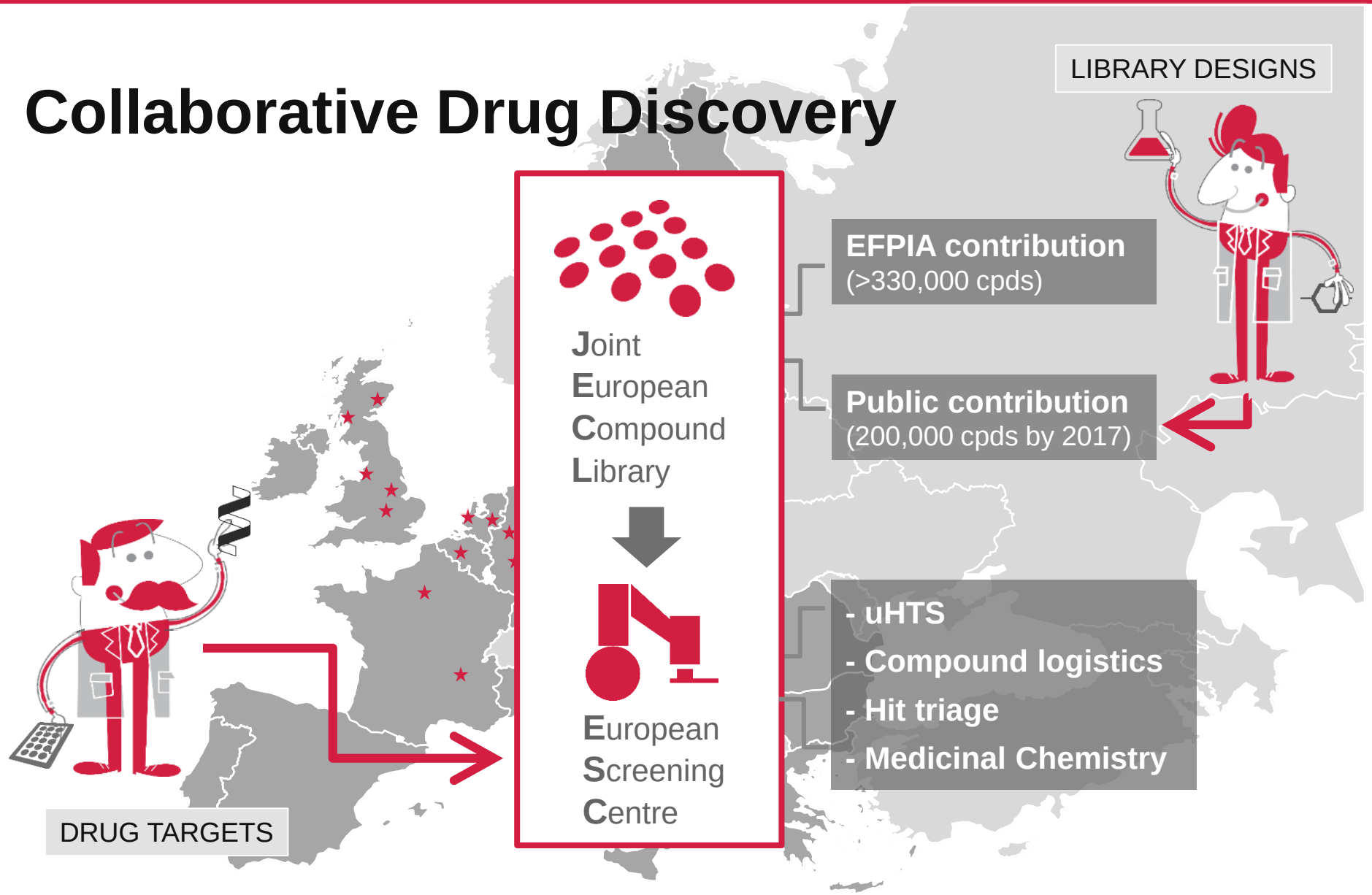
European Lead Factory– making a pan-European compound collection & screening centre a reality

Dimitrios Tzalis (Taros), Head of Chemistry

6th FIP Pharmaceutical Sciences World Congress 2017, Stockholm, Sweden
23 May 2017

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Collaborative Drug Discovery



The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

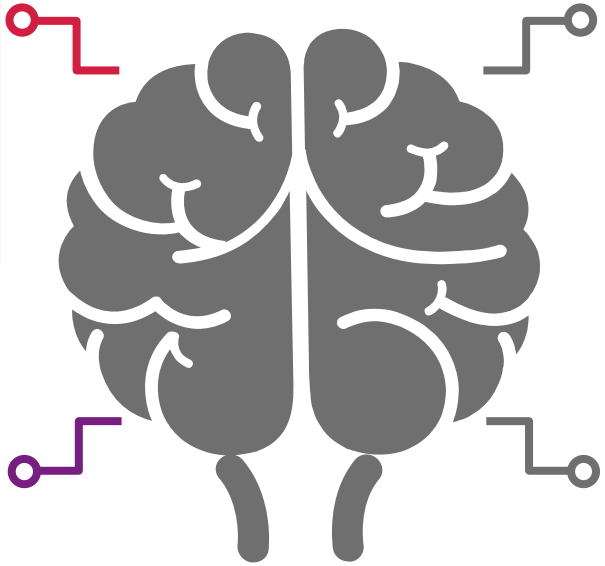
Made possible by…

European Screening Centre

pivot park screening centre
lygature
University of Dundee
bio:ascent
University of Oxford

EFPIA partners

AstraZeneca
SANOFI
MERCK
UCB
Lundbeck
janssen
BAYER



funded by

imi innovative medicines initiative

Public Compound Consortium

Chemistry CROs

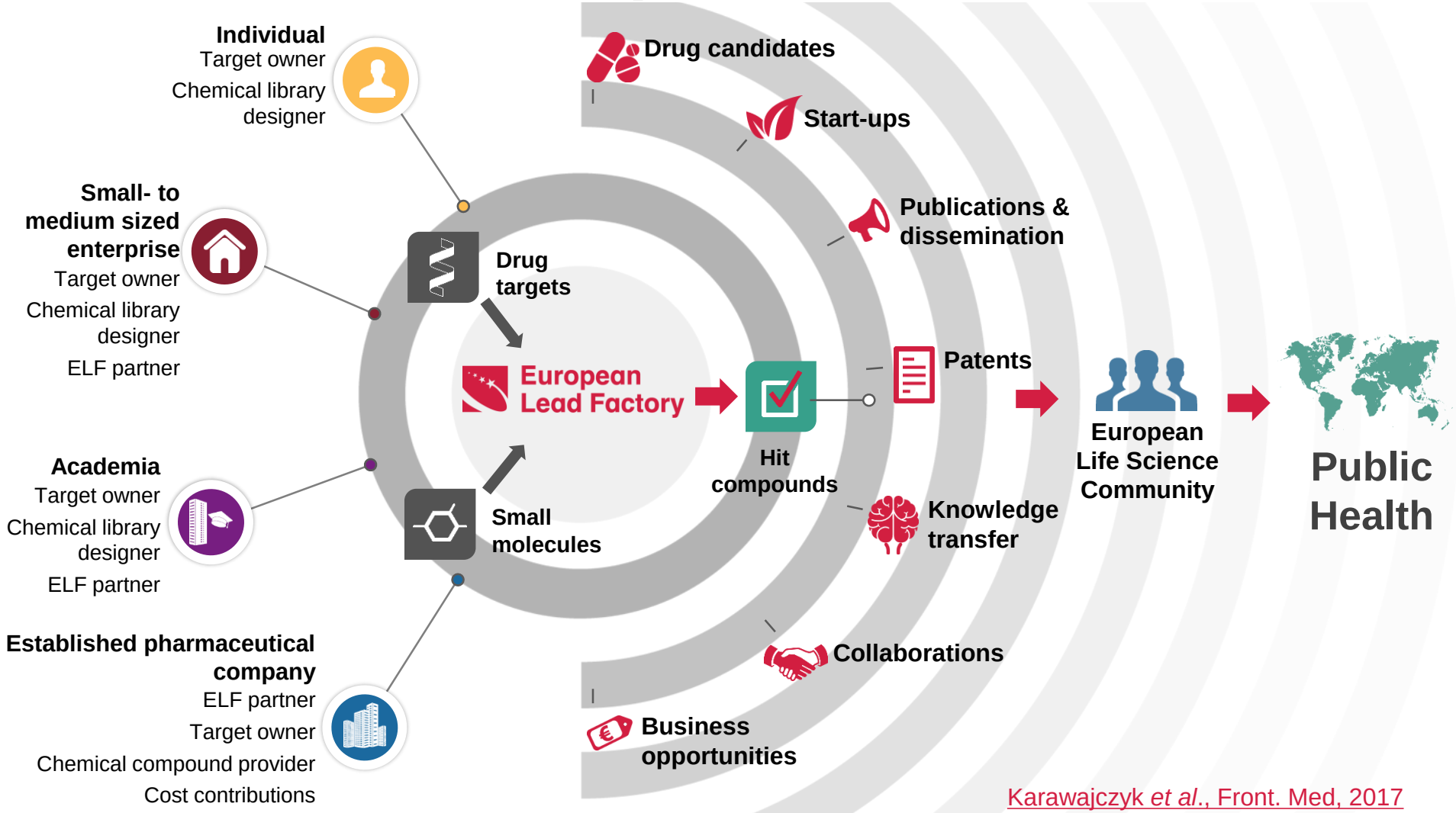
TAROS
EDELRIS MEDICINAL KEYMISTRY
SYNCOM Designing chemistry
MERCACHEM
SYGNATURE discovery

ARTTIC INTERNATIONAL MANAGEMENT SERVICES
VU UNIVERSITY AMSTERDAM
UNIVERSITY OF LEEDS
LDC Lead Discovery Center
UNIVERSITÄT DUISBURG ESSEN Offen im Denken
The University of Nottingham UNITED KINGDOM · CHINA · MALAYSIA
university of groningen
LUMC
ChemAxon
DTU Technical University of Denmark
MAX-PLANCK-GESELLSCHAFT
Radboud Universiteit Nijmegen

imi innovative medicines initiative efpia

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

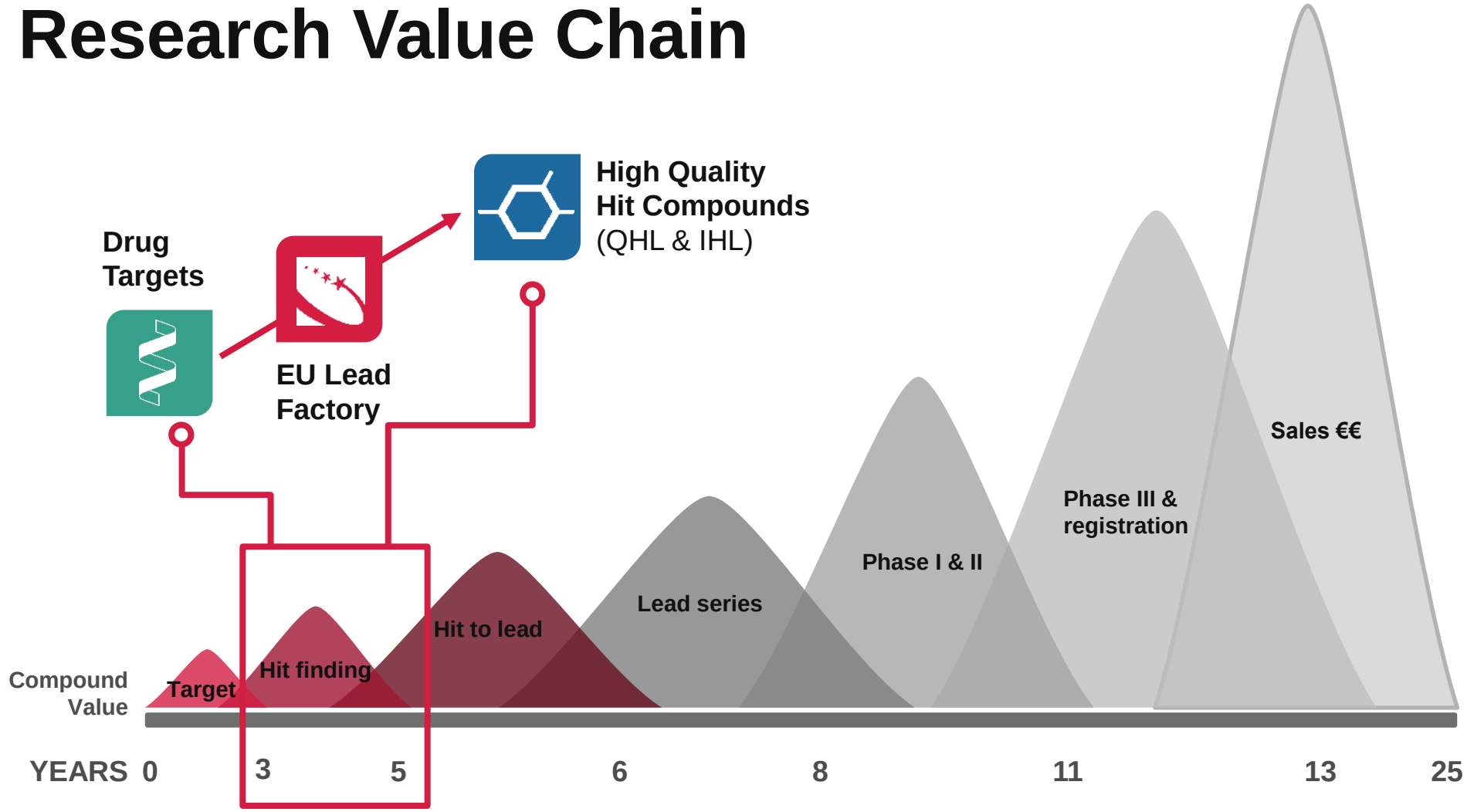
Interactions & Impact



Karawajczyk *et al.*, Front. Med, 2017

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Drug Research Value Chain

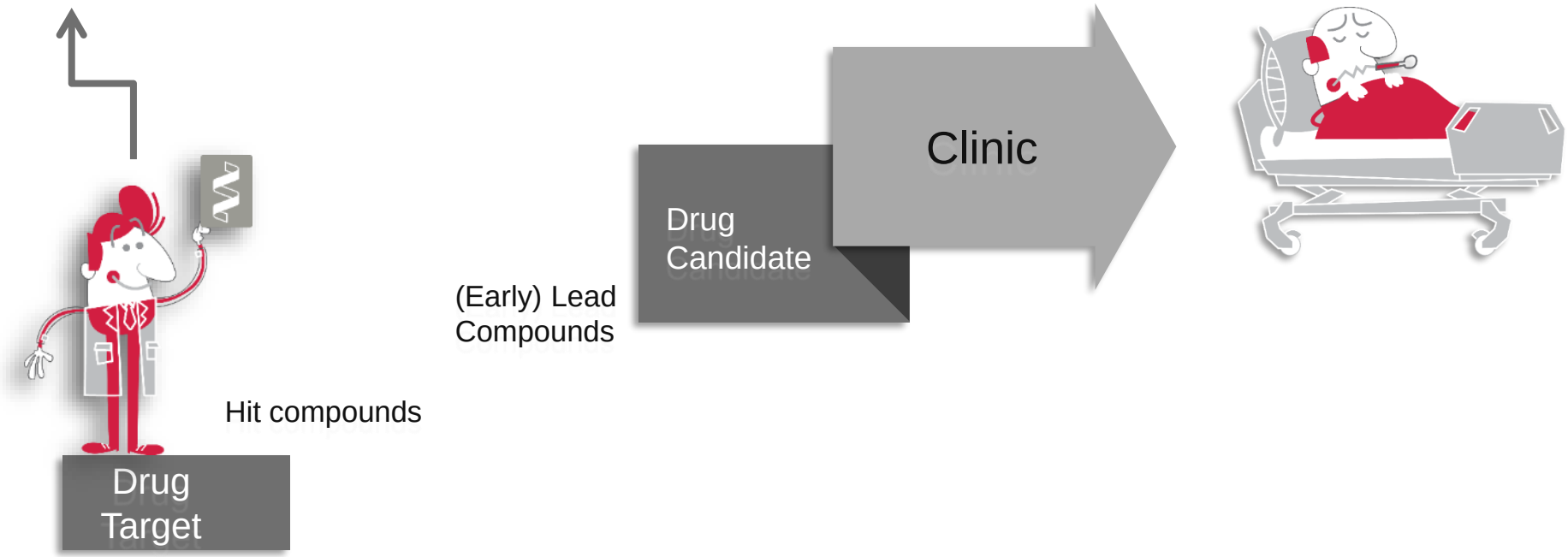


The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

The EU Lead Factory Model

Researcher

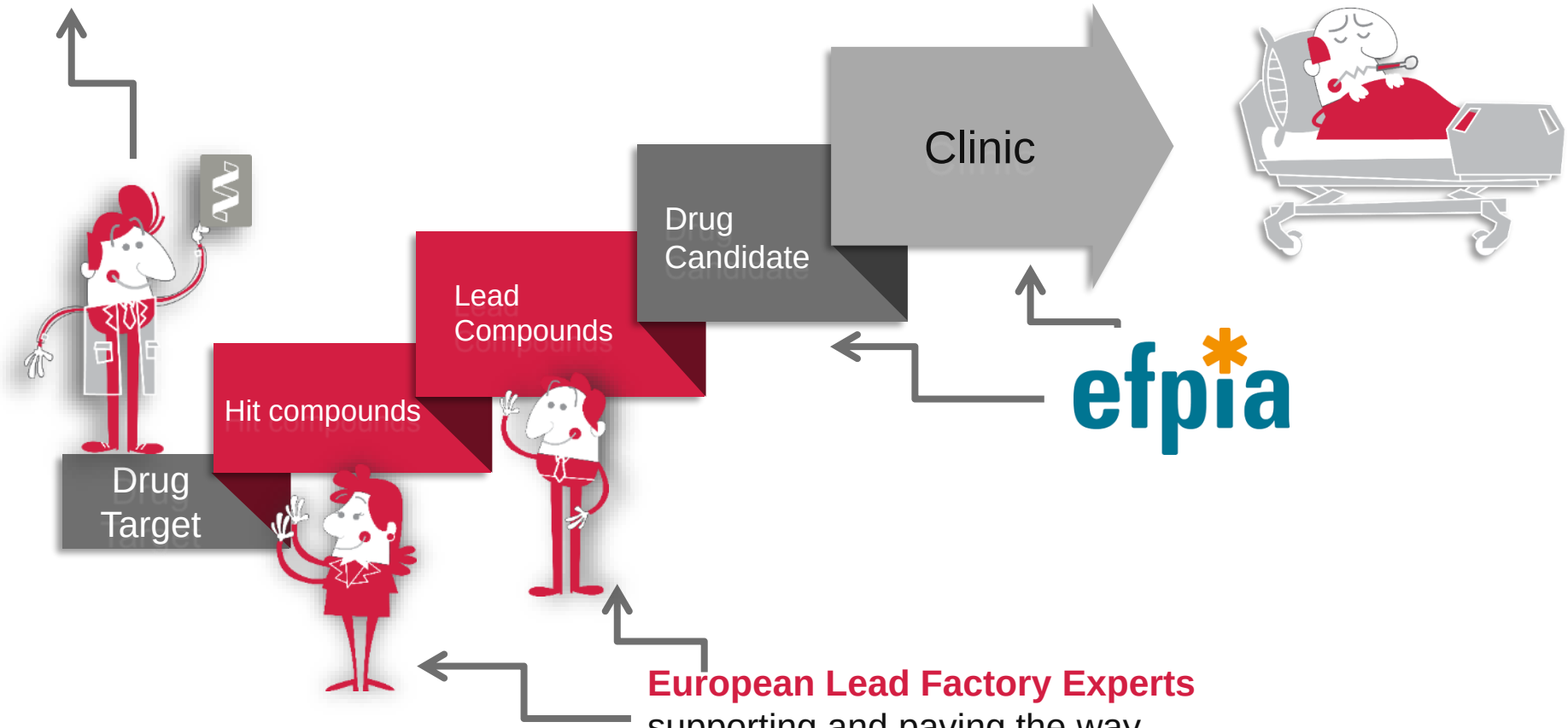
in the **lead**



The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

The EU Lead Factory Model

Researcher
in the **lead**



The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Hitting the Targets – and beyond!

Project Objectives

- Produce the best **200 000 screening compounds** in just 5 years
- Use **expertise and infrastructure** to boost innovation in early drug discovery in Europe
- Leverage **combination** of knowledge, strengths, capabilities and assets in **academia, SMEs & big pharma** in Europe

⇒ Building a **factory**

- Defining best practice and governance
- Set up an IT infrastructure

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Best practice and governance

- Criteria and workflow for library/target proposal review/selection
- Library/target Selection Committee
- Criteria and workflow for library/target proposal validation
- Library/target Validation Management
- Criteria and workflow for library/assay production and transfer
- Knowledge & data transfer

Defined and fully operational

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

IT infrastructure

- Web portal for library submission
- Chemoinformatics tool to enable library evaluation and selection
- Chemistry management platform (TarosGate) for library progress and logistics tracking
- Honest Data Broker (HDB) for facilitating the confidential evaluation of biological data

Fully operational

Additional advantages

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Collective Intelligence EU Lead Factory

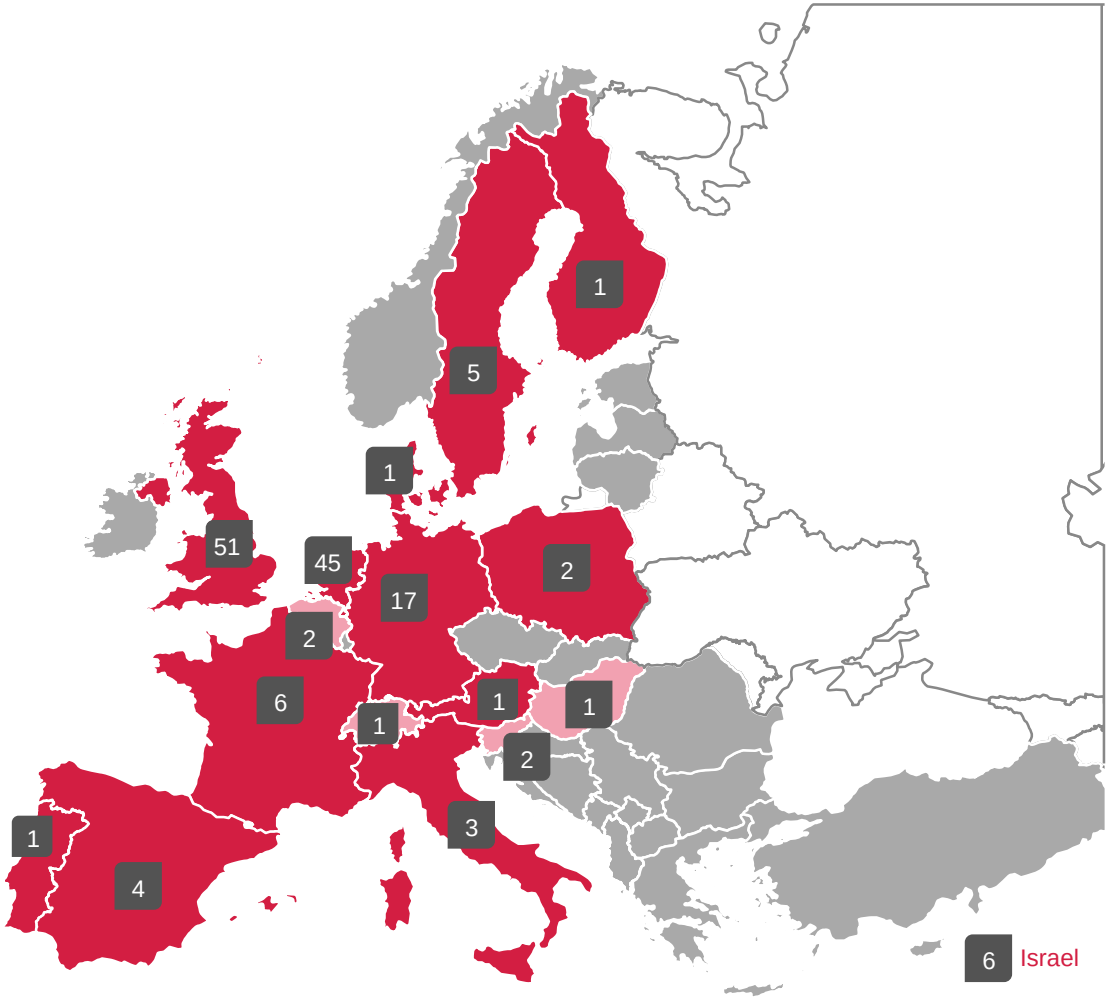
The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Geographic distribution of public target proposals

Eligible

Submitted (149)

Accepted (85)

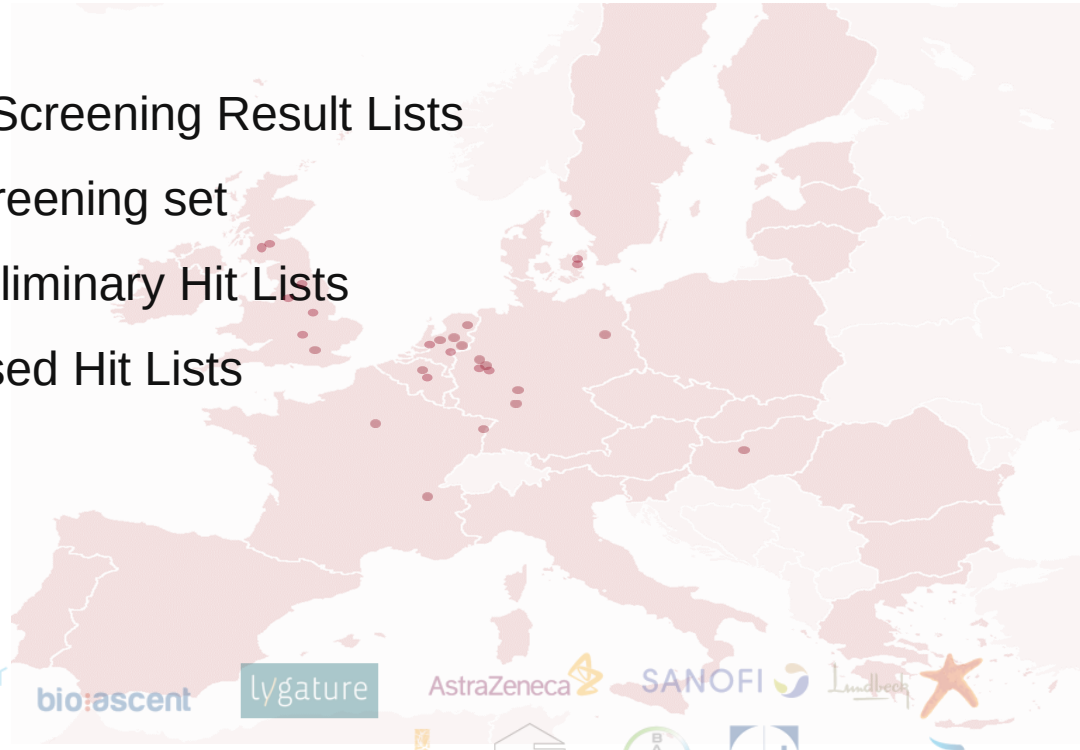


Status March 31, 2017

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

ELF: Collaborative Big Data

- **128,204,242** data points
- **42,522,956** primary HTS entries in Screening Result Lists
- **452,655** compounds in the 2017 screening set
- **26,253** compounds selected for Preliminary Hit Lists
- **4246** compounds selected for Revised Hit Lists
- **73** HDB users across Europe



The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

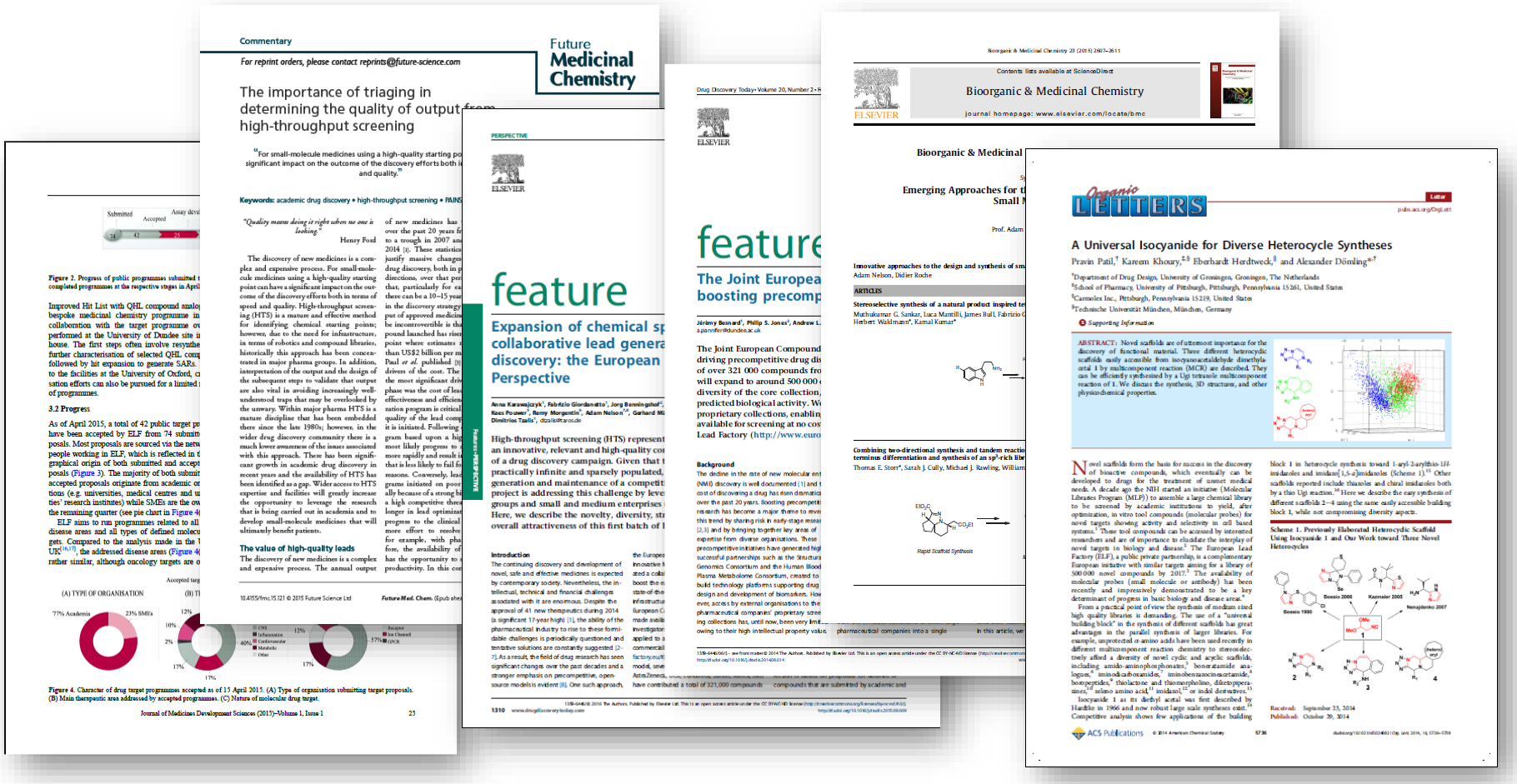
4th Annual Chemistry Learnings & Achievements Meeting

Goals:

- Exchange of the knowledge
- Integration
- High quality scientific presentations
- Recognition of excellence

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

> 50 Publications



The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

A blueprint for public-private partnerships


European Lead Factory hits its stride

nature REVIEWS DRUG DISCOVERY

Nature Reviews Drug Discovery **15**, 221–222 (2016) by Katie Kingwell


frontiers in Medicine Regulatory Science

The European Lead Factory: A Blueprint for Public–Private Partnerships in Early Drug Discovery

Anna Karawajczyk[1], Kristina M. Orrling[2], Jon S. B. de Vlieger[2], Ton Rijnders[2] and Dimitrios Tzalis[1]*

[1]Taros Chemicals GmbH & Co. KG, Dortmund, Germany
[2]Lygature, Utrecht, Netherlands

The European Lead Factory (ELF) is a public–private partnership (PPP) that provides researchers in Europe with a unique platform for translation of innovative biology and chemistry into high-quality starting points for drug discovery. It combines an exceptional collection of small molecules, high-throughput screening (HTS) infrastructure, and hit follow-up capabilities to advance research projects from both private companies and publicly funded researchers. By active

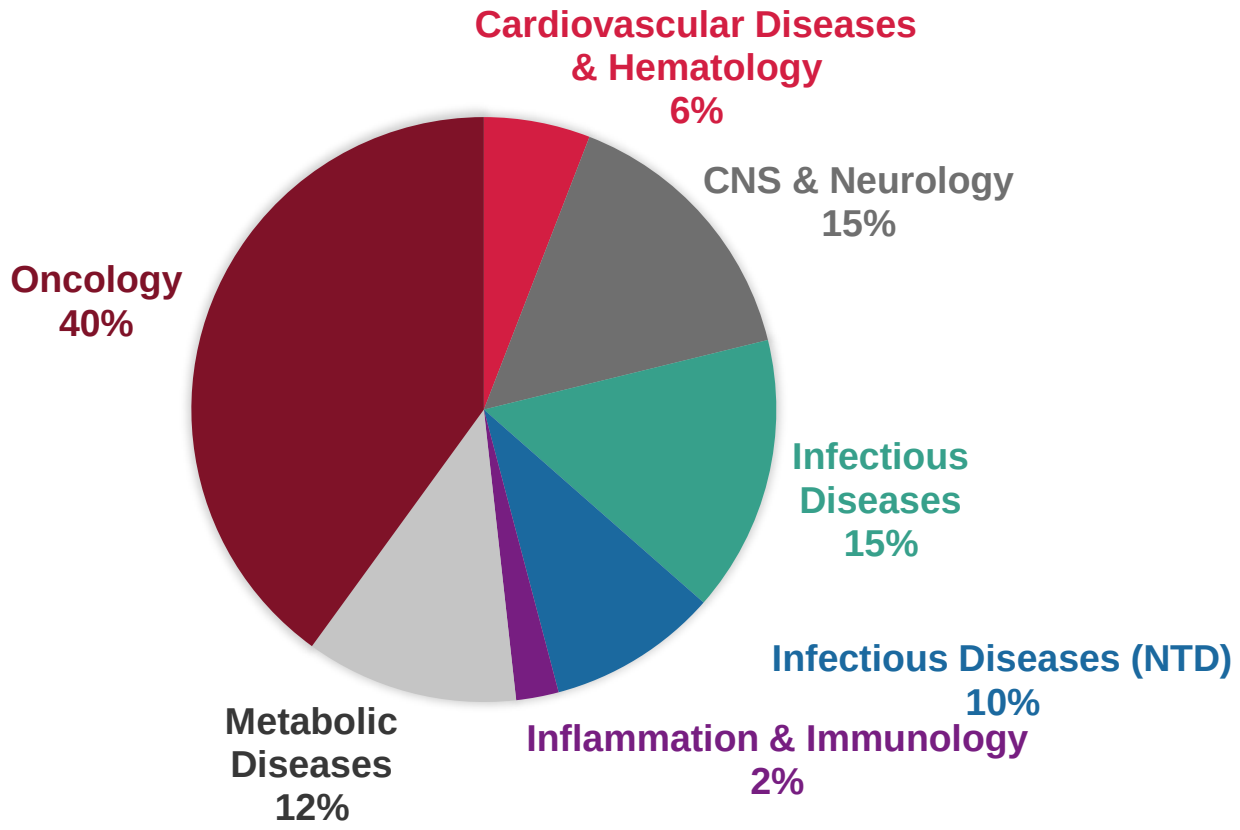
Frontiers in Medicine **3**, 75 (2017); Open Access

Euronews BUSINESS PLANET, 2016-12-28
Jan Skriwanek NKS
Dimitrios Tzalis ELF

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Therapeutic area distribution

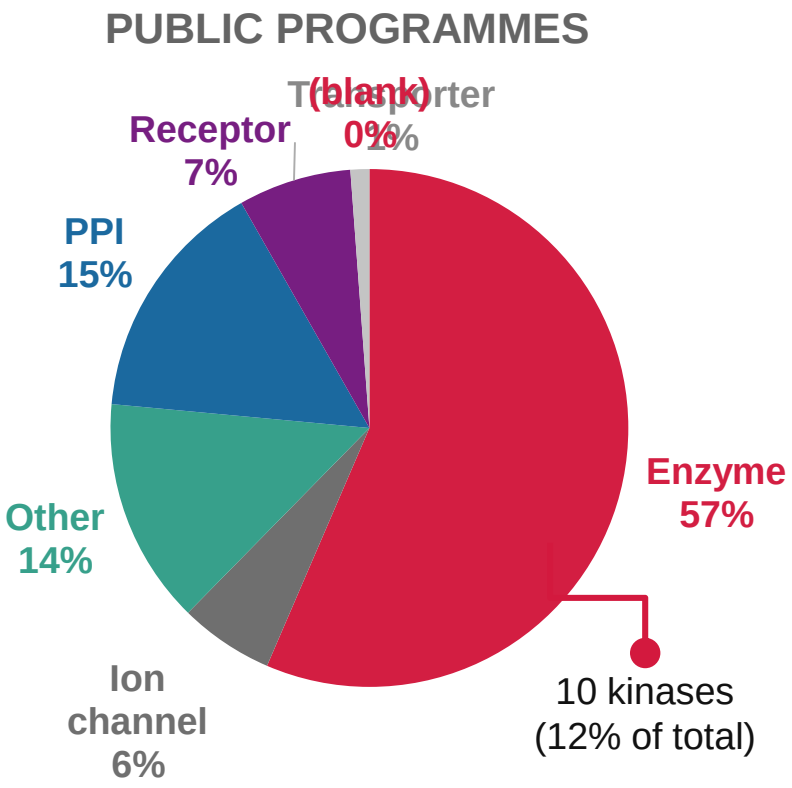
ACCEPTED PROGRAMS

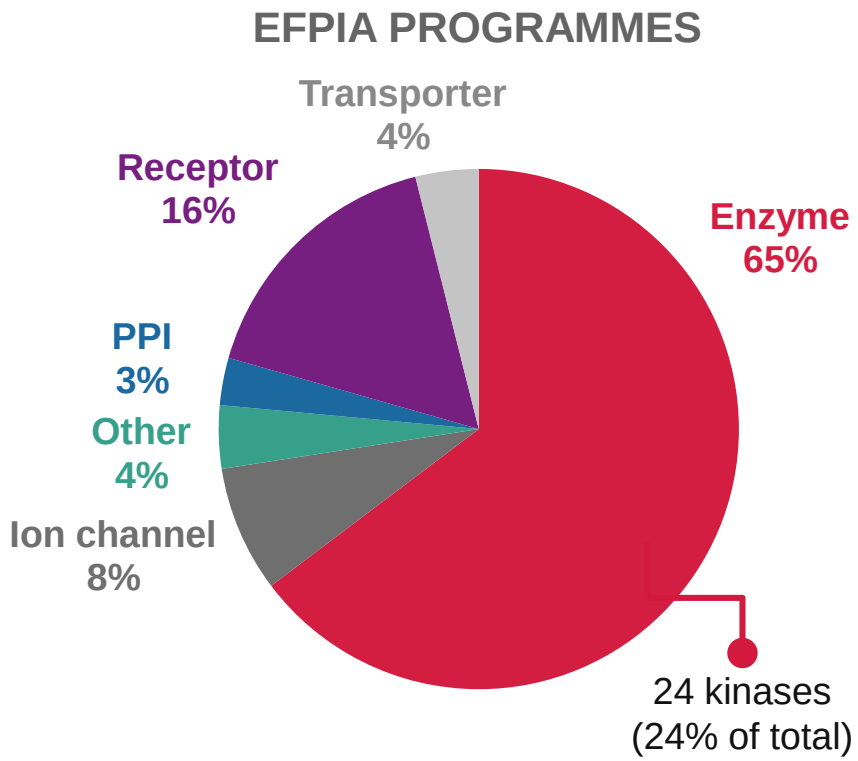


Status March 31, 2017

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Comparison of target distribution

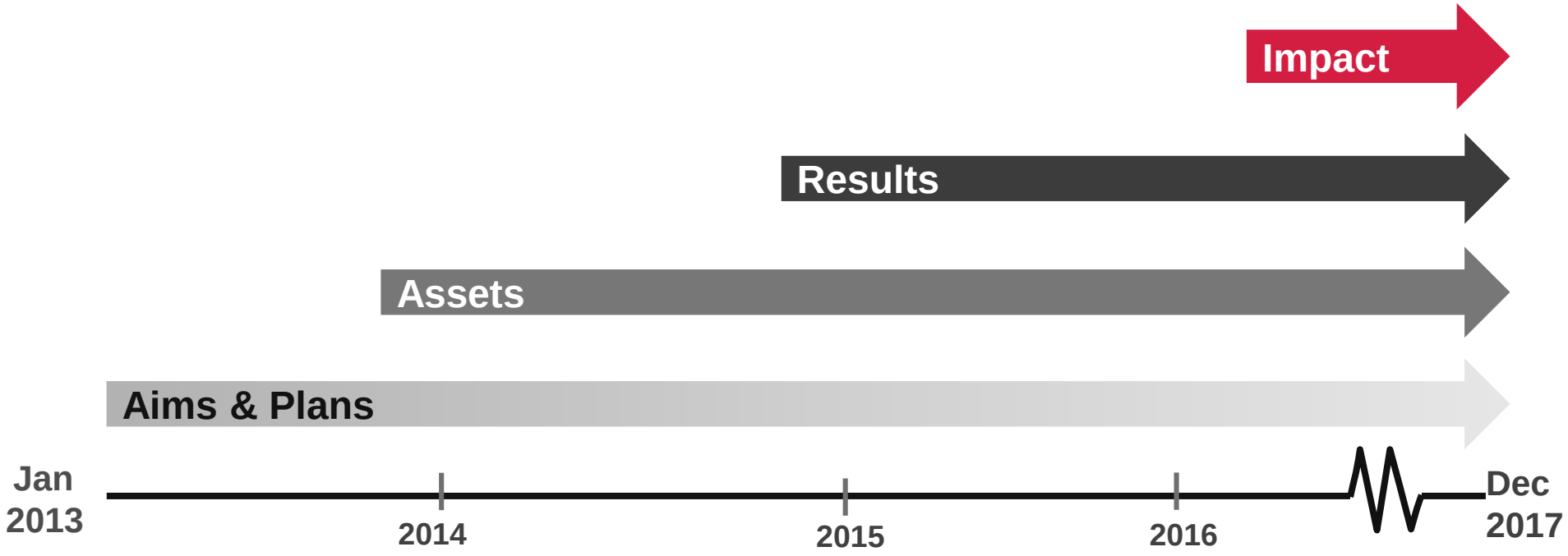




Status March 31, 2017

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Progress 2013 - 2017



Powerful drug discovery engine!

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Life after ELF…

Investment in spin-out from charity

Virtual biotech company launched to battle Parkinson's

PARKINSON'S UK
CHANGE ATTITUDES.
FIND A CURE.
JOIN US.

08.03.2017

In a world-first type of collaboration, Parkinson's UK and the University of Sheffield have launched a joint venture biotech company, Keapstone Therapeutics. Parkinson's UK has allocated 1 million GBP over the next sixteen months to further develop compounds that boost the internal cellular defence mechanisms against oxidative stress. These compounds were discovered by IMI's European Lead Factory.

New spin-out company & investment

European Lead Factory drug-like hit leads to creation of a spin-out

GU Ventures
HOLDINGBOLAGET VID GÖTEBORGS UNIVERSITET

23.11.2016

Dr. Margit Mahlapuu, one of the academic researchers who has benefited from EU Lead Factory screening activities by identifying a drug candidate series for type 2 diabetes, went on to create a spin-out company based on these results. Dr Mahlapuu's group, based at the University of Gothenburg, first... Read more

Further development within IMI's ENABLE project

Promising antibiotic programme gets European boost

Innovative Medicines Initiative projects European Lead Factory and ENABLE create pipeline for novel antibiotics from University of Oxford

Advancing science, creating new companies, exploiting IMI project synergies for patient benefit

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Testimonials: Public Target Owners

Dr Margit Mahlapuu
Univ of Gothenburg

We had already performed a small-scale screen that did not identify a compound with sufficient potency to build on. The ***synergy in competencies*** *between my lab and the EU Lead Factory has given the project a* ***big push forward****.*

METABOLIC DISEASES

Dr Chris Schofield,
University of Oxford

'Overall, we are ***extremely satisfied*** *with the progress, from assay optimization to post-hit validation.The work done within ELF is really of* ***high industry-like standard*** *and* ***very professional****.'*
'It is an ***initiative*** *that needs to be* ***continued****.'*

ANTI-MICROBIAL RESISTANCE

Dr Joost Uitdehaag
NTRC

'Through ELF we now have access to ***unique*** *and* ***tractable chemotypes****. They allowed us to get* ***proof-of-concept*** in vivo *and eventually develop a* ***best-in-class drug candidate****.'*

IMMUNO-ONCOLOGY

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

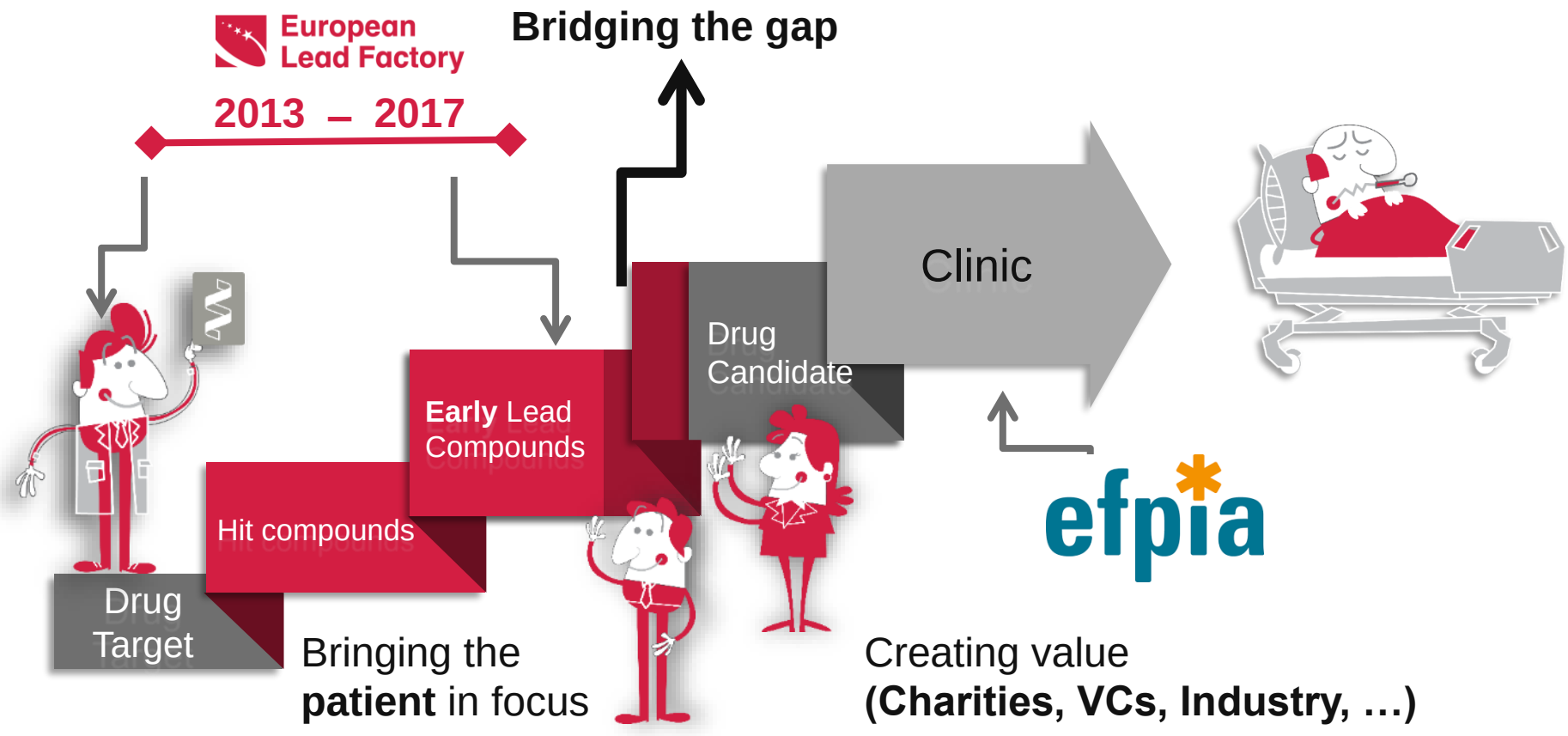
JECL in the battle against Parkinson's disease

The University Of Sheffield. + Drug targets + JECL Small molecules → European Lead Factory → Hit compounds = Keapstone Therapeutics

The **University of Sheffield** and **Parkinson's UK** have launched a new £1 million virtual biotech company to create new drugs for Parkinson's disease based on a **JECL** new class of compounds that can activate the brain cell defence system.

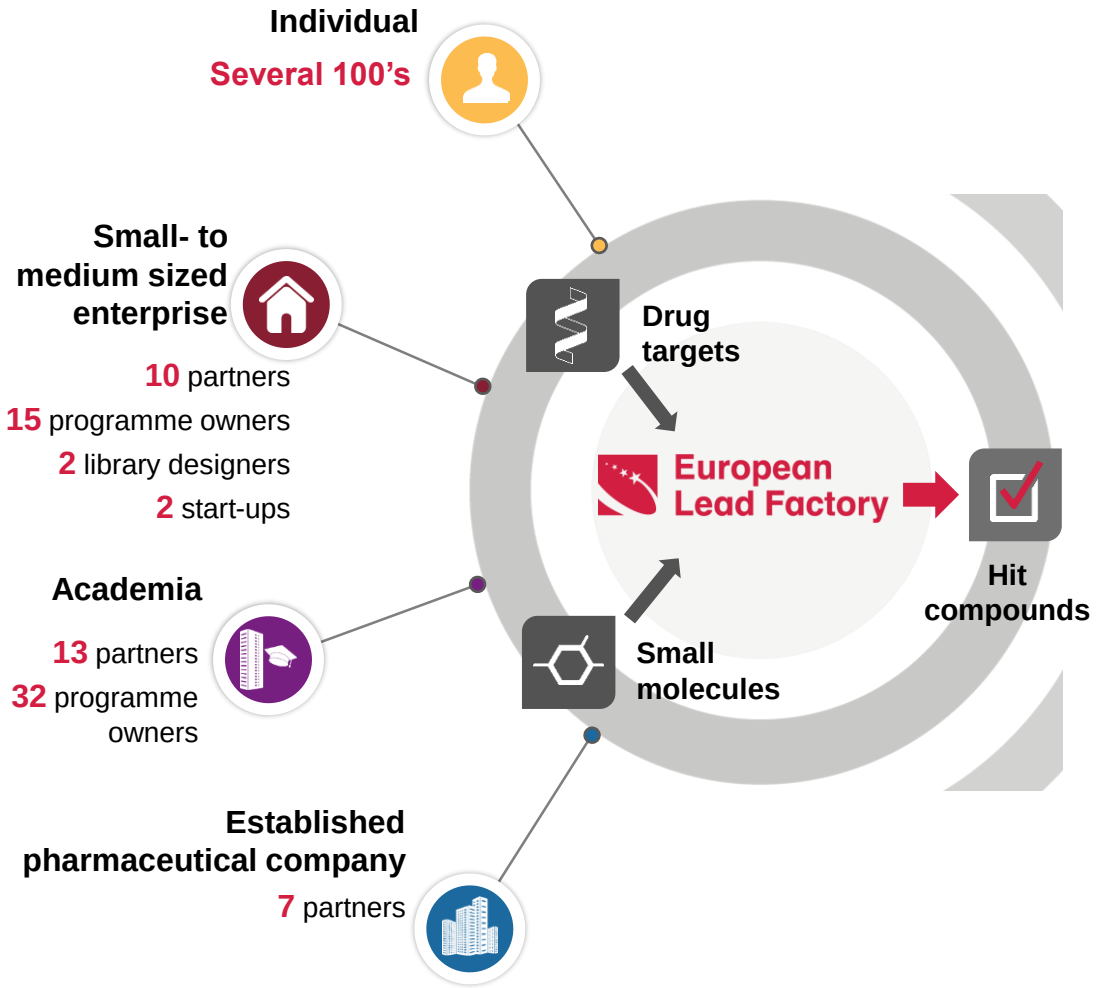
The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

ELF envisions the engagement of all stakeholders to further increase patient benefit



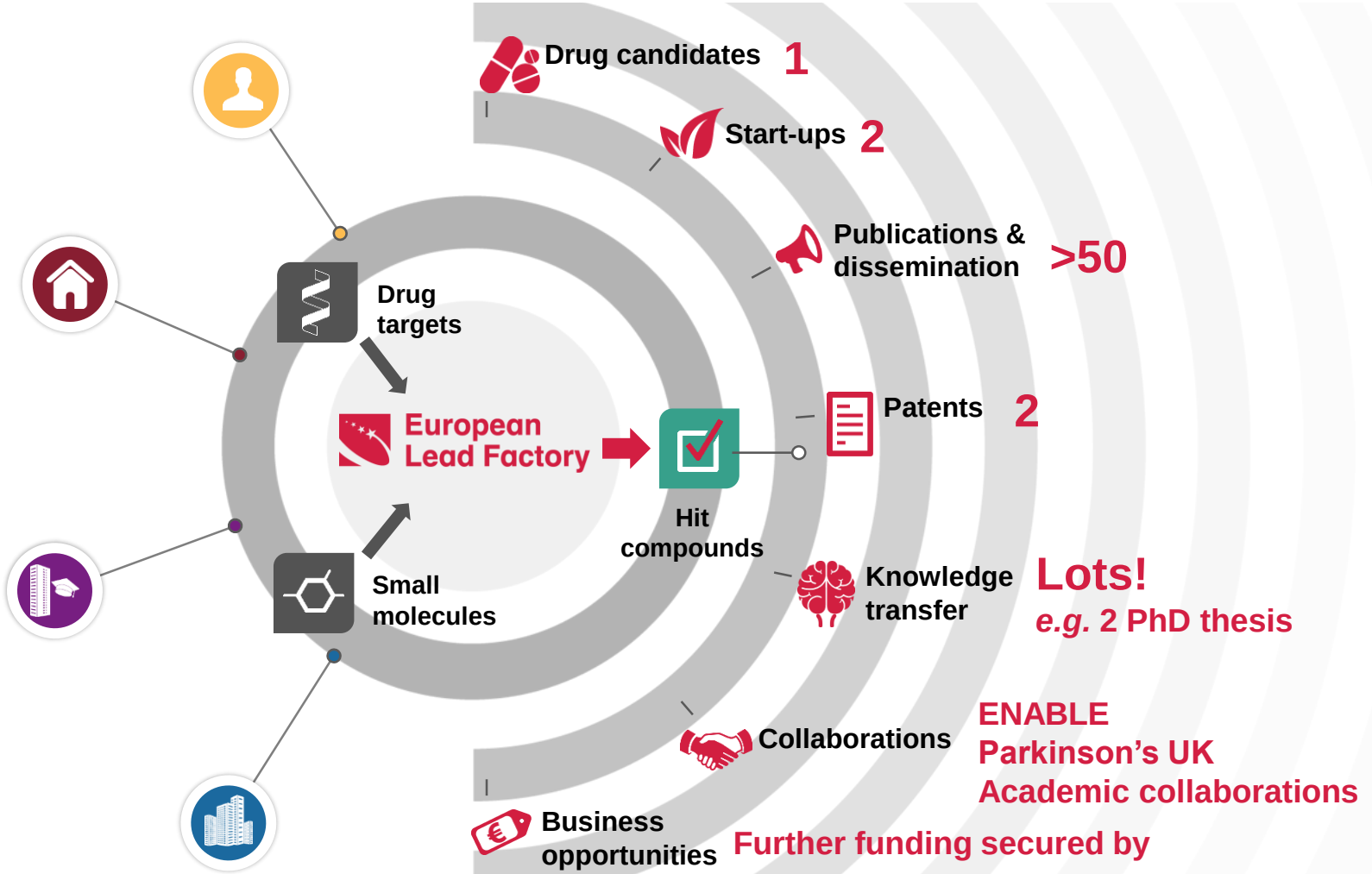
The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Interactions



The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

Impact



The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.

European Lead Factory

www.europeanleadfactory.eu

Only the official and formally signed contractual documents in relation to the European Lead Factory (Project Agreement, Grant Agreement, Description of Work, and Third Party Access Agreements) have a binding value in relation to the subject matter covered in these slides.
Any information contained in these slides is not binding upon the parties and can in no event be used to interpret or complement the formally signed contractual documents referred to above.

The research leading to these results has received support from the Innovative Medicines Initiative Joint Undertaking under grant agreement n° 115489, resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA companies' in kind contribution.