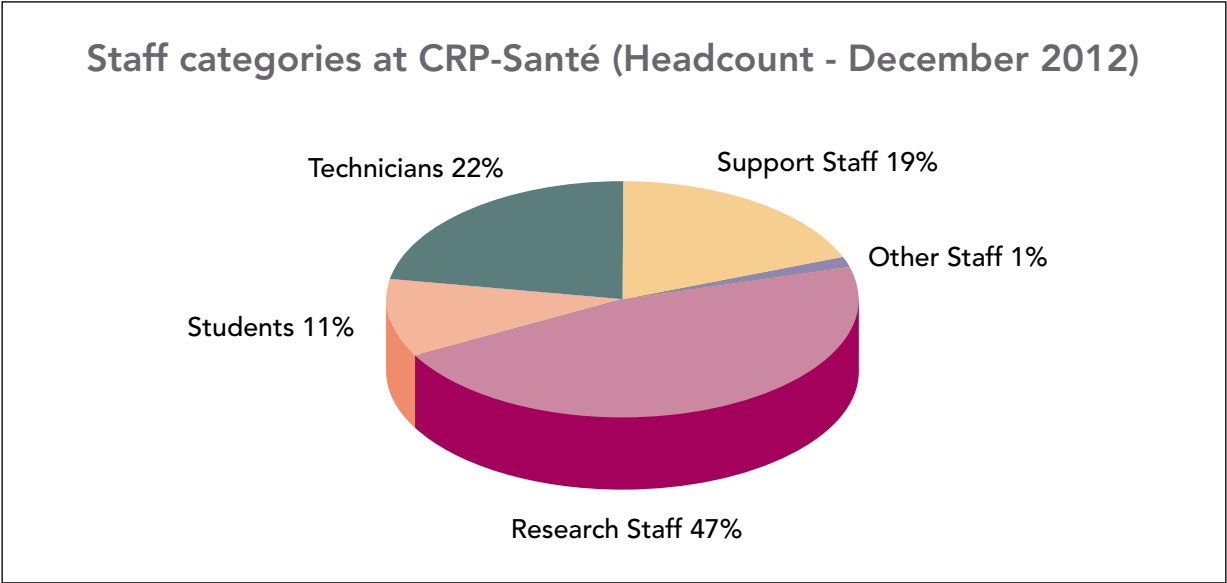
**Most important sources of funding:**

- Ministry of Higher Education and Research: 19.689.353 € / 65%
- National Research Fund: 4.623.360 € / 15%
- Ministry of Health : 2.120.946 € / 7%
- Ministry of Foreign Affairs: 839.898 € / 3%

## Statutory expenses 2012



# KEY FIGURES



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