Research in Luxembourg

Luxembourg: a young research location

Creating structures

- 1987: First law on the public-sector research
- 1987: First public Research Centres (LIH and LISER)
- 1999: National Research Fund (FNR)
- 2003: University of Luxembourg
- 2009: Luxembourg Centre for Systems Biomedecine (LCSB)
- 2009: Interdisciplinary Centre for Security Reliability and Trust (SnT)
- 2012: Max-Planck Institute Luxembourg, dedicated to International and European Procedural Law
- 2015: Creation of LIST (Luxembourg Institute of Science and Technology)
- 2015: BELVAL Luxembourg Research and Innovation Campus
Research in Luxembourg

Luxembourg: a young research location

Sustained efforts...
Research in Luxembourg

Belval – Luxembourg’s Research and Innovation Campus

- 120 hectares site of Luxembourg's largest steel foundry
- 750 MEUR urban renewal project
- 20 new buildings
- All major research and innovation actors
- Around 7,000 students and 3,000 teaching staff and researchers
Development of the Luxembourgish Economy

BioHealth
Ecoinnovation
ICT
Materials
Space
Scientific output
(SCImago data for Field of Medicine)
Biomedical research from a Luxembourgish perspective
Biomedicine Quo vadis? From Data to Knowledge

Psycho-social Stress  Food  Toxins  Genes

Individual level  Population level

Mechanistic models, Prediction

State of health and disease

Prevention  Diagnosis  Therapy  Education  Policy Development
Personalized Medicine Consortium (PMC)

~ 150M investment by Lux Gouvernement

- Institute for Systems Biology (Seattle)
- Translational Genomics Research Institute (Arizona)
- Partnership in Personalised Medicine – Consortium of several U.S. centres
LCSB From systems biology to systems medicine

Family Studies

Patients

Longitudinal Cohorts

Pathway and Network Analysis
Computational Models
Machine Learning

Yeast  Zebrafish  Mouse  Organ on a chip  Microbiome  Human
LCSB: At the interface of IT and medicine

Bio- and Medical Informatics

Integration of Clinical and Non-Clinical Data

Computational Disease Modelling

International Data Hub
New ELIXIR node in Luxembourg

- Repository of biological data
- Decentralised Hub & Nodes structure for hosting data
- Assessed among the 3 strategically most important European infrastructures

Luxembourg became node for translational medicine data
Translational and personalized medicine in Luxembourg,

Clinical research in close collaboration with other national partners (hospitals, university, IBBL...) and become recognized in this domain at an EU level,

To implement a state-of-the-art public health research firmly implemented in the EU context and serving the needs of the country,

To develop research-oriented training & higher education activities in close collaboration with the University of Luxembourg
Clinical and Epidemiological Investigation Center

- Observational Healthy volunteers
- Exploratory
- Trials with IMP Phase II & III Registries
- CTU for Belgium & Luxembourg Coordination of EU trials

CIEC

LUXEMBOURG – CHL

VISION-DMD
Integrated BioBank of Luxembourg

An accredited & certified biobanking infrastructure

Offering a full range of bioservices to academia, industry and EU consortia

IBBL is an autonomous Institute organised within the Luxembourg Institute of Health (LIH)
Integrated BioBank of Luxembourg

- Preferred partner in EU projects:
  - MINDACT study (Microarray In Node negative Disease may Avoid ChemoTherapy)
  - BIOMARKAPD project of the EU Joint Programme for Neurodegenerative Disease (JPND) Research
  - STORE (for Sustaining access to Tissue and data frOm Radiobiological Experiments), FP7 Programme
  - IMI Cancer ID and IMI Litmus
  - H2020 SPIDIA4P

- EATRIS host institution for Luxembourg

- 70+ active projects (40+ fee for service contracts)

- Key projects in LU:
  - National centre for Excellence in Research on Parkinson's Disease (NCER-PD) (with LCSB, LIH, CHL)
  - Plan National Cancer (with LNS, LU Hospitals)

- Key projects outside of LU:
  - EORTC (European Organisation for Research and Treatment of Cancer):
    - Scientific partner and biobank infrastructure
  - BIG (Breast International Group, BIG)
    - Aurora study
FNR’s National Centre of Excellence in Research (NCER)

Joint Research Program on Earlier Diagnosis of Parkinson’s Disease

20M€ invest over 8 years

Patient cohort

Early diagnosis

Patient stratification
From banking and media to digital health

Making use of current infrastructures and competences
The Luxembourg Life Sciences ecosystem

The Luxembourg Life Sciences environment

70 Cluster members

- 46 companies
- 14 service providers
- 6 public research organisations
- 4 strategic partners
Need for systemic change in the healthcare system

- Data-driven
- Personalised
- Patient-centered
- Preventive
Luxembourg – Healthcare System

- 1 Payor
- 4 major hospitals for acute care and 5 smaller hospitals for specialized care
- ~ 98 public Pharmacies
- ~ 2200 Practitioners (incl. Dentists)
- Laboratories:
  - 3 private Laboratory groups
  - 1 national Laboratory (LNS)
  - Each hospital has a laboratory
- 2 major providers for the home care domain (cover 97%)
- Up to 60 institutions for long term care
Exchange and sharing of medical data

Goals for the national eHealth services platform in Luxembourg:
- facilitate a seamless communication between healthcare professionals
  => Continuity of care
- enhance a better coordinated healthcare and a more comprehensive and efficient health system.
  => Integrated care

Define a national strategy (SDSI) promoting interoperability between healthcare information management systems.
  – Develop and implement a common interoperability platform to support such data sharing and exchange
Agence eSanté – Platform and DSP goal

- Support for enhanced diagnostic and patient treatment
- High level of quality and security
- Usage of more structured data
- Reduction of costs
The Gap: Clinical research in Luxembourg
The Aim: Bridging between research and healthcare
Saving Time: Through teaming up with strong partners

• Strong IT component: digital medicine, eHealth records, big data analytics
• Infrastructure for clinical research: research ward, clinical imaging, phase 1 CTC, etc....
• Firmly establish clinician-researchers in Luxembourg

Complete the value-added chain for biomedicine in Luxembourg
→ the continuum from basic research to patient application
FNR’s international cooperation

http://fnr.lu/fnr-international-cooperation/
INTER: Multi-lateral international Collaborations

JPND research

ERA CO SYSTMED

Per Med

ERASysAPP

CASYM EUROPE

ERASysBio ERA-NET

neuron

TRANSCAN
Thank you for your attention