THE CENTRE FOR DRUG DESIGN AND DISCOVERY

IS AN INVESTMENT FUND AND TECHNOLOGY TRANSFER PLATFORM

FOR EARLY PHASE INNOVATIVE SMALL MOLECULE DRUG DISCOVERY AND TARGET VALIDATION

ESTABLISHED END 2006 BY K.U.LEUVEN R&D

IN COLLABORATION WITH:

European Investment Fund – EIF
Universities / Research Institutes
Spin-off companies / SMEs
CROs
Academic drug discovery can lead to drugs and value!

Examples of K.U.Leuven based technology transfer successes

• tPA (tissue plasminogen activator - Activase®)
  - Prof. Collen - ischemic stroke
  - Licensed to Genentech – launched 1987

• Tenofovir (Viread® - Truvada® - Atripla®)
  - Prof. De Clercq, Prof. Balzarini (Rega Institute) – Prof. Holy (IOCB)
  - Licensed to Gilead Sciences – launched 2001
  - other phosphonates: Adefovir (Hepsera®) and Cidofovir (Vistide®)

• Valacyclovir (Valtrex®)
  - Prof. Vander Haeghe, Prof. Busson, Prof. De Clercq (Rega Institute)
  - Licensed to Glaxo Wellcome

• Imidazopyridines
  - Prof. Neyts, Prof. De Clercq (Rega Institute) – Pürstinger (Univ. Innsbruck)
  - Licensed to Gilead Sciences - Phase II initiated end 2008

• Inecalcitol
  - Prof. Bouillon (K.U.Leuven) – Prof. Vandewalle, Prof. P. De Clercq (UGent)
  - Licensed to Hybrigenics - Phase II initiated end 2008
But there is a significant gap and need in technology transfer!

**UNIVERSITIES & RESEARCH INSTITUTES**
- Excellent, innovative biomedical research available !!!
  - identifying new genes or proteins and their functions
  - new targets for preventing or treating human diseases

**PHARMA & BIOTECH INDUSTRY**
- Pipelines are drying out
- Huge need for new and safer drugs
- SMEs – spin-offs face difficulties with small molec. drug discovery

• TRANSFER & TRANSLATION OF THIS EXCELLENT AND INNOVATIVE RESEARCH TO POTENTIAL TREATMENTS IS OFTEN LACKING
• SPIN-OFF creation is difficult

- Many times too early to be taken up by pharma/biotech industry
- Lack of seed funding in the early stages of drug development
- No platforms available for SME creation / support
- Lack of drug discovery and development capacity at academic institutions
  - high-throughput screening
  - obtaining proof-of-principle
  - target validation
  - ADMET
CD3 closes the gap, stimulates innovation and creates value in the drug discovery process.
**GOAL**

"Stimulating and optimizing the transformation of innovative biomedical research into clinical small molecule drugs and create cures for diseases with a high need for treatments"

**STRATEGY**

1. **Supplement (academic) biomedical research with all expertise lacking for professional small molecule drug discovery**

2. Fully apply the biomedical expertise and capacity present at the universities, research institutes or spin-offs – they perform biology

3. Focus on innovative specific targets/approaches/chemical classes which are not (or minimally) investigated in pharma-industry

4. Develop until "lead" compound class with broad IP-protection in ~2y, then license to industry or create spin-off

Centralised facility and team for professional medicinal chemistry, ADME-Tox and drug discovery coordination with own funds in collaboration with academic experts

**TARGET**

Universities, spin-offs and research institutes

**BENEFIT**

Everybody = universities, industry, society, investors, scientists, etc.
CD3 funding and innovation model

(JOINT) FUNDING APPLICATIONS + EIF 8 Mill. € KULEUVEN

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<th>Partners</th>
<th>CD3</th>
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- Medicinal chemistry
- ADME-Tox
- HTS
- Selection of projects
- Project management
- Patenting
- Licensing
- Bus. development (together with LRD)

Research Group X
University A

Research Group Y
Institute B

Spin-off Company C
- Targets / approaches / insights
- Biology expertise
- assays

- Any university or research institute
- SMEs – spin-off companies

Pharma Co. A
Spin-off Co. B
Biotech Co. C
CD3 invests in selected drug discovery projects and works with an experienced team

- Investment fund to perform drug discovery projects
- Different types of drug discovery projects are performed
  Screening, development, target validation, rational design
- Strong selection of projects
- Coordination, IP follow-up & business development are very important
- Scientific Advisory Board & Investment Committee established
- Work with an in house professional team of scientists with pharma experience in drug discovery
Multiple project proposals have been received

Status end 2009

- 89 project proposals received & evaluated from different parties in Europe
- around 65% of project proposals from KUleuven

- 10 Development projects approved
  - 7 ongoing
- 11 Screening projects
CD3’s Development projects already resulted in highly innovative results

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<tr>
<th></th>
<th>Screening</th>
<th>Hit compound validation</th>
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<th>In vivo POC</th>
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<td>3. Human Immunodeficiency virus</td>
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<td>LEDGF-integrase inhibitors</td>
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<td>5. Overactive bladder – cancer</td>
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<td>6. Human rhino virus (asthma, COPD)</td>
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<td>7. Dengue virus</td>
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<td>8. Cancer</td>
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<td>9. Arthritis</td>
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Example: innovation in drug discovery

2003 LEDGF/p75 is a co-factor of HIV replication
(Cherepanov et al., J. Biol. Chem.)

2006 LEDGF/p75 tethers IN to the chromatin
(LLano et al., Science)

2006 Overexpression of the LEDGF/p75 integrase
binding domain (IBD) inhibits HIV replication
(De Rijck et al., J. Virol.)

2007 Start investment in drug discovery project in
collaboration with Prof. Z. Debyser (KULeuven)

2009 New anti-HIV drugs inhibiting LEDGF-integrase
interaction identified

2009 Multiple patent applications filed - Business
Development initiated

2010 Highly active anti-HIV drugs identified - existing
drugs – kills all resistant viruses

2010 Publication Nature Chemical Biology

2010 Exclusive license to be established
THANK YOU FOR YOUR ATTENTION