Centre for Drug Design and Discovery

CD3

Centre for Drug Design and Discovery

"The investment fund for innovative small molecule "academic" drug discovery"

16 June 2010
UCL - Sopartec

CD3 ?

***THE* CENTRE FOR DRUG DESIGN AND DISCOVERY**

***IS* A GAP FUNDING 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* EXTERNAL PARTNERS**

European Investment Fund – EIF

Universities / Research Institutes

Spin-off companies

CROs

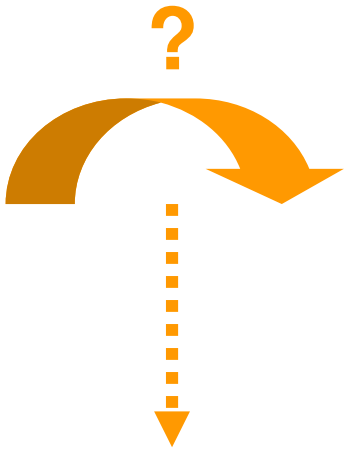
KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

Starting point:
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**

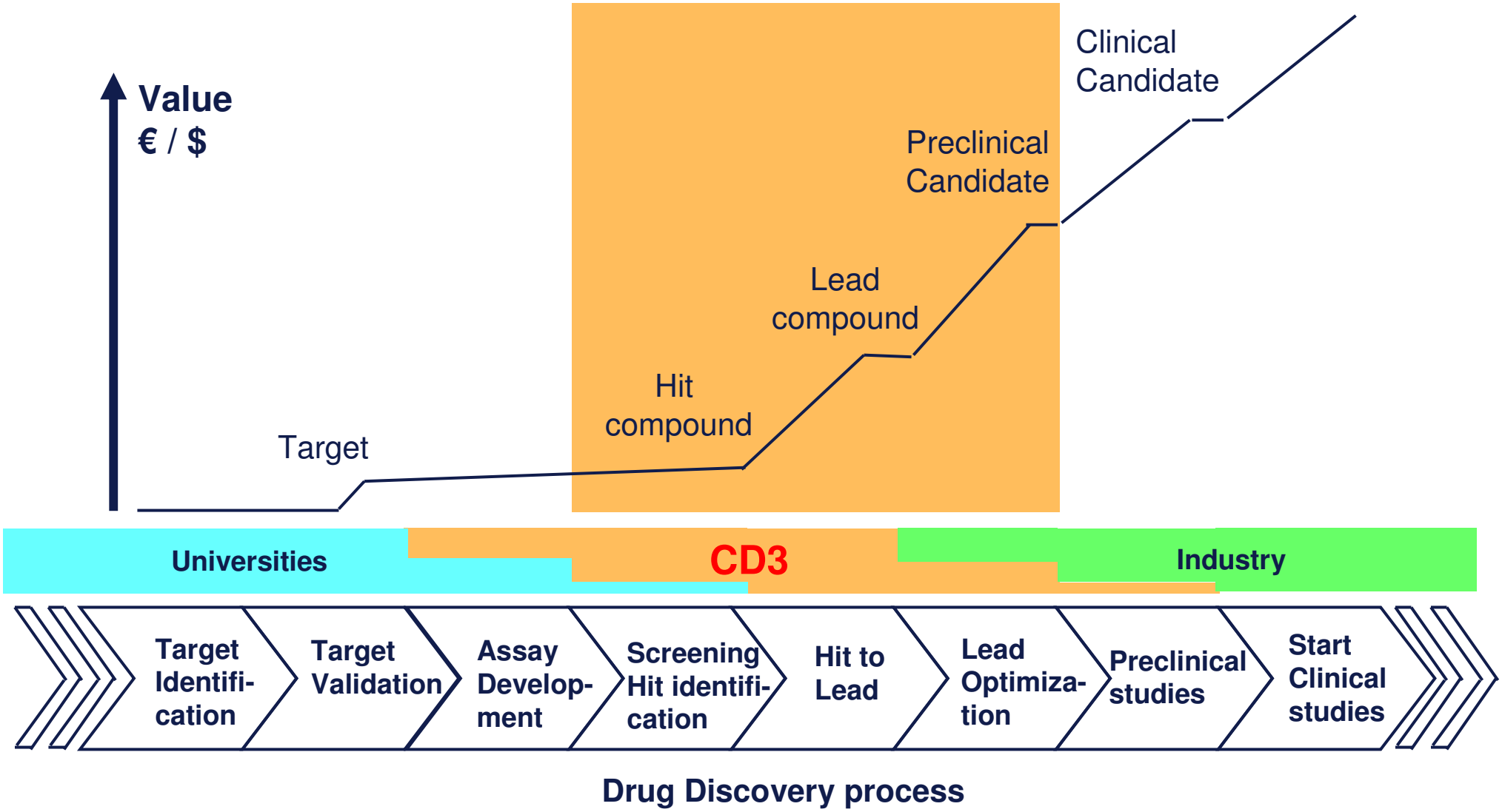
TRANSFER & TRANSLATION OF THIS EXCELLENT AND INNOVATIVE RESEARCH TO POTENTIAL TREATMENTS IS OFTEN LACKING

- **Many times too early to be taken up by pharma/biotech industry**
- **Lack of seed funding in the early stages of drug development**
- **Lack of drug discovery and development capacity at academic institutions**
  - high-throughput screening
  - obtaining proof-of-principle
  - medicinal chemistry
  - target validation
  - ADMET

KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

CD3 closes the gap, stimulates innovation and creates value in the drug discovery process



CD3 = Investment fund with professional small molecule drug discovery support

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.**

KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

CD3 = TT platform with professional small molecule drug discovery support and own funds

CD3 will complement an innovative biomedical research project with everything missing for professional drug discovery:

- support in “target identification and validation stage”
- high value compounds

  such as compound libraries: - 35.000 to 50.000 “high value” compounds

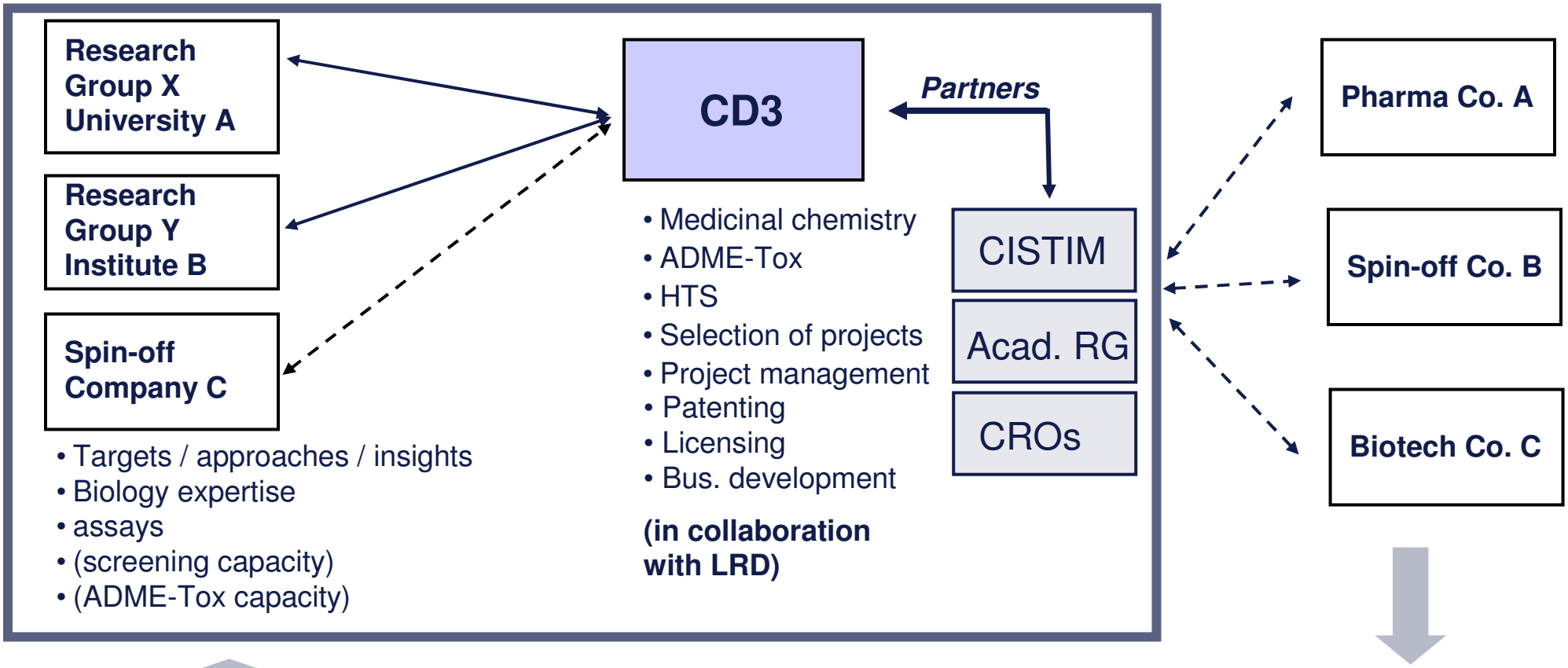
  - focussed libraries (i.e. targeting kinases, GPCRs, PPIs, etc.)
- high throughput screening (HTS) facilitation and performance
- in silico drug design, modelling and screening
- pharma compliant medicinal chemistry expertise
- chemical synthesis in hit to lead projects
- preliminary ADME-Tox (in vitro tox, metabolism, pharmaco-kinetics, etc)
- project coordination and follow-up
- IP support specific for the small molecule drug field

→ **Lead compounds class and target validation with IP in 2 years**

KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

CD3 established multiple collaborations & contacts and has strategic partnerships = big network



KULeuven, VIB, UCL, UGent, companies, AMC, UGroningen, etc.

Potentially to J&J, GSK, Pfizer, Vertex, Gilead Sciences, Roche, Astra-Zeneca, BI, Novartis, BMS, Abbott, Sanofi-Aventis, Merck, etc.

KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

CD3 uses strict project selection criteria & tight governance

Four major types of projects (+ combinations)

1. **"Screening projects"**
   start = specific target/innovation

2. **"Rational design projects"**
   start = target with structural information

3. **"Development Projects"**
   start = hit compounds

Exceptionally

4. "Target identification / validation Projects"
   start = non-drug like active compound or non-validated target

- Lower threshold
- Low investment
- early stage projects
- validate "drugability" of target

- **Strong selection**
- **High investment**
- **hit-to-lead projects**
- **2 – 3 chemists/project**

Industrially managed with clear procedures

- **Selection of projects is based on specific and strict criteria**

  target, assay, research group, indication, innovation, market, etc.

- **IP follow-up, business development, Scientific Advisory Board, Investment Committee, Consultants**

KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

CD3 Investment Committee & Scientific Advisory Board are fully operational and attracted top professionals

INVESTMENT COMMITTEE (IC)

- KUL: 2 members
  1. Paul Van Dun
  2. Bernard Majoie
- EIF: 2 members
  1. Henri-François Boedt / Felicitas Riedl
  2. Sue Foden

SCIENTIFIC ADVISORY BOARD

1. Dr. Brunner
2. Prof. E. De Clercq
3. Dr. C. Greengras
4. Dr. C. Lipinski

KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

Current status CD3

- **3 years operational**
- **Fully equiped** (~pharma industry) – possibility for 16 full time chemists
- Access to a **high level professional team**

  14 medicinal chemists – 1 biologist – multiple returned from pharma industry
- **IC and SAB fully operational**
- **Pipeline is filling**: multiple proposed projects under evaluation

  - ~multiple Screening projects in progress

  - 10 Development Projects approved

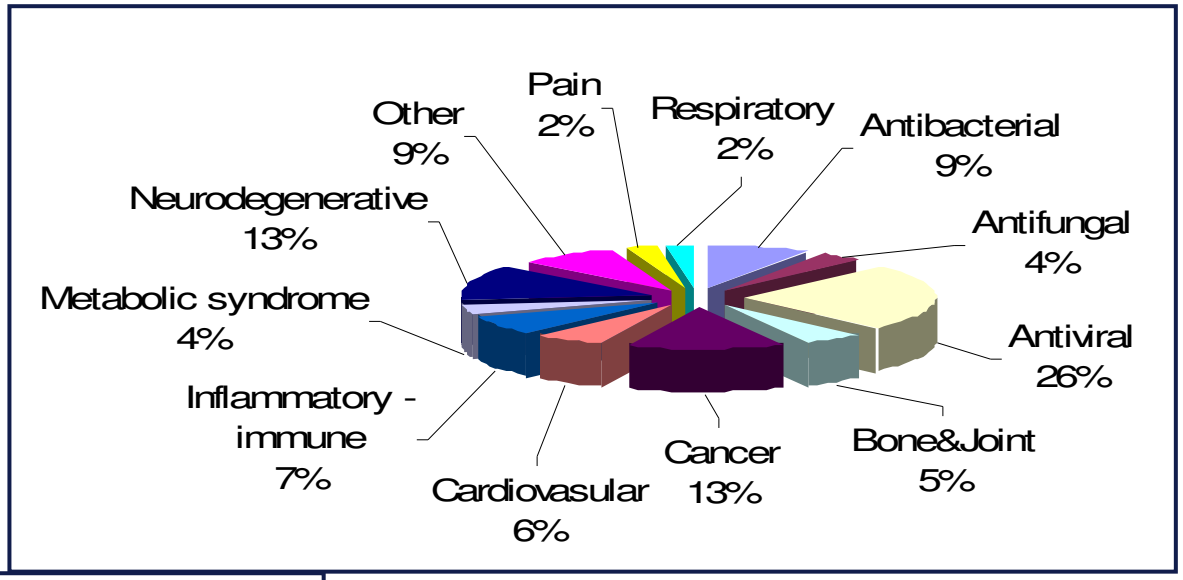
KATHOLIEKE UNIVERSITEIT LEUVEN

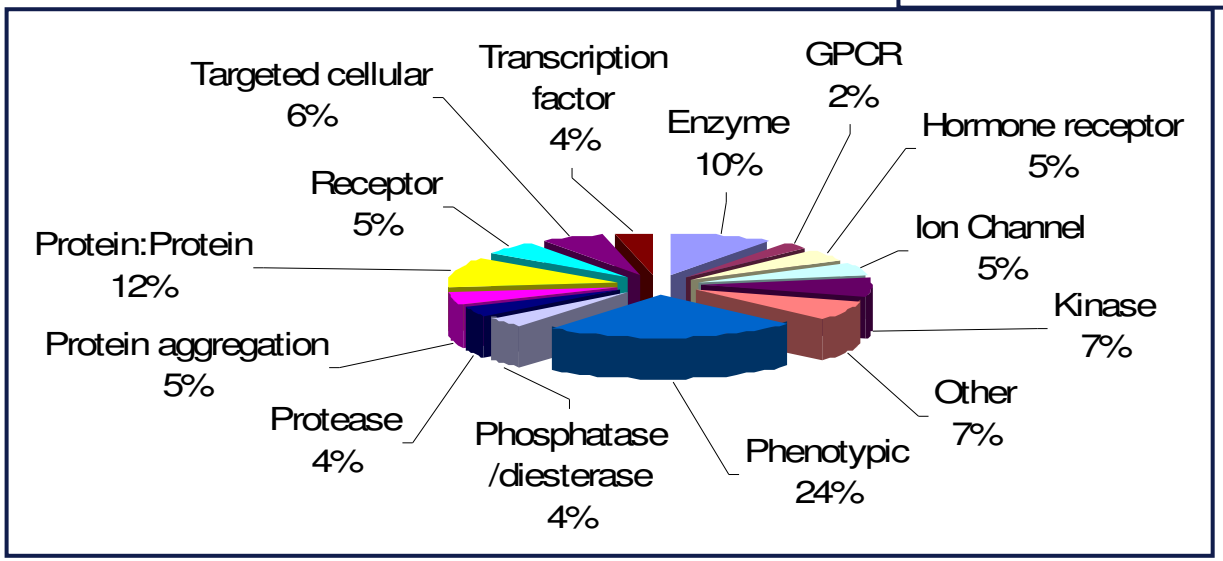
EUROPEAN INVESTMENT FUND

Multiple project proposals have been received

Status end 2009

- **89 project proposals received in ~3 years time**

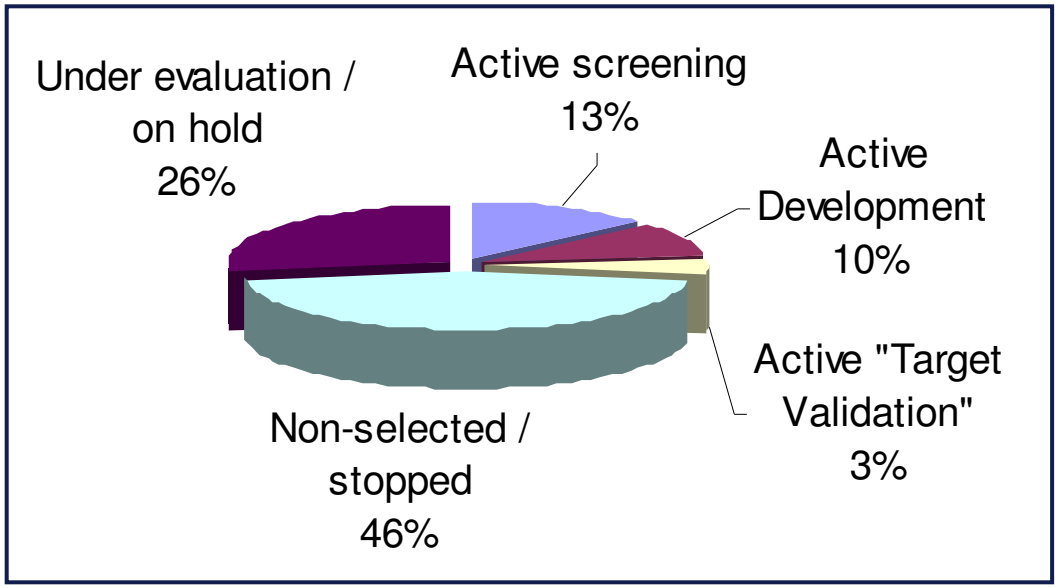




Multiple project proposals have been received

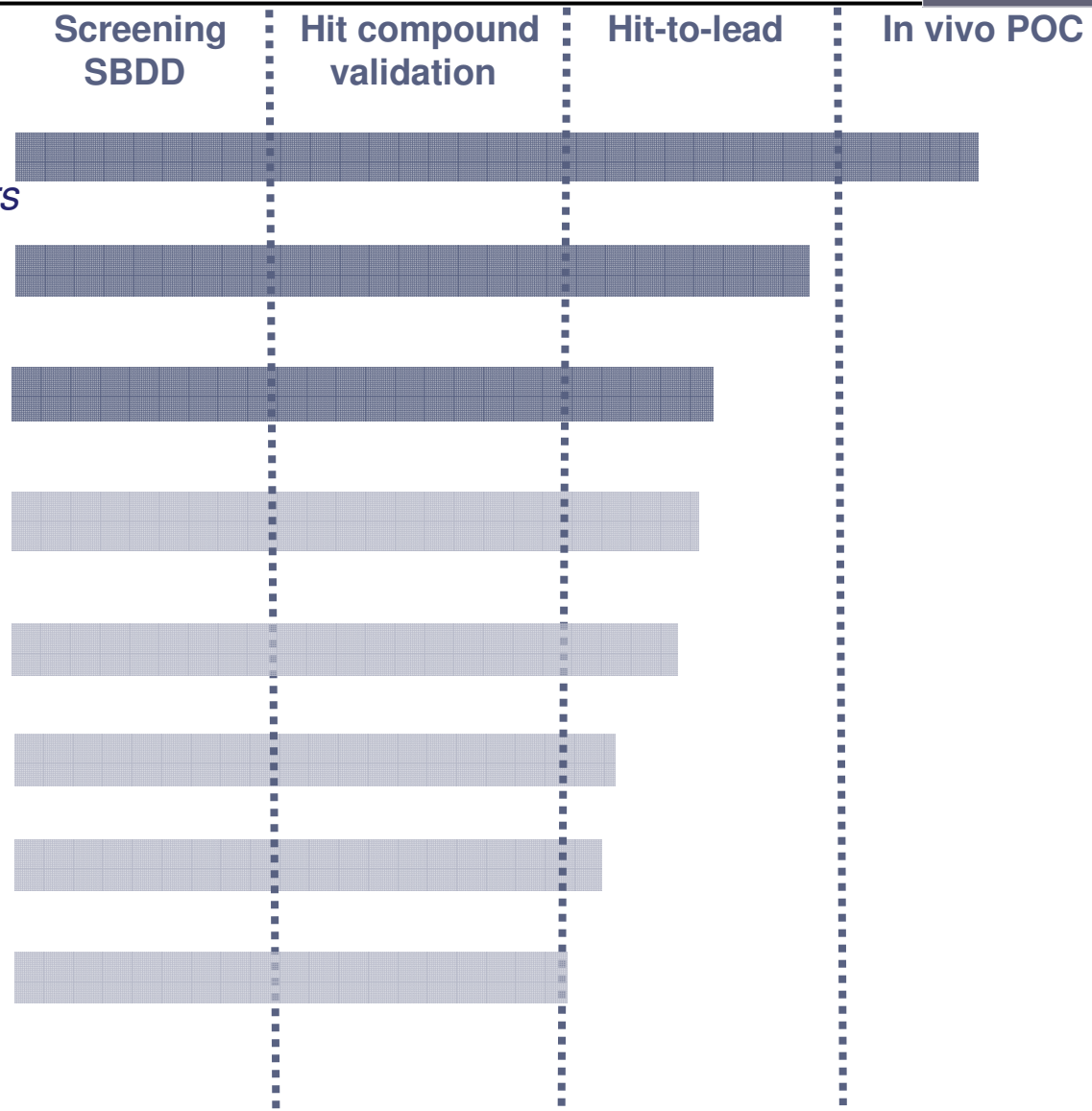
Status end 2009

- **89 project proposals evaluated**



- 10 Development projects approved
  - 7 ongoing
- multiple Screening projects ongoing

CD3's Development projects already resulted in highly innovative results



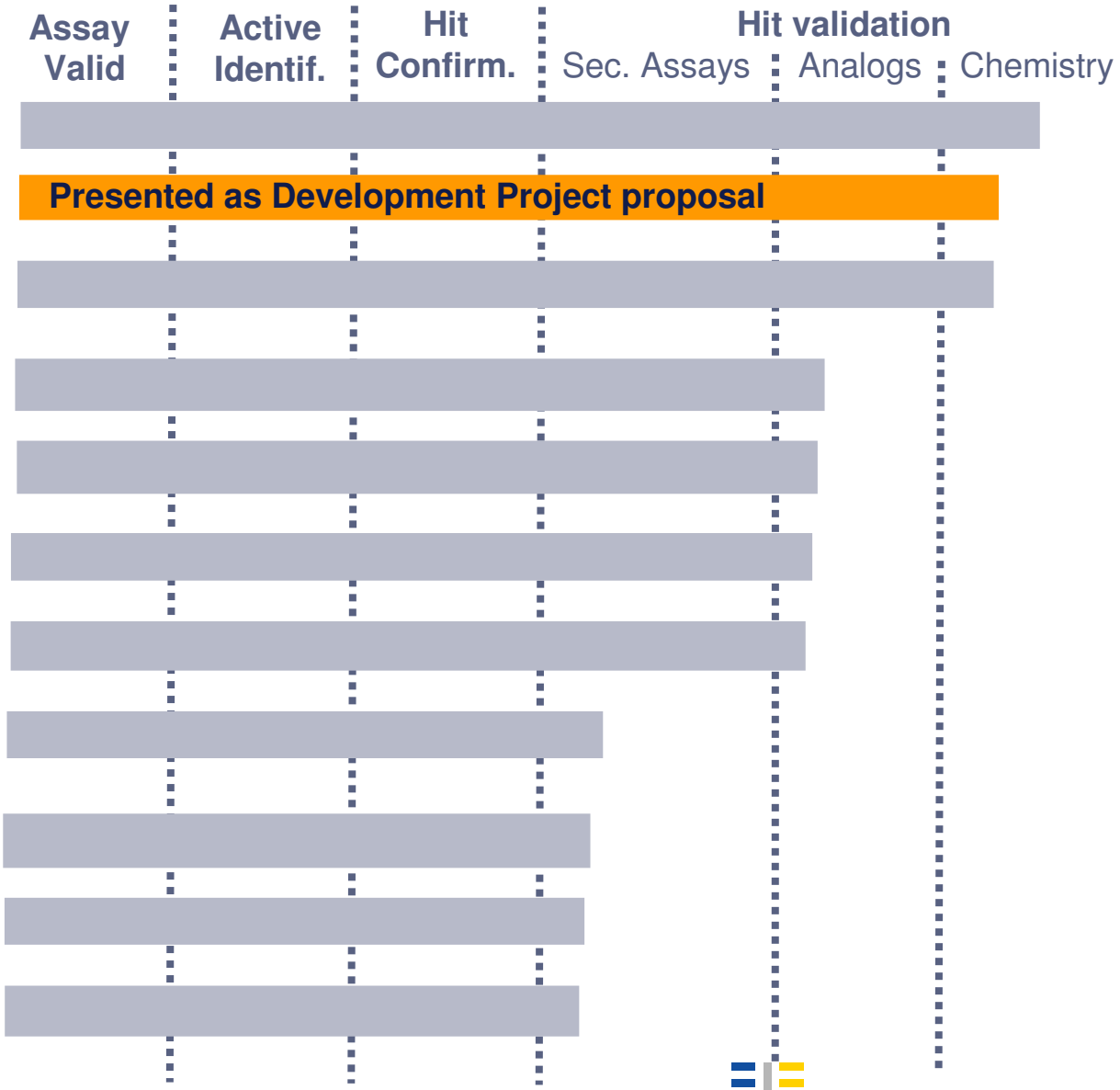
1. **Alzheimer's disease**
   Tau aggregation induced tox.inhibitors
2. **Human Immunodeficiency virus**
   LEDGF-integrase inhibitors
3. **Auto-immune dis. / transplant rej.**
   B inhibitors
4. **Overactive bladder – cancer**
   C inhibitors
5. **Human rhino virus (asthma, COPD)**
   phenotypic
6. **Dengue virus**
   phenotypic
7. **Cancer**
   MDM2-p53 inhibitors
8. **Arthritis**
   BMP modulators

KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

June 2010 – selection of CD3's ongoing Screening Projects

1. **Influenza virus**
   phenotypic
2. **Cancer**
   MCT1 inhibitors
3. **Chondrocalcinosis - OA**
   x inhibitors
4. **Antibacterials**
   y inhibitors
5. **Antibacterials**
   z inhibitors
6. **Chikungunya virus**
   phenotypic
7. **FCV / FMDV**
   phenotypic
8. **Epilepsy – "mood" disorders**
9. **Cancer**
   w inhibitors
10. **HIV**
    v inhib
11. **Biofilm formation inhibitors**
    phenotypic



KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

First in-class inhibitors of the LEDGF/p75-integrase interaction and HIV replication

Publication May 16th
Nature Chemical Biology

CD3: Licensing to Pharma & Biotech companies

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 n collaboration with Prof. Z. Debyser (KULeuven)

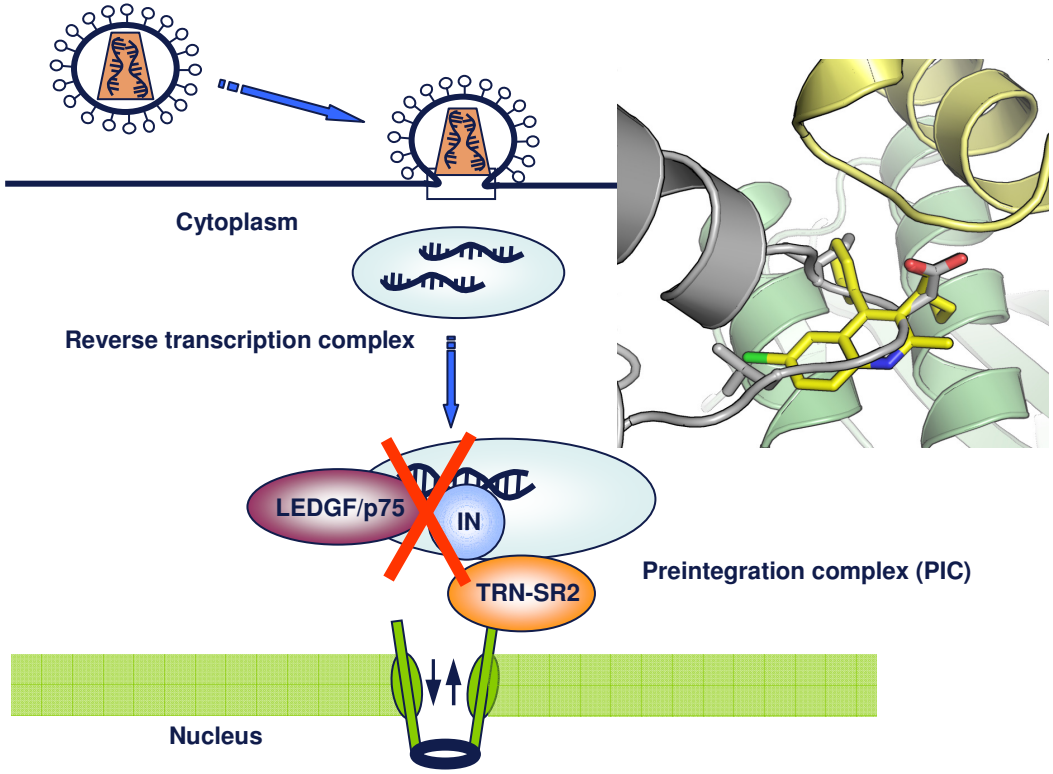
2009 New anti-HIV drugs inhibiting LEDGF-integrase interaction identified

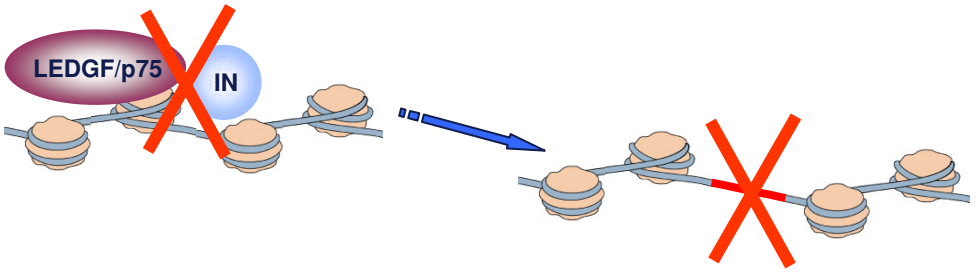
2009 Multiple patent applications filed - Business Development with Big Pharma initiated

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

2010 Publication Nature Chemical Biology

2010 Exclusive license to be established with Big Pharma





KATHOLIEKE UNIVERSITEIT LEUVEN

EUROPEAN INVESTMENT FUND

THANK YOU FOR YOUR ATTENTION