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Dear reader,

On third of October the whole country in general but especially all members of CRP-Santé felt honoured by the press release that the Nobel Prize in Physiology or Medicine 2011 was awarded to Jules A. Hoffmann «for his discoveries concerning the activation of innate immunity». Professor Hoffmann was in fact not only born in Echternach, a small town in eastern Luxembourg, but Jules A. Hoffmann is also a member of the Board of Administration and President of the Scientific Board of CRP-Santé. In these two important roles, he contributed largely to the still ongoing restructuring of CRP-Santé as well as to the Luxembourgish initiative to develop outstanding biomedicine projects in our country in collaboration with a wide range of international institutional and private partners.

In my quality as President of the Board of Administrators, I have the privilege and the exceptional honour to warmly congratulate Professor Jules A. Hoffmann on his brilliant success concerning the activation of innate immunity. I am deeply convinced that this Nobel Prize awarded to a researcher with Luxembourgish origins who still has very strong links to the country and local scientific community will sustainably catalyse outstanding research at national level and especially at CRP-Santé.

2011 with this outstanding event that a member of CRP-Santé won a Nobel Prize, was an excellent year for our research institution. In fact, all the research departments have been able to contribute significantly to the reaching of the aims defined by the second performance contract with the Government for the years 2011 to 2013. The reader will find in this annual report all relevant facts and figures concerning the whole activity of CRP-Santé, but I would like to expressly underline that our researchers did not only fulfill the requirements of the performance contract to a considerable degree. They did even do much better by publishing more than eighty peer-reviewed scientific papers with a high impact factor.

I am deeply convinced that outstanding scientific excellence will be the only sustainable way to meet the challenges in the future. Indeed, during the past year CRP-Santé was able to create strong and important partnerships and collaborations with both international public and private partners; however this was only possible thanks to the fact that parts of our research activities are internationally recognized as being among the best in their respective fields.

In the recent past CRP-Santé was able to constantly develop its activities in a context of economic growth and a national governmental research policy aiming to increase spending for research and innovation up to 1% of GNP. But in the following years, we will also have to challenge the impact of the international financial and economic crisis and its effect on research in terms of funding, even if the Government still confirms its commitment to consider public research as being one of the priorities of its policy, the impact of the crisis is likely to diminish or make more difficult access to finance for the public research centers. I believe that by merging in the short future activities in order to generate on the one hand economies of scale, but on the other hand mainly in order to create in some strategic domains the critical mass by combining expertise with resources we will be able to face the challenges of the future. Thanks to the recent reforms and restructuring of the Institution, I am confident that CRP-Santé will be more successful in creating national and international collaborations and economical and societal value.
Following a general trend in research CRP-Santé activities become increasingly multi-disciplinary and international. Close to 50% of our research projects are with collaboration partners, documented by formal collaboration contracts, either national or from outside Luxembourg. In order to sustain this development CRP-Santé had in 2011 formal meetings with the University of Liège (IGSA research center), the University of Reims Champagne Ardennes and the University of Strasbourg, aiming at finding additional areas of collaboration and student training. CRP-Santé researchers are now also members of the PhD school in Life Sciences which was newly created at the University of Luxembourg, and as such contribute actively in the definition and implementation of the PhD program.

CRP-Santé prepares for future challenges by a continuous strategic reflection, which translates into structural and functional improvements of our organization. Based on external audits, we improved the processes in the department of oncology in 2010/11 and are now busy restructuring the department of cardiovascular diseases. Similar audits are planned for the remaining departments over the next years and we believe that this permanent review process is essential for keeping our organization dynamic. In 2011, CRP-Santé created the competence center for Methodology and Statistics (CCMS), building on already existing in-house capabilities which are now coordinated and developed under the leadership of Prof. Stephen Senn, who joined CRP-Santé from the University of Glasgow. CCMS is a service provider to internal (research units) and external clients such as the WHO, the academia and the pharmaceutical industry. A next step, planned for 2012, will be the inception of a health economics research unit for which we have developed a strategic plan together with an international scientific advisory board under the guidance of Prof. Scott Ramsay from the Fred Hutchinson Cancer Research Center in Seattle, and for which we are currently seeking a senior leader. We are also in the process of reassessing our strategy in mental health research with the help of an external expert, in order to better satisfy the needs of our country in a field which is extremely costly in terms of human suffering and health care expenditures.

Mr. Thomas Lentz, our new CFO who started to work with us in April 2011, is strongly committed to further improve the quality of administration and technical services. Thereby he continues implementing the idea of the previous CFO that researchers should be relieved from excessive administrative burden and should be able to concentrate efficiently on their core business which is research.

Economical and societal value creation from the research activities remains a priority for CRP-Santé. Even if the economical environment in the biohealth sector is still sparse in and around Luxembourg, CRP-Santé was able to initiate several promising collaborations with private industry partners and filed a patent in 2011.

After many years of waiting, 2012 will be finally the year in which we will start the construction work of our new research building. The planning phase is finished and the authorization processes come to an end. The perspective of new, adequate facilities motivates the employees and management of CRP-Santé to imagine future growth and development of their institution for the benefit of Luxembourg.


Laboratory of Cardiovascular Research

MISSION
The laboratory focuses on therapeutic and prognostic aspects of the development of heart failure following myocardial infarction. Projects running in the laboratory of cardiovascular research can be separated in two main research axis: the study of the effects of adenosine on left ventricular remodeling and the development of heart failure (therapeutic approach of the disease), and the identification of new biomarkers of clinical outcome after myocardial infarction (prognostic approach).

KEY RESULTS
- Organization of the 2011 Benelux Bioinformatics Conference.
- Development of the myocardial infarction drug-target interactome network (My-DTome) to predict cardiovascular effects of non-cardiovascular drugs.
- Large-scale analysis of microRNAs as diagnostic biomarkers of acute myocardial infarction.
- Demonstration of the performance of cloud computing for gene set analysis.
- Completion of one PhD thesis.

PUBLICATIONS

KEY PARTNERS
- Lariboisiere Hospital and INSERM U942 of Paris, France
- University of Homburg, Germany
- University Hospital of Nancy and Nancyteop, Nancy, France
- University of Leicester, United Kingdom
- Heart Failure Research Center of Maastricht, The Netherlands

HEAD OF LABORATORY
Dr. Daniel WAGNER, MD, PhD

ASSOCIATE HEAD OF LABORATORY
Dr. Yvan DEVAUX, PhD
Laboratory of Immunology

MISSION
Areas of interest range from basic research to applied and clinical research:

- To understand public health issues related to new variants of human and veterinary viruses (influenza, measles, rubella, hepatitis, parvo-, viruses, tick-borne pathogens; avian viruses, avian influenza virus),
- To understand the effect of stress response mediators on the immune system, and the interaction between the immune system and the neuroendocrine system at a molecular level of nuclear receptors,
- To understand epigenetic mechanisms of perinatal programming of the immune system,
- To develop immune-preventive strategies against carcinogens, based on novel conjugate vaccines.

KEY RESULTS

- With the emergence of influenza A viruses (IAV) increasingly resistant against common antiviral drugs, in particular Oseltamivir (Tamiflu) there is an urgent need for new antiviral drugs. We have identified a cellular protein (vacuolar ATPase) as a novel target for inhibition of viral growth and with a potential for the treatment of influenza A virus infections. The novelty of this approach is that it targets cellular proteins that are not susceptible to mutations unlike viral proteins. Brit J Pharmacol 164, 344-357, 2011.

- As part of the worldwide effort to control avian influenza virus (AIV), we have extended surveillance to the wetlands in Northern Nigeria. We found reassortant low-pathogenic AIV H5N2 viruses in wild birds, that were related to highly pathogenic H5N1 strains found a few months earlier in the same bird species and belonged to a group of viruses that have a high risk of becoming highly pathogenic. These viruses contained genes both from European and South-African strains and represent a considerable risk for poultry industry in the region. J Gen Virol 92, 1172-1183, 2011.

- To understand the origin of the swine-origin pandemic influenza virus (pH1N1), we investigated antibodies in Luxembourg swine farmers. More swine farmers had antibodies against swine influenza virus (SiV) and against pH1N1 than the general population. Antibodies against SiV and pH1N1 correlated in swine workers but not in the general population suggesting that swine workers had contact with a pH1N1-like virus but not the general population. Emerging Infectious Diseases 17, 404-1, 2011.

- We investigated virus-host interactions of the NS1 protein of highly pathogenic H5N1 virus and compared them to several influenza A viruses. We showed that NS1 of two avian strains, in contrast to NS1 of H1N1/2009 stimulated translation of viral mRNA. NS1 of H5N1 was an effective inhibitor of cellular pre-mRNA polyadenylation, unlike NS1 of H5N2 and H1N1/2009. These differential activities contribute to the higher pathogenicity of the H5N1, and the lower pathogenicity of the other viral strains. J Biol Chem 286, 7239-47, 2011.

- The human glucocorticoid receptor (GR) is the receptor for cortisol, the key stress mediator. We have investigated the structure of the GR gene and dissected GR expression that is modulated by multiple layers of transcriptional and translational complexity including multiple untranslated first exons, each with its own promoter, SNPs and epigenetic methylation. These studies help to understand inadequate responses to psychosocial stress. Human Genetics 129, 533-543, 2011.

PUBLICATIONS


MISSION

Created in 2008, the Department of Oncology is currently composed of two research units: the Laboratory of Experimental Hemato-Oncology (LHCE) and the Norlux Neuro-Oncology Laboratory (Norlux). The department carries out translational research at the cellular and molecular level with a focus on cancers of the brain, lung, blood and metastases. Research strongly relies on patient derived tumor biopsies and is highly active in the development of novel animal models for cancer research. The laboratories apply a wide range of state-of-the art technologies including genomic, transcriptomic, proteomic, and metabolomic analyses, as well as in vitro and in vivo imaging technologies (e.g., flow cytometry, confocal microscopy, in vivo bioluminescence/fluorescence, magnetic resonance imaging [MRI]). The Department is also highly active in training and teaching activities, including the supervision of Master and Ph.D. students through its affiliation with several doctoral schools in Luxembourg and Europe. Prof. Rolf Bjerkvig, Head of the Department, also holds the position of professor of anatomy and cell biology at the University of Bergen in Norway. Prof. Bjerkvig is a member of numerous national and international scientific committees and has been honored with several international awards for his research in neuro-oncology.
The Laboratory of Experimental Hemato-Oncology carries out investigations at the interface of basic and clinical cancer research. Its research focuses on the molecular mechanisms of hematological malignancies and their implications for treatment, and the identification of cancer biomarkers as well as molecular signatures of the tumor cell response to anti-cancer therapeutics. In addition, the laboratory carried out fundamental research on autophagy as an important resistance mechanism activated in cancer cells leading to tumor escape from therapies.

**Key results**
- Identification of miRNA signature in B-cell chronic lymphocytic leukemia.
- Identification of autophagy as a new player in non-small cell lung carcinoma.

**Publications**

**Key Partners**
- Centre Hospitalier de Luxembourg (CHL), Service de Pneumologie
- Institut de Cancérologie Gustave Roussy, INSERM U753, Villejuif, France
- Institute for Systems Biology, Seattle, USA
- Laboratoire de Biologie Cellulaire et Moléculaire de l’Institut Jules Bordet (ULB), Bruxelles, Belgium
- Laboratoire de Recherche en cancérologie pulmonaire, Institut Jules Bordet, Bruxelles, Belgium.
Norlux Neuro-Oncology Laboratory

MISSION
The Norlux laboratory aims to understand the biological mechanisms underlying the initiation and progression of malignant brain tumors and to identify novel molecular therapeutic strategies against these incurable cancers. A special focus is on tumor angiogenesis and metabolism, tumor heterogeneity and cell-based therapeutic strategies. The laboratory is part of the NorLux Neuro-Oncology network.

KEY RESULTS
- Norlux has generated two major high impact publications in 2012. One in Proc Natl Acad Sci U S A (IF 9.7) and one in CELL STEM CELL (IF 25.4).
- The laboratory has been highly successful in competitive funding: in 2011 44.8% of the laboratory budget is covered by external competitive grant money.
- S.P. Niclou has been invited to join the Scientific Advisory Board of the European Association for Neuro-Oncology (EANO).
- S. P. Niclou has been elected as council member of the European Association for Cancer Research (EACR), the largest Cancer Research organization in Europe, where she serves as a representative of Luxembourg.
- As a coordinator, the laboratory took the lead in the application for a large European research initiative on brain tumor metabolism, encompassing 8 high rank partners, within the EU FP7-HEALTH program.

PUBLICATIONS

KEY PARTNERS
- University of Bergen, Department of Biomedicine, Norway
- Centre Hospitalier de Luxembourg, (CHL): Neurosurgery Department
- Umeå University, Department of Radiation Sciences, Oncology, Umeå, Sweden
- Translational Genomics Research Institute (TGen), Oncology Division, Arizona
- University Medical Center Groningen, The Netherlands
Centre for Health Studies

MISSION
Through its research and surveillance systems, the Centre for Health Studies provides reliable information about the population’s state of health, health determinants and risk prediction indicators, which allows public authorities to build their prevention and healthcare finance projects and to evaluate their effectiveness. The centre identifies the health services resource requirements and carries out healthcare economic analyses.

KEY RESULTS
- Publication for the first time in Luxembourg of European indicators in neonatology
- The Ministry of Health requested the Centre for Health Studies to establish the National Register of Injuries
- The Ministry of Health has commissioned the Centre for Health Studies as responsible for implementing the National Cancer Register
- Publication of the final evaluation of the satisfaction of dependents residing in nursing homes
- Signing of two contracts with WHO-TDR for the management of study data on neglected diseases

PUBLICATIONS


KEY PARTNERS
- Ministère de la Santé et Direction de la Santé, Luxembourg
- Ministère de la Sécurité Sociale, Inspection Générale de la Sécurité Sociale, Luxembourg
- Caisse Nationale de Santé, Luxembourg
- Université de Liège, Ecole de Santé Publique, Belgique
- Hôpitaux et médecins cliniciens, Luxembourg
European Medicines Agency - Luxembourg Focal Point

MISSION
Through its EMEA focal point, CRP-Santé has been providing support to the Luxembourg Government since 1995 and especially to the Pharmaceutical and Drugs Division (DPM) of the Health Ministry which fulfils the role of a Luxembourg Drug Agency, as well as to the Medicines Control Service of the National Health Laboratory. Experts have been delegated to participate in the activities of the European Medicines Agency in London, where they provided scientific opinions on the efficacy, quality and safety of medicines being authorized for marketing in Europe.

KEY RESULTS
- Assessment reports on new drugs, by Dr. Jean-Louis Robert, as expert from Luxembourg, for Committee for Medicinal Products for Human Use.
- Participation, as expert from Luxembourg, of Dr. Carine de Beaufort in the Pediatric Committee for assessment of pediatric drugs.
- Participation, as expert from Luxembourg, of Dr. Guy Berchem in the Committee on Advanced Therapies.
- Participation, as expert from Luxembourg, of Dr. Henri Metz in the Committee for Orphan Medicinal Products.

KEY PARTNERS
- Organisation Mondiale de la Santé, Geneva, Switzerland
- Ministère de la Santé, Direction de la Santé, Division de la Pharmacie et des Médicaments, Luxembourg
- European Medicines Agency, London, UK
- Agence Française de Sécurité Sanitaire des Produits de Santé, Saint Denis, France
European Monitoring Centre for Drugs and Drug addiction - Luxembourg Focal Point

MISSION
The National EMCDDA Focal Point is the national centre of excellence in the fields of drug use surveillance, tracking emerging or illegal psychoactive substances and new consumer trends. The main objective of the National Focal Point is to collect, produce, analyze and provide valid, reliable and comparable national data on drugs and drug addiction. This includes epidemiological surveillance, targeted research activities, publication of research results and release of the annual report on the state of the drugs problem in Luxembourg.

KEY RESULTS
- Epidemiological surveillance of problem drug use and validation of applied methodologies. The national RELIS surveillance system does produce EU comparable drug-related data and provides indispensable input for targeted research.
- Peer-reviewed publications on hepatitis B (HBV), hepatitis C (HCV) and HIV infections in problem drug users (PDU) and intravenous drug users (IDU) in Luxembourg.
- New results from a serial, multi-methods PDU/IDU prevalence estimation study. (in press)
- Methodological research on drug-use surveillance systems and indirect epidemiological indicators. (in press)

PUBLICATIONS

KEY PARTNERS
- Inpatient & outpatient treatment centres (CTM, Jugend an Drogenhellef, Arcus, Solidarité-Jeunes)
- Psychiatric departments of national hospitals
- Low threshold agencies (Abrigado, CNDS)
- Services in prison (Programme Tox, Centre Pénitentiaire Luxembourg)
- Law enforcement agencies (Police Judiciaire)

EXTERNAL EXPERT
Mr. Alain ORIGER
Laboratory of Emotional Disorders

MISSION
The focus of the laboratory is the study of fear and sadness in anxiety disorders, major depressive disorders and obesity. In addition, the laboratory investigates the impairment in functioning and the reduction in quality of life that accompany such disorders as well as their course and outcome following treatment. Emotions are investigated using a battery of specific questionnaires and rating scales, personality tests and physiological measurements. An original aspect of the LATE is the use of virtual reality.

HEAD OF UNIT
Dr. Charles PULL, MD, MA

KEY RESULTS
- Exposure to virtual environments elicits significant psychological and physiological manifestations of fear in subjects with fear of flying or fear of driving.
- Severe obesity is associated with significant psychopathology (in particular depression), impairment in functioning and distortion of body image perception.

PUBLICATIONS

KEY PARTNERS
- Clinique des Troubles Emotionnels Centre Hospitalier de Luxembourg
- Unité polyvalente de l’obésité or UPO of the Centre Hospitalier de Luxembourg
- Université du Québec in Gatineau, Quebec, Canada
- Universitat Jaume I, Castellon, Spain
Sports Medicine Research Laboratory

MISSION
The general aim of the Sports Medicine Research Laboratory is to study the impact of movement, training and sports, as well as inactivity on healthy and injured or ill individuals to provide decisive information for prevention, therapy, rehabilitation and sports. The major objective of the laboratory in 2011 was to pursue our ongoing studies, to start new research projects and to disseminate first scientific results.

KEY RESULTS
- Five new research projects have been launched, involving collaborations with 3 universities in Germany, Maastricht and Belgium and 2 private companies.
- Two new PhD students and one post-doctoral fellow have received an AFR grant from the National Research Fund and have integrated our team.
- Within the framework of a research project, a clinical pathway has been implemented at the Centre Hospitalier de Luxembourg - Clinique d’Eich to optimize clinical intervention after knee soft tissue injuries.
- Sports injury surveillance has been pursued at a broad level across different sport federations on behalf of the Ministry of Sport and the National Olympic Committee (COSL).
- Our laboratory was involved in the organization of 11 national conferences, 1 national workshop and 1 international congress. Our results were presented at 9 scientific meetings and congresses.

PUBLICATIONS

KEY PARTNERS
- Département Ministériel des Sports, Luxembourg
- Centre de l’Appareil Locomoteur de Médecine du Sport et de Prévention du Centre Hospitalier de Luxembourg
- Comité Olympique et Sportif Luxembourgois
- Université de Liège, Belgium
- Université des Saarlandes, Germany
- Maastricht University, The Netherlands
- Université catholique de Louvain, Louvain-la-Neuve, Belgium
Laboratory of Immunogenetics and Allergology

MISSION
Allergic and immune diseases are a major health problem for hundreds of millions of people worldwide. The aim of the Laboratory of Immunogenetics and Allergology is to strengthen its skills in applied research, to develop competitive basic research and to create an optimal environment for improved diagnosis, prevention and treatment of patients with allergic and immune-mediated diseases. Research is being performed in close collaboration with the National Unit of Immunology and Allergology at the Centre Hospitalier de Luxembourg.

KEY RESULTS
- A new dog allergen, Can f 6, has been isolated. 61% of the patients allergic to dogs react to Can f 6. The new allergen cross-reacts with Fel d 4, a cat allergen. These findings have to be taken into account when interpreting positive skin or in vitro IgE tests to dog or cat dander.
- Parvalbumins are major allergens of fish. They are highly conserved and fish allergic patients generally react to several fish species. Using different parvalbumins isolated by our laboratory, we could establish patient-specific sensitization profiles leading to personalized diagnostic implications.
- The humoral and cellular immune response of BALB/c mice to the main cat allergen Fel d 1 varies markedly when different adjuvants (AL(OH)3, LPS, CpG) are used in immunization mixtures. These findings will be used to modulate allergy-like induced immune responses to Fel d 1 in mice.
- NK cell tropocytosis in TAP-deficient individuals was shown. NK cell phenotyping was performed with 13 color flow cytometry.
- The anti-inflammatory role of neurturin in an asthma model was confirmed. NK cells were investigated as a potential target in glioblastoma treatment.

Publications

Key Partners
- Département de Pneumologie, Hôpitaux Universitaires de Strasbourg, France
- Center for Clinical and Experimental Allergology, Rome, Italy
- Centre d’Ingénierie des Protéines, Université de Liège, Belgium
- Department of Biomedicine, University of Bergen, Norway
- Southampton General Hospital, University of Southampton, United Kingdom
Laboratory of Plant Molecular Biology

MISSION
Understand the molecular mechanisms of biological processes in human diseases, with a particular focus on the actin cytoskeleton and bioactive compounds from medicinal plants.

KEY RESULTS
- We have previously established that the two LIM domain-containing proteins (LIMs) are important regulators of the actin cytoskeleton organization. Novel functional analyses demonstrate that one LIM, namely WLIM2, shuttles into the nucleus, binds to specific DNA sequences and activates histone gene expression. These sets of data indicate that LIMs are part of a cytoskeletal-nuclear crosstalk involved in the control of gene expression.

- In the frame of the HUMCRP CORE project (FNR), we provide evidence that the three LIMs of the human cysteine-rich protein (CRP) family display direct actin-stabilizing and -bundling activities. We found that these activities are not altered by six point mutations previously associated with cardiomyopathies. However, two point mutants exhibit significant modifications in their actin regulatory activities and are currently investigated in greater details to test their possible implication in heart disease.

- A manuscript describing an atypical subclass of actin-depolymerizing factors (ADFs) has been published in FEBS Letters. We provide evidence that both ADF5 and ADF9 do not enhance actin filament turnover as most of ADFs/cofilins do, but instead promote actin filament stabilization and bundling. We are currently investigating the underlying molecular mechanisms, which might help to understand the formation of actin rods in degenerative diseases such as Alzheimer’s disease.

- We have purified and identified a plant component that induces apoptosis in leukemia cells and has cytostatic effects on non-leukemia cancer cell lines.

- The Retrovirology and Plant Molecular Biology laboratories have been awarded by FNR for their contribution to FNR’s Researchers’ Night 2010 (“Outstanding Promotion of Scientific Culture”). They organized a science café on “Science in Advertisements: Use and Misuse”, as well as a workshop on “Experimental cosmetics – Use of local medicinal herbs”.

PUBLICATIONS


KEY PARTNERS
- University of Bergen, Department of Biomedicine, Bergen, Norway
- Institute of Medicinal Plant Development, Research Center for Pharmacology and Toxicology, Beijing, China
- Institute of Medicinal Plant Development, Resource and Conservation Research Center, Beijing, China
- Modern Research Center for Traditional Chinese Medicine, Shanghai, China
- Institut de Biologie Moléculaire des Plantes, Molecular Mechanisms of Phenotypic Plasticity, Strasbourg, France
RESEARCH DEPARTMENTS
DEPARTMENT OF VIROLOGY, ALLERGOLOGY AND IMMUNITY

Laboratory of Retrovirology

MISSION
Chronic viral infections caused by HIV and HCV are an ever-growing public health problem in Luxembourg as in the rest of the world. More than 700 patients infected with HIV and 1700 patients infected with HCV have been followed in the Centre Hospitalier de Luxembourg during the past decade. The laboratory of Retrovirology performs fundamental and applied research in the field of chronic viral infections (HIV, HCV). The activities of the laboratory focus on two research domains, which interact closely: immuno-virology and clinical virology.

KEY RESULTS
- Engineering of a set of chimeric CXCR4/CXCR7 chemokine receptors and their preliminary characterization for HIV-1 entry and chemokines binding
- Prediction of the tridimensional structures of the HIV-1 co-receptors CCR5 and CXCR4 and identification of new peptides inhibiting HIV-1 entry and neutralizing CXCL12 chemokine binding
- Validation of a recombinant viral assay for phenotypic HIV tropism evaluation highlighting subtype-related discordances with the Geno2Pheno-coreceptor genotypic prediction tool currently recommended by European Guidelines for HIV-infected patient management
- Validation and uncertainty assessment of three HIV-1 DNA real-time PCRs for early diagnosis in infants and total cell associated HIV-1 DNA quantification
- Development and validation of an upgraded version of the COMET software for HCV genotyping and subtyping.

PUBLICATIONS


**KEY PARTNERS**

- EuroSIDA, EuroHIV, Euresist, European Society for Antiviral Resistance (ESAR)
- PMEs: Complix, Ghent, Belgium, ABL, Luxembourg, Institut für Immunologie und Genetik, Kaiserslautern
- Service National des Maladies Infectieuses, Centre Hospitalier de Luxembourg
- AIDS Reference-Laboratories of Belgium
- University Medical Center Utrecht, The Netherlands
The mission of the CIEC is:

- To promote clinical research according to Good Clinical Practice (ICH-GCP),
- To develop national clinical research network,
- To consolidate fundamental and experimental findings by the conduct of clinical research, and
- To provide access to new and innovative therapeutic approaches through means of a clinical study.

**HEAD OF COMPETENCE CENTER**

Dr. Anna CHIOTI, MD

**KEY RESULTS**

- Initiation of 16 clinical trials: 8 pharma driven (drug & medical devices), 7 investigator initiated or academic (in coll. with IBBL, CRP-Santé research departments, University hospitals St. Luc) in various therapeutic areas (oncology, orthopedics, infectious diseases, pulmonology, diabetes, allergy,...)  
  CIEC officially joined ECRIN (European clinical research infrastructures) and has as such contributed to the feasibility of 5 new projects financed by the FP7 framework program.  
  On April 1st 2011, CIEC launched www.luxclin.lu, the first webpage in Luxembourg dedicated to clinical research not only accessible to investigators and health care professionals but also to the public.  
  In October the 3rd Clinical Research Day took place with an increased number (140) of participants (36 posters are presented).  
  To mark the International Day of Clinical Trials on May 20th 2011, the CIEC opened its doors to the public to give insight in its research projects, methods and daily practices.

**PUBLICATIONS**

MISSION

The Luxembourg Biomedical Research Resources (LBR2) provides cutting-edge technical support to researchers at CRP-Santé as well as external users. The LBR2 is focused on translational research, with the specific aim of bridging biomedical research to clinical application, namely the development of assays towards personalized medicine. The center has built expertise in specific areas, including microarray, clinical proteomics, flow cytometry and confocal microscopy; in addition the center has a biomonitoring laboratory and an animal facility.

The specific missions of LBR2 center include:
- Maintain state-of-the-art technology platforms
- Contribute and support CRP-Santé research projects
- Provide services and expertise to external public and private partners, with an emphasis on high added-value projects.
Animal Facility

MISSION
The CRP-Santé animal facility is a high quality infrastructure allowing animal experimentation under strictly controlled conditions (e.g., specific pathogen free facility). Hygienic standards and internal regulations follow the guidelines and recommendations of the Federation for Laboratory Animal Science Associations (FELASA).

HEAD OF ANIMAL FACILITY
Dr. Simone NICLOU, PhD
Confocal Microscopy

MISSION
The microscopy platform provides support to scientists for high quality cell imaging. The facility offers assistance at all levels, from specimen preparation through microscope operation and image analysis. Two main techniques are available, confocal microscopy for three dimensional analysis and TIRF (Total Internal Reflection Fluorescence) microscopy for observations in the cortex, near plasma membrane plane. The platform offers training sessions or collaborative work for sample processing and data analysis. The platform is also open to academic or industrial users from Luxembourg and surrounding areas.

KEY RESULTS
- We imaged the different behavior of two Actin Depolymerization Factors: ADF1 and ADF9, and showed their antagonist activities (Tholl et al., 2011).
- A confocal picture presenting the actin cytoskeleton in BY2 cells decorated by ADF9-GFP has been selected for the cover of FEBS Letters (June issue, Tholl et al.).
- We implemented a new powerful technique based on evanescent wave illumination: Total Internal Reflection Fluorescence (TIRF) microscopy. This technique generates high contrast images with a strong reduction of out of focus background (especially in the cortical area for vesicles, receptors or actin observation).
- The platform was invited to the first meeting on Cell Imaging Techniques in the “Grande Région” (Nancy; October 3, 2011) to promote collaboration between institutions of the 3 borders area.

PUBLICATIONS

KEY PARTNERS
- Cytoskeleton & Cell Plasticity Laboratory, Prof. Evelyne Friederich, University of Luxembourg
- Plateforme de Microscopie et d’Imagerie, Dr. Jérôme Mutterer, IBMP, Strasbourg, France
- Plateforme de Cytométrie et de Microscopie, Dr. Sébastien Plançon, University of Luxembourg
- Plateforme d’Imagerie Cellulaire et Tissulaire, Dr Dominique Dumas, Faculté de médecine, Nancy, France
Flow Cytometry

MISSION
The Core Facility Cytometry is the centralized flow cytometry service of CRP-Santé. It assists researchers with flow cytometry experimental design, data acquisition, cell sorting and data analysis. Currently the facility is equipped with a FACSCalibur cell sorter and a FACSCanto analyser. It is an open facility accessible for personnel from CRP-Santé as well as external researchers.

KEY RESULTS

PUBLICATIONS

KEY PARTNERS
- Dutch Flowgroup / Dutch Society for Cytometry
- Luxembourg Cytometry Association (LCA)
- Integrated Biobank of Luxembourg (IBBL)
- Complix
- University of Luxembourg
- BectonDickinson
- Translational Genomics Institute (TGen), Phoenix, USA
Laboratory of Analytical Human Biomonitoring

MISSION
Fields of competences of Laboratory of Analytical Human Biomonitoring cover analytical toxicology and development of biomarkers for the assessment of occupational and environmental exposure to organic pollutants and for therapeutic drug monitoring. Analytical techniques available at LAHB are based on chromatography coupled with tandem mass spectrometry.

KEY RESULTS
- First determination of polycyclic aromatic hydrocarbon metabolites concentration in brain tissue
- Setting up of highly sensitive analytical methods based on hair analysis allowing the biomonitoring of multi-exposure to environmental levels of pollutants

PUBLICATIONS

COMPETENCE CENTERS
LUXEMBOURG BIOMEDICAL RESEARCH RESOURCES (LBR2)
The main objective of the Luxembourg Clinical Proteomics Center is creating an internationally competitive translational research unit that bridges the basic biomedicinal researches to clinical applications:

- Evaluating protein biomarkers for diagnosis, prognosis of diseases and monitoring drug responses.
- Building robust proteomic platforms based on state-of-the-art mass spectrometry technology.
- Developing workflows of targeted proteomics leveraging novel instrumentation.

**Key results**

- The evaluation of the new mass spectrometry techniques for targeted proteomics was continued. LCP has had early access to a novel quadrupole-orbitrap instrument in the framework of collaboration with ThermoFisher Scientific. The quantification capabilities of this new technology was evaluated in the context of targeted proteomics.
- The second phase of the lung cancer project in the Partnership of Personalized Medicine (PPM) program was structured focusing on immediate clinical needs. With the increased efforts in Luxembourg, the experiments on human lung tissue started to guide subsequent analysis of proteome in human plasma.
- The development of quantification workflow was expanded by the second generation-quantification standards enabling accurate quantification of peptides in biological samples. The workflow was applied to clinical samples including human urine and plasma.
- The first peer-reviewed (fully produced in the laboratory) publications were published. Two PhD programs were approved for AFR grant, and a total of three PhD programs were initiated. Research proposals submitted to the CORE and post-doc AFR were successfully approved. We have actively participated in education programs: teaching a full proteomics module at the University of Luxembourg in the systems biology master program, participation in the EUROCUP COST action, and the organization of a workshop on targeted proteomics in Luxembourg.

**Publications**


**Key partners**

- University of Luxembourg
- ThermoFisher Scientific, USA
- Commissariat à l’Énergie Atomique (CEA), France
- Institut Curie (IC), France
- Fred Hutchinson Cancer Research Center (FHCRC), USA
- Translational Genomics Institute (TGen), USA
- Université de Ghent, Belgium
- Integrated Biobank of Luxembourg (IBBL)
Microarray Center

MISSION
The Microarray Center aims to provide academic and private sector scientists alike with comprehensive and flexible microarray services for genomic studies. State-of-the-art procedures and integrated quality controls are combined with industry-leading technology platforms to ensure projects are delivered to the highest standards with in-depth data mining. Microarray team is multi-disciplinary and provides a full range of expert support services in sample preparation, microarray analysis, Next-Generation sequencing, biostatistics and bioinformatics.

HEAD OF LABORATORY
Dr. Laurent VALLAR, PhD

KEY RESULTS
- Microarray Center participated in 28 research projects funded either by the Fonds National de la Recherche (5), CRP-Santé (10), University of Luxembourg (5) or foreign institutions (8). The laboratory also coordinated a FNR CORE project focused on the study of alternative splicing in lung cancer.
- Christelle Ghoneim, post-doctoral researcher at MC, was rewarded the best and most outstanding poster at the Onco-trans conference held in September 2011 in Nancy, France. Dr Ghoneim introduced new genomic signatures specific for two types of non small cell lung cancer.
- Komal Baig, a graduate student from University of Luxembourg, successfully completed her Master degree in Systems Biology after having conducted part of her research project in the laboratory. Gina Youcef started her PhD under the cosupervision of MC and the INSERM/UMRS 961 from Nancy. Her project is funded by an AFR grant from FNR.
- With the implementation of a Roche 454 GS Junior sequencing platform, MC has significantly expanded its offer of services which now covers the various application areas permitted by Next-Generation Sequencing technology.
- The laboratory also implemented a high-throughput real time PCR platform. The system is particularly useful for fast validation in large series of samples of expression data obtained from whole genome analyses.

PUBLICATIONS

KEY PARTNERS
- Institut de génétique moléculaire, CNRS UMR5353-IFR122, Montpellier, France
- Translational Genomics Institute (TGen), Phoenix, USA
- Unité INSERM/UMRS 961, Faculté de Médecine, Nancy, France
- Integrated Biobank of Luxembourg (IBBL)
- Department of Life Sciences, University of Luxembourg
The Competence Center for Methodology and Statistics was established in March 2010 in order to meet the methodological and statistical needs of all CRP-Santé laboratories. It also aims to develop contractual public health data management, and handling activities for other national and international bodies. It provides its expertise during the preparation of studies in order to determine the design best suited to the research questions. It defines the statistical methods which guarantee the highest quality of the results.

**MISSION**

The Competence Center for Methodology and Statistics was established in March 2010 in order to meet the methodological and statistical needs of all CRP-Santé laboratories. It also aims to develop contractual public health data management, and handling activities for other national and international bodies. It provides its expertise during the preparation of studies in order to determine the design best suited to the research questions. It defines the statistical methods which guarantee the highest quality of the results.

**HEAD OF COMPETENCE CENTER**

Prof. Stephen SENN, PhD

**KEY RESULTS**

- Support for and collaboration with researchers in the CES: On many occasions this has led to joint publications, some of which are mentioned in the section reporting activities of the CES.
- Collaborative work with WHO/TDR (special programme for training and research) in investigating treatments for Neglected Tropical Diseases (NTRDs): leishmaniasis, schistosomiasis, tuberculosis, HAT, Malaria
- Support for work at CRP-Sante on HIV resistance
- Advice and training for various external bodies including statistics courses given for the Royal Statistical Society (London), Roche Pharmaceuticals (Basel) and trainee nurses in Metz and Thionville

**PUBLICATIONS**

Communication

The communication unit is headed by Aurélia DerisChebourg.

**MISSION**

- Development of the internal and external communication and marketing strategy.
- Promotion of the institution’s image to the scientific community and to the public.
- The unit is also in charge of event management (e.g., conferences, workshops).

**KEY RESULTS**

- E-marketing strategy linked to the website
- Promotion of the Scientific Culture in partnership with other national institutions and associations (FNR, Télévie, Fondation Cancer, etc.)
- Organization of congresses, workshops, seminars, Call for funding (accompanying measures of FNR) and sponsorship
- Publication of comics, newsletters, flyers, documents of presentation

**Technical Environment Safety Service**

The TESS unit is headed by Jean-Luc Konrad.

**MISSION**

- Taking care of all technical issues on buildings used by CRP-Santé including the maintenance and the supervision of technical installations, waste handling and energy optimization.
- Striving for excellence in environmental, health and safety performance involving all employees and facilities.

**KEY RESULTS**

- Acquisition of ‘green’ electricity for the entire CRP-Santé
- Setup of the final design and planning of the new building of CRP-Santé
- Rearrangement of offices to improve the use of surfaces and an ergonomic environment
- Carry out of a preventive maintenance program to improve performance and extend the life of building equipment, furniture and interior finishes
- Integration of the maintenance program for IBBL and providing support to IBBL for setting up new equipment
- Improvement of individual health surveillance and risk assessment by inventory of risk at work

**Finances**

The finances unit is headed by Jérémy Klein.

**MISSION**

- Day-to-day management of all financial aspects for the research projects in compliance with legal and contractual requirements.
- Preparation of the annual budget together with the head of units.
- Active assistance in the preparation of the individual budgets for each project in collaboration with the principal investigators.
- Establishment of financial statements for partners, management and the board of administration.

**KEY RESULTS**

- Integration of the controlling in the financial department
- Redesign of the management dashboard
- Providing accounting services for Complix Luxembourg and IBBL
- Cash flow management optimization
- Cost improvements by centralizing insurance
- Filing and acceptance of a FEDER grant for the extension of the animal facility

**Human Resources**

The human resource unit is headed by Natacha Beich.

**MISSION**

- Providing service and support to all employees regarding HR matters and assist management in the development of HR strategy in compliance with the performance contract.
- Performing as the social secretariat for CRP-Santé and Complix Luxembourg.
- Taking care of recruitment, development and training of CRP-Santé staff.

**KEY RESULTS**

- Continuous progress in the implementation of the HR strategy related to the European Charter for Researchers
- Implementation of a new time management system
- Improve the offer of training courses to the employees
Information Technologies
The IT unit was lead by Romain GENSON as interim manager followed by Thibaut LENFANT.

MISSION
Guarantying the quality of IT services though a high availability of the IT infrastructure and providing professional advice.
Being on top of the technical evolution and introducing new technologies.
Providing technical support to ensure the successful realization of IT related projects.

KEY RESULTS
- Server consolidation and virtualization based on Blade Server technology running VMware
- Data consolidation on a new high performance storage
- Development and implementation of the new intranet
- Integration of department of Immunology IT infrastructure in the IT network of CRP-Santé

Project Management
The project management unit is headed by Jo SCHROEDER.

MISSION
Transversal management of all research projects and providing support in the application process for competitive projects on national and European levels. Furthermore, watch for new competitive funding opportunities on national and European levels. Additionally, drafting and follow up of contractual agreements related to the various projects and the collaboration with scientific partners. Finally, implementation and maintenance of the protection regulations insurance coverage for research projects and assisting the Technology Transfer Office in the legal protection of intellectual property.

KEY RESULTS
- In 2011, the overall number of projects realized at CRP-Santé grew by 35% and reached 202 projects by the end of the year.
- 10 applications for EU funding programs have been submitted. 4 applications were accepted, 2 are still pending.
- Start setting-up an internal project management training course adapted to CRP-Santé needs for young researchers and AFR beneficiaries
- Consolidation of the legal management of the contractual assets
- Design a streamlined process for the filing of ethic committee applications by researchers

Purchasing
The purchasing unit is headed by Marc WEISEN.

MISSION
Improving the centralized purchasing function to get best quality products and synergies at the lowest cost.
Identifying new supply sources to enhance negotiation levels.

KEY RESULTS
- Negotiation and acquisition of equipment for the new animal facility
- Creating additional value by improved centralization of purchasing
- Increased purchasing support to the laboratories

Technology Transfer
The technology transfer unit is headed by Dr. Françoise LINERS.

MISSION
Translation of the biomedical research made in Luxembourg into economic value by securing and pro-actively protecting of intellectual property with commercial potential. Marketing of technology through negotiation of agreements with private companies and institutions as well as facilitating the creation of spin-off companies.

KEY RESULTS
- Finalization of a licensing agreement with Firalis, a French innovative biotech company
- Deposit of one new patent application
- Launching the process of a public/private partnership in the field of sports medicine

Quality Management
The quality management unit is headed by Blandine VALET.

MISSION
Supervision and monitoring the development and implementation of the Quality Management System by creating and sustaining a climate of acceptance for continuous improvement.
Targeting to get the main laboratories ISO 9001 certified by end of the current performance contract.

KEY RESULTS
- Creation of process mapping and quality policy / definition of measurable and relevant objectives and indicators.
- Implementation of corrective and preventive actions following the internal audit.
- Preparation of the specifications of a tool such as an Enterprise Resource Planning (ERP) to help with the processes.
- Integration of two additional units into the scope of reporting for ISO 9001 certification.
KEY FIGURES

Total yearly budgets (including CAPEX)

Investments at CRP-Santé

Categories of professional staff of CRP-Santé

Staff evolution over the years

R & D charges at CRP-Santé

* Those amounts include Staff costs, Operating costs and Travel costs
* Investments, Depreciation of equipments, Interestes, Taxes and Non-recurring expenses are excluded
La comptabilité financière et analytique a été réalisée au CRP-Santé. Les comptes ont été vérifiés par KPMG Audit Sàrl, réviseurs d’entreprise agréés, et approuvés par le Conseil d’Administration lors de sa séance du 21/03/2012.

**AUDITOR’S REPORT**

**Bilan au 31 décembre 2011**

(En Euros)

<table>
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<td><strong>C. ACTIF IMMOBILISÉ</strong></td>
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<td>I. Immobilisations incorporelles</td>
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<td>a) acquis à titre onéreux</td>
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<td>b) créés par l’entreprise</td>
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<td>II. Immobilisations corporelles</td>
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<td>4.476.730</td>
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<td>1. Installations techniques et machines</td>
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<td>II. Immobilisations corporelles</td>
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<td>4.476.730</td>
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<td>3. Autres installations, outillage et mobilier</td>
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<td>4. Acomptes versés et immobilisations corporelles en cours</td>
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<td><strong>D. ACTIF CIRCULANT</strong></td>
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<td>I. Stocks</td>
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<td>II. Créances</td>
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<td>b) dont la durée résiduelle est supérieure à un an</td>
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<td>2. Créances sur partenaires</td>
<td>2.198.687</td>
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<td>4. Autres créances</td>
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<td>782.610</td>
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<tr>
<td>b) dont la durée résiduelle est supérieure à un an</td>
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<tr>
<td>III. Valeurs mobilières</td>
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<tr>
<td>IV. Avoirs en banque, avoirs en compte de chèques postaux, chèques et en caisse</td>
<td>12.972.966</td>
<td>12.000.731</td>
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<td>TOTAL DE L’ACTIF CIRCULANT</td>
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<td><strong>E. COMPTES DE REGULARISATION</strong></td>
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<td>299.404</td>
<td>200.509</td>
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<td><strong>A. CAPITAUX PROPRES</strong></td>
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<td>I. Capital souscrit</td>
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<td>IV. Réserves</td>
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<td>V. Résultats reportés</td>
<td>882.225</td>
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<td>VI. Résultat de l’exercice</td>
<td>40.886</td>
<td>229.034</td>
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<td>VII. Subventions d’investissement</td>
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<td><strong>B. PROVISIONS POUR RISQUES ET CHARGES</strong></td>
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<td>3. Autres provisions</td>
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<td>540.302</td>
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<td>TOTAL DES PROVISIONS</td>
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<td><strong>C. DETTES</strong></td>
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<td>1. Emprunts obligataires</td>
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<td>2. Dettes envers des établissements de crédit</td>
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<td>3. Acomptes reçus sur commandes</td>
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<td>4. Dettes sur achats et prestations de services</td>
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<td>5. Dettes représentées par des effets de commerce</td>
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<td>6. Dettes envers des entreprises liées</td>
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<td>7. Dettes envers des entreprises avec lesquelles la société a un lien de participation</td>
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<td>8. Dettes fiscales et dettes au titre de la sécurité sociale</td>
<td>1.042.616</td>
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<td>a) Dettes fiscales</td>
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<td>b) Dettes au titre de la sécurité sociale</td>
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<td>9. Autres dettes</td>
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<td>TOTAL DES DETTES</td>
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<td><strong>D. COMPTES DE REGULARISATION</strong></td>
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<td>11.116.840</td>
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<td>TOTAL DU PASSIF</td>
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<td>21.040.707</td>
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**Compte de profits et pertes pour l’exercice allant du 1er janvier 2011 au 31 décembre 2011**

*(en Euros)*

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2010</th>
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<tr>
<td><strong>A. CHARGES</strong></td>
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<tr>
<td>1. Réduction du stock de produits finis et en cours de fabrication</td>
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<tr>
<td>2. a) Consommation de marchandises et de matières premières et consommables</td>
<td>3.100.039</td>
<td>2.894.950</td>
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<td>b) Autres charges externes</td>
<td>5.002.304</td>
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<td>3. Frais de personnel</td>
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<td>a) Salaires et traitements</td>
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<td>b) Charges sociales couvrant les salaires et traitements</td>
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<td>1.942.186</td>
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<td>4. a) Corrections de valeur sur frais d’établissement et sur immobilisations corporelles et incorporelles</td>
<td>1.754.634</td>
<td>4.822.165</td>
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<tr>
<td>b) Corrections de valeur sur éléments de l’actif circulant</td>
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<tr>
<td>5. Autres charges d’exploitation</td>
<td>1.499.052</td>
<td>928.231</td>
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<tr>
<td>6. Corrections de valeur sur immobilisations financières et sur valeurs mobilières faisant partie de l’actif circulant</td>
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<tr>
<td>7. Intérêts et charges assimilées</td>
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<tr>
<td>b) Autres intérêts et charges</td>
<td>4.554</td>
<td>6.645</td>
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<td>10. Charges exceptionnelles</td>
<td>2.480</td>
<td>5.225.406</td>
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<tr>
<td>13. Résultat de l’exercice (bénéfice de l’exercice)</td>
<td>40.886</td>
<td>229.034</td>
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<tr>
<td><strong>TOTAL DES CHARGES</strong></td>
<td>30.206.251</td>
<td>35.094.284</td>
</tr>
</tbody>
</table>

| **B. PRODUITS**         |               |               |
| 1. Montant net du chiffre d’affaires | 800.596       | 735.350       |
| 2. Augmentation du stock de produits finis et en cours de fabrication |               |               |
| 3. Travaux effectués par l’entreprise pour elle-même et portés à l’actif |               |               |
| 4. Contributions et Fonds | 29.173.239    | 38.764.603    |
| 5. Produits de participations |               |               |
| 6. Produits d’autres valeurs mobilières et de créances de l’actif immobilisé |               |               |
| 7. Autres intérêts et produits assimilés |               |               |
| b) Autres intérêts et produits assimilés | 140.829       | 66.047        |
| 9. Produits exceptionnels | 91.588        | -4.471.715    |
| 10. Résultat de l’exercice (perte de l’exercice) |               |               |
| **TOTAL DES PRODUITS**  | 30.206.251    | 35.094.284    |
CONTACT ADDRESSES

GENERAL MANAGEMENT
CRP-Santé
1B, rue Thomas Edison, L-1445 Strassen
Tel.: (+352) 26 970 880
Fax: (+352) 26 970 717
e-mail: finance.henry@crp-sante.lu

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1A-B, rue Thomas Edison, L-1445 Strassen
Tel.: (+352) 26 970 730
Fax: (+352) 26 970 719
e-mail: fabienne.anger@crp-sante.lu

DEPARTMENT OF PUBLIC HEALTH
Centre for Health Studies
Mrs. Marie-Lisa LAR
Dr. Sophie COURFIQUAL
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