



First Annual Symposium of the
Luxembourg Network of Bioinformatics
LuciLinX

16th October 2008 - 09.00 - 18.00

Chamber of Commerce - Conference Centre - LUXEMBOURG - KIRCHBERG

**Laboratoire de Biologie Moléculaire et
Cellulaire du Cancer**
Fondation de Recherche Cancer et Sang
Hôpital Kirchberg

Marc Diederich



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- **Cancer research lab focusing on :**
 - Inflammation
 - Cell differentiation
 - Apoptosis
 - Glutathione metabolism
 - Bioactive screening of natural compounds
- **... in different types of cancer:**
 - Leukemia and lymphoma
 - Prostate cancer
 - ...



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- **First of all, the biologists in our lab:**
 - are frequent users of a large panel of **software tools and packages** for different purposes:
 - **Primer Design** (Invitrogen Vector NTI, MethPrimer)
 - **Microscopy** (ImageJ, Olympus Cell M, Leica Firecam)
 - ***In silico* Transcription factor binding site prediction** (Genomatix MatInspector)



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- Large panel of **molecular and cell biology** related assays and tools currently in use at our lab:
 - Western Blots,
 - Real-time PCR,
 - Flow cytometry,
 - Electromobility shift assay,
 - ChIP assays
- These techniques generate reasonable amounts of data
- Analysis and interpretation is thus more straightforward



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- **A microarray platform:**
 - **Complexity and quantity of data is a real matter**
 - **Data storage, analysis and interpretation need a strong (bio)informatics support**
 - **Allows a quick assessment of a more complete functional profile for new bioactive compounds as a first analysis step**



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- **Our microarray platform:**
 - Dual channel scanner (Axon GenePix 4100A)
 - Oligonucleotide arrays (Whole genome arrays from Agilent)

(Agilent Bioanalyser 2100, Nanodrop N-1000, Agilent hybridization system)

- **The Bioinformatics analysis pipeline is putting a high impact on :**
 - Quality assessment
 - Flexibility



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- **Workflow for microarray analysis**
 - **Feature extraction**
 - **GenePix Pro**
 - **Pre-processing and testing for differential expression**
 - **Limma** and other BioConductor related **R packages**
 - **Mining for biological knowledge**
 - Large emphasis on approaches for analysis of signal transduction pathways and networks:
 - **Overrepresentation analysis** and related techniques applied to
 - » Gene Ontology
 - » KEGG pathways
 - » *In silico* predicted TFBS
 - » **Own** curated GeneSets (e.g. Myeloid differentiation related)
 - Analysis of protein interaction networks using flexible tools:
 - » **Ariadne Pathway Studio**
 - » **Cytoscape**





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- **Just to give you a short insight what types of compounds we are actually focusing on using microarrays:**

- **Curcumin**

- Natural polyphenol
- NF-kappaB, AP-1 and STAT inhibitor
- Phase II clinical studies

- **Valproic acid**

- A well known histone deacetylase inhibitor
- Originally used as treatment for bipolar disorders and epilepsy
- Currently examined in numerous clinical trials for different leukemia and solid tumors



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Gene expression profiling related to anti-inflammatory properties of curcumin in K562 leukemia cells

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Running title : Curcumin in human leukemia



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