



INFRAFRONTIER

mouse disease models

INFRAFRONTIER / IMPC Promoting the international exchange of mouse mutant resources

Martin Hrabé de Angelis, Helmholtz Zentrum München

INFRAFRONTIER / IMPC Meeting, Munich, May 8th 2014



Resource and data sharing policies

- Maximize public benefit
- Drive the cycle of discovery
 - Persistence of primary data
 - Re-use of bioresources and avoid duplication of effort in resource development
 - Maximise use of large scale resource development / data collecting projects



The Rome Agenda, 2009, focus on mouse community

Opinion

Nature **461**, 171–173 (10 September 2009) | doi:10.1038/461171a; Published online 9 September 2009

Post-publication sharing of data and tools

Paul N. Schofield¹, Tania Bubela², Thomas Weaver³, Lili Portilla⁴, Stephen D. Brown⁵, John M. Hancock⁵, David Einhorn⁶, Glauco Tocchini-Valentini⁷, Martin Hrabe de Angelis⁸, Nadia Rosenthal⁹ & CASIMIR Rome Meeting participants¹⁰

The Rome Agenda

Access to data and materials

- The data on which publications are based should be made available immediately through public databases on publication. Journals should insist that mice or embryonic stem cells are deposited in a public repository within a specified time frame.
- It should become mandatory for publications to explain where and how to access data and materials generated during the investigation. Publications should acknowledge any other data or materials used, the originating sources and availability.
- Grant reviewers should be provided with clear guidelines to assess data- and material-sharing plans, whether these have been met in the application, and whether the mechanism of sharing proposed would meet appropriate

goals if the work was to be funded or ultimately published.

- Funding organizations should be willing explicitly to cover the costs of deposition of materials arising from projects as part of the project budget.

Licensing and patenting

- The public sector should patent mice as research tools only under exceptional circumstances.
- Licensing terms for mouse resources or research methods should promote the establishment of a mouse 'research commons'.
- Materials and data should be shared under the least restrictive terms possible. Material transfer agreements for sharing materials between academic and not-for-profit institutions should be avoided or simplified.
- Researchers should be free to

breed shared mice for internal research purposes and to cross-breed to develop new mouse models.

- Licensing of mice or methods for commercial use should include a broad reservation of rights for academic and not-for-profit institutions.
- Licensing terms should not include inappropriate royalty reach-through or product reach-through on subsequent inventions, and institutional policy should reflect this.

Data and resource-sharing infrastructure

- Further dedicated sustainable investment in public databases and repositories should be encouraged.
- Funding agencies should provide researchers with clear direction on

expectations for data/resource/publication sharing, and should ensure appropriate data-sharing plans at the outset of projects and facilitate sharing as data and resources are generated.

Standards and tool development

- Data structure and semantics need standardizing and adopting.
- Metadata should be consistently attached.
- Investment is needed in computational tools to make use of standards and interoperability for data sharing and reuse.

Attribution and reward

- Attribution of data or resources should be enforced by journals and databases.
- A system for measuring attribution is needed to provide rewards for data sharing.



Need for Munich Repository Workshop

- Review impact of Rome Agenda
- Progress of global resource development initiatives (IKMC / IMPC) and need for efficient resource sharing mechanisms among consortia members and for the wider mouse community
- Disruptive innovations (genome editing technologies)



Munich Repository Workshop – Meeting objectives

- Simplify the international exchange of mouse mutant resources and to define the procedural changes required to achieve this goal
- Review key issues facing the mouse community and mouse repositories
- Discussion of technical issues underpinning the international exchange of mouse mutant resources
- Focus on IP issues and the burdensome transactional negotiations involving licenses and MTAs
- Present best practices in sharing research tools



Munich Repository Workshop – Participants

- Repository Directors / EMMA node Directors
- IKMC / IMPC executives
- Technical experts (Shipment, Health monitoring, IT)



Munich Repository Workshop – Participants

- Funders: NIH
- Journals: NATURE, PLOS
- Technology Transfer / legal experts from:
 - UC Davis
 - NIH
 - JAX
 - Sanger Institute
 - Helmholtz Zentrum München
 - IGBMC / ICS



Munich Repository Workshop – Participants

In addition:

- Policy experts
- Industry
- Addgene, Structural Genomics Consortium
- Special guests



Munich Repository Workshop – Participants

Dr Nikolaus Blum
Administrative Director of
Helmholtz Zentrum München



Munich Repository Workshop – Agenda

- Introductory presentations on current challenges of mouse community
- Updates on resource development initiatives (IKMC / IMPC) / and commercialization of resources
- Technical issues underpinning mouse resource sharing (shipment, health monitoring, IT)
- Rome Agenda and impact
- Best practice examples for resource sharing from mouse community and beyond
- Focus of day 2: Panel discussions



- Publication of results/ commentary
- Develop strategy to follow up on meeting discussions
- Decisions on organizational issues / working groups
- Meeting documentation on INFRAFRONTIER website



In Memoriam – Stan Leibo

The EMMA partners offer
their condolences to the
friends and family of
Stan Leibo who passed
away on March 25th





In Memoriam – Stan Leibo

Stanley Leibo from the University of New Orleans was a renowned authority in cryobiology and a passionate teacher who headed the joint EMMA / JAX cryocourse from 1999 - 2013



10th anniversary of the EMMA-JAX annual cryopreservation course, 2009



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The INFRAFRONTIER Research Infrastructure

Martin Hrabé de Angelis, Helmholtz Zentrum München

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Selected from 150 proposals:

- BBMRI – biobanking
- EATRIS – translational research
- ECRIN – clinical trials
- ELIXIR – bioinformatics

▪**INFRAFRONTIER – animal disease models**

- INSTRUCT – structural biology

(up-dated in 2008 and 2010 for additional projects)



Building the INFRAFRONTIER Research Infrastructure

Preparatory Phase (2008-2012)

Infrafrontier Project

- **Capacity building** to meet the increasing demands
- Developing the **European Research Area**
- Developing a **business plan** based on a sustainable funding concept
- Providing a **strategic plan** for the implementation phase
- Reaching a **legal agreement** between all partners

Implementation and Operation (from 2013)

Infrafrontier Research Infrastructure

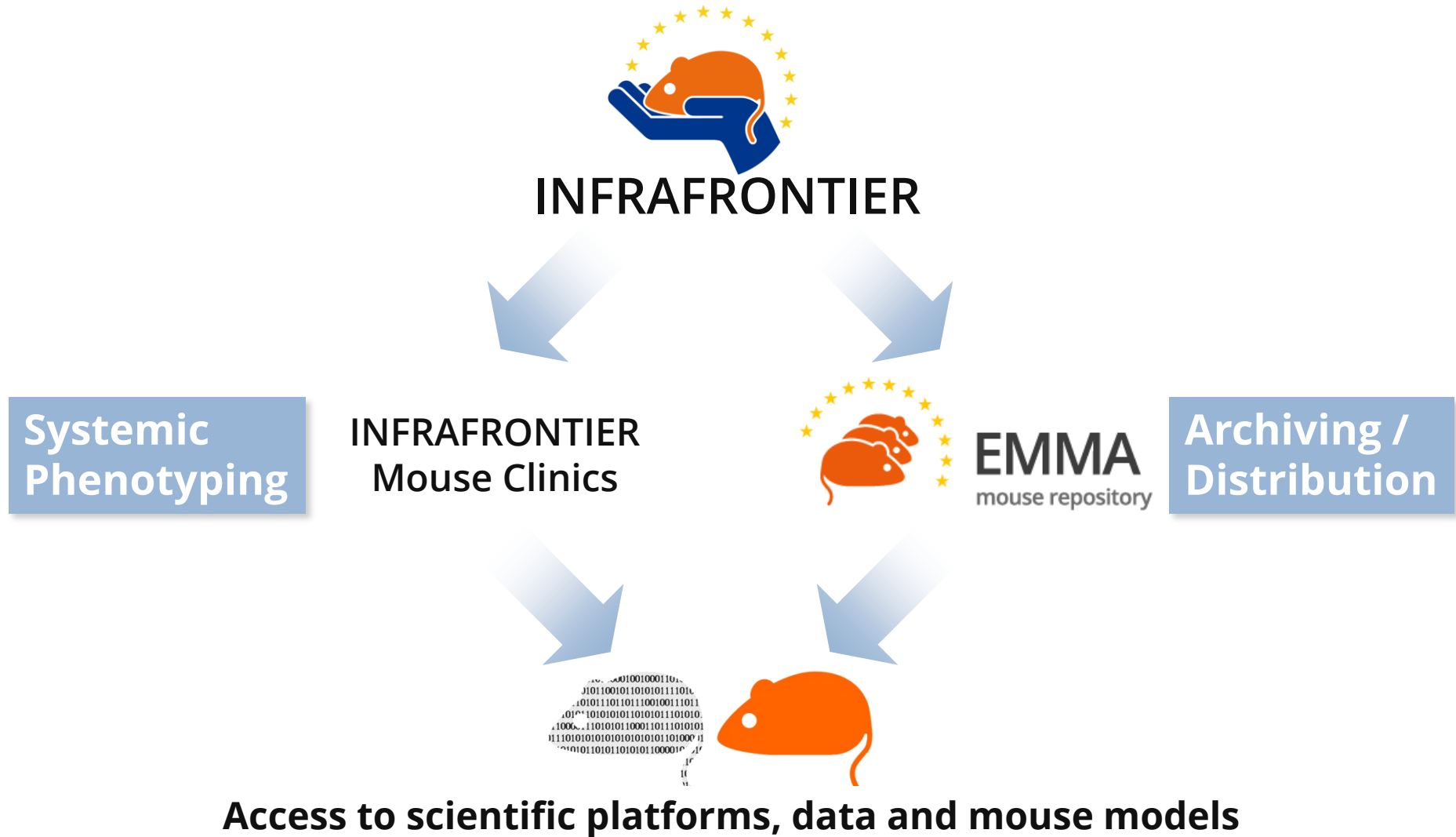
Infrafrontier Legal
Entity

National Infrafrontier
Partners

Infrafrontier-I3 Project

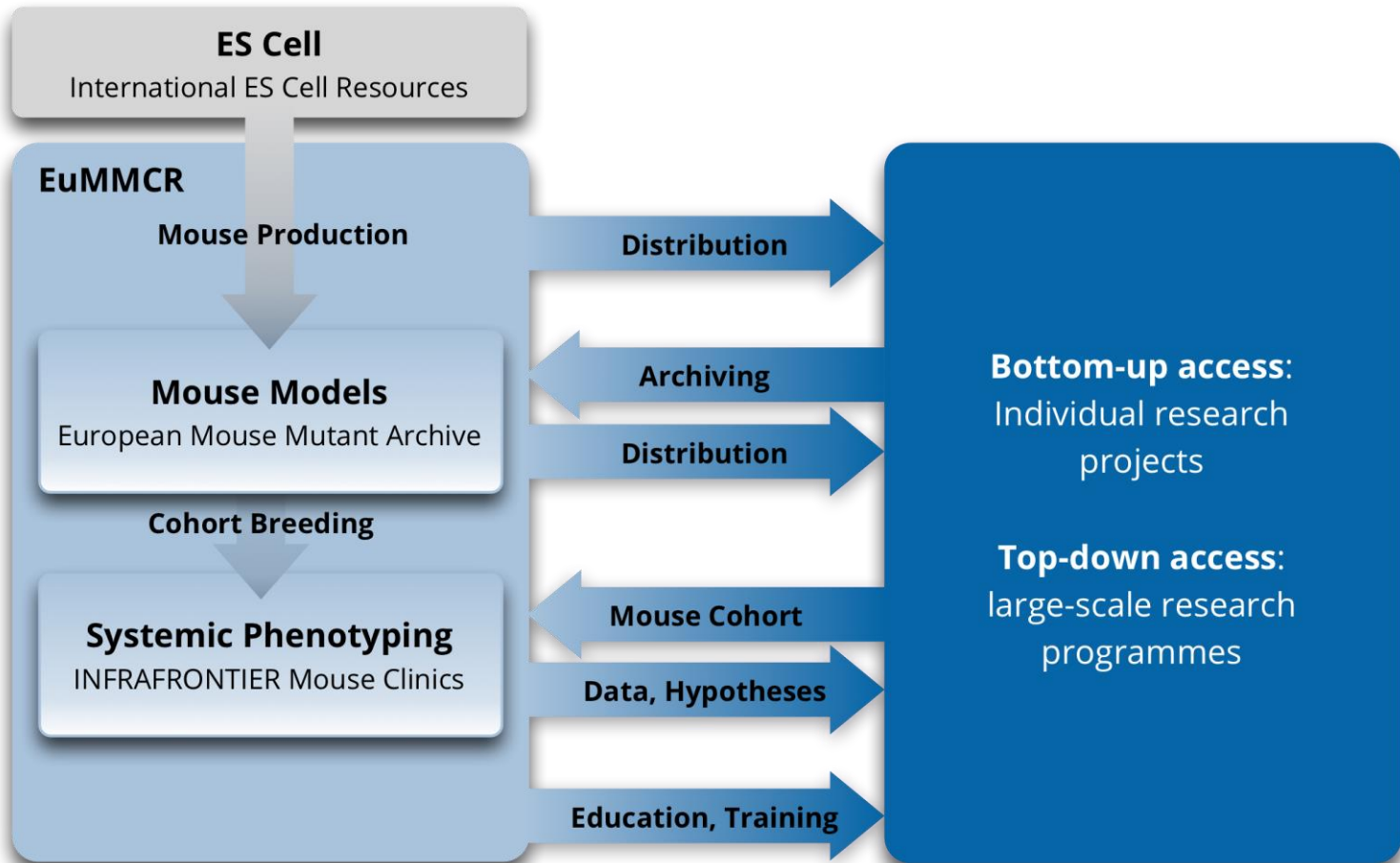


The INFRAFRONTIER Research Infrastructure





Serving the biomedical research community




INFRAFRONTIER
mouse disease models

**Biomedical Research
Community**




User access through www.infrafrontier.eu

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mouse disease models

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Infrafrontier Research Infrastructure | Resources and services | Procedures | Knowledgebase



INFRAFRONTIER core services

- European Mouse Mutant Archive (EMMA)
Archiving and distribution of mouse models
- First-line phenotyping of mouse mutants

[Learn more >](#)


EMMA strains

Search EMMA strains

Search by: Gene name/symbol, strain name, EMMA ID, OMIM name/ID, phenotype, ...


Browse EMMA strains

Strain Types | Genes | Human Diseases

[Help](#) 


Resources and Services

Deposit mice




EMMA archives your mouse mutant free of charge >

Order mice




Over 3000 mouse mutants, major collections and research tools >

Axenic service




EMMA produces germ-free mice free of charge >

NKI GEMM-ESC archive




Rapid target gene validation in complex cancer mouse models

Mouse production and phenotyping



Free of charge services for European researchers >

Training and consulting



Hands-on courses in cryopreservation and phenotyping >

News & Events

21 Mar 2014
INFRAFRONTIER IMPC Phenotyping Workshop, San Francisco, USA
[Read more >](#)

27 Feb 2014
Free of charge mouse phenotyping service for European researchers
[Read more >](#)



World-wide distribution of INFRAFRONTIER users



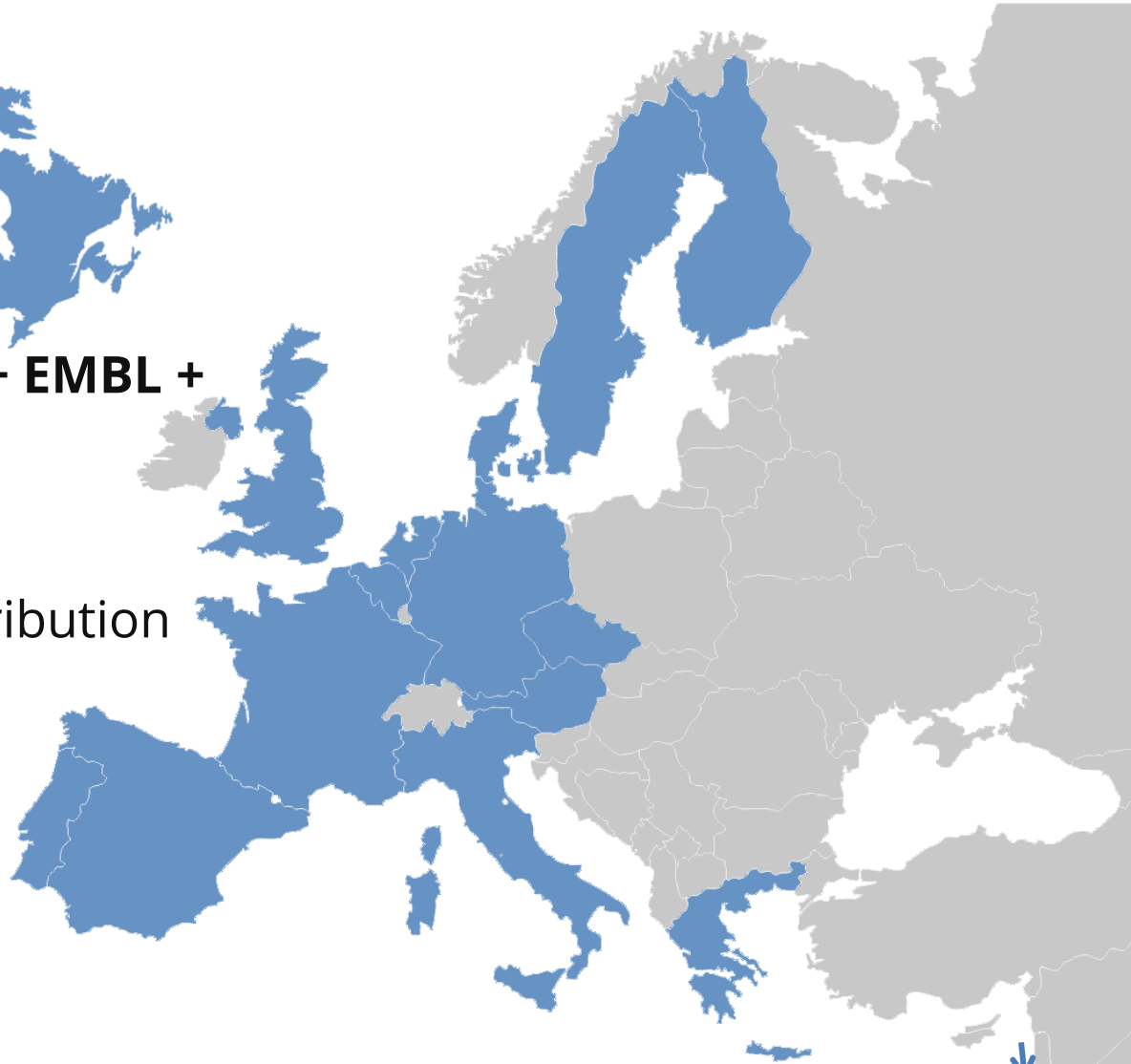
1393 user projects in 2013 alone!



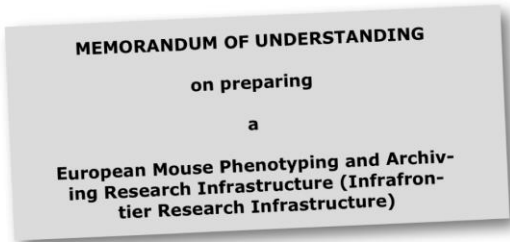
The INFRAFRONTIER partner network



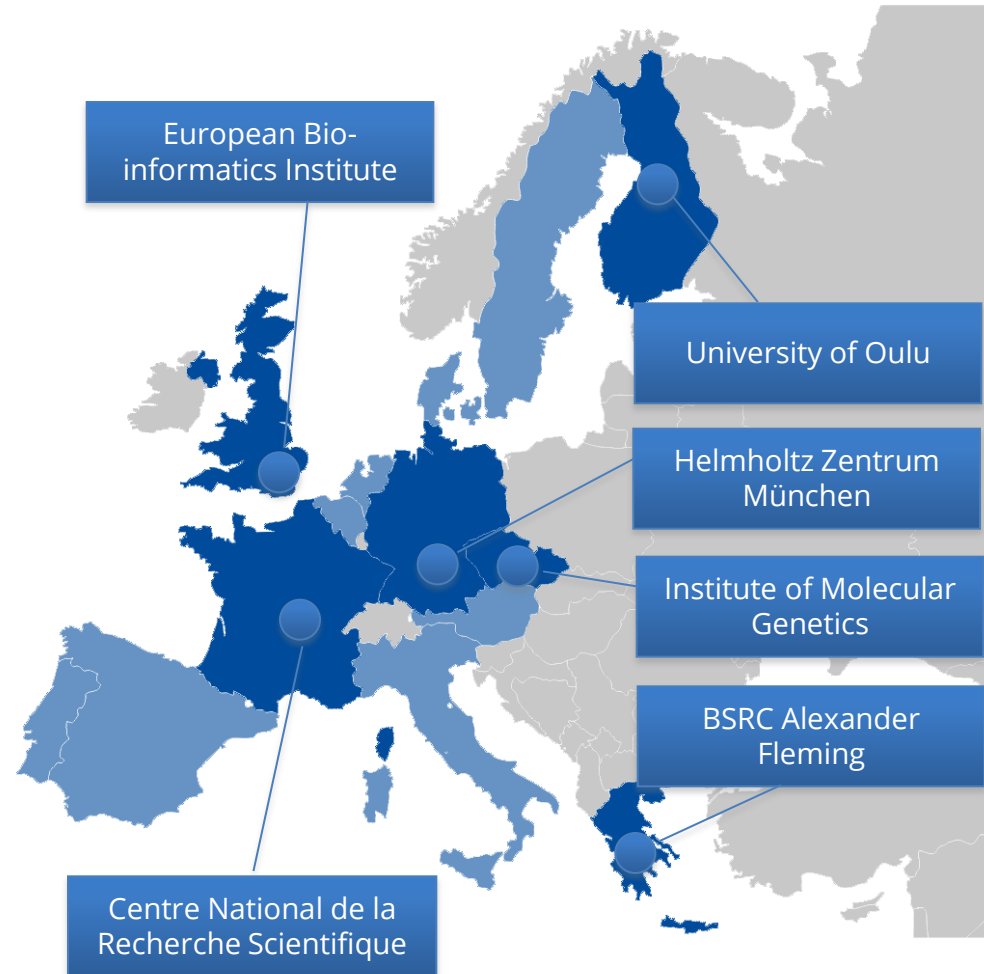
- **14 European countries + EMBL + Canada**
- Mouse clinics
- EMMA archiving and distribution nodes
- Bioinformatics



↓
Israel

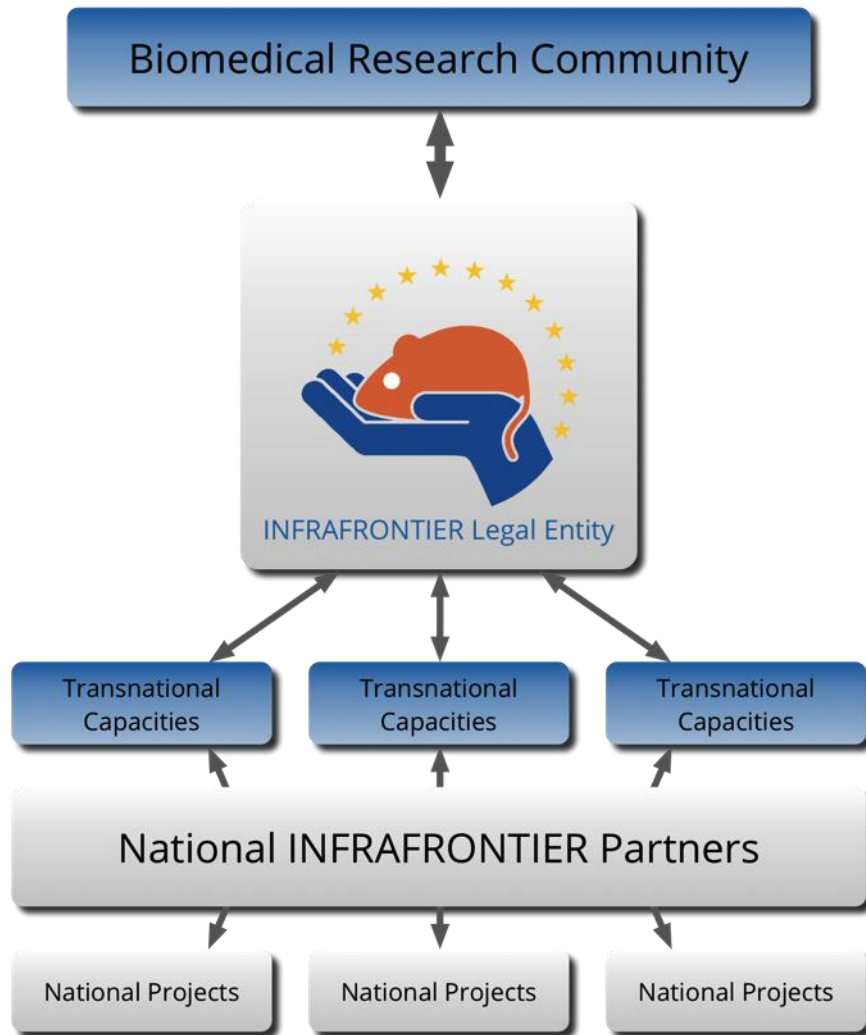


- Based on **INFRAFRONTIER MoU**
- **Partners:**
 - DE – HMGU 11 Apr 13
 - FR - CNRS 05 Dec 13
 - CZ – IMG 05 Dec 13
 - FI – U OULU 05 Dec 13
 - GR - Fleming 05 Dec 13
 - EMBL 2014
 - NL – NKI 2014
 - Sweden, Italy, Spain: coming soon





INFRAFRONTIER GmbH – Added Value



- **Users:**

- Single point of entry to all resources and services
- Guaranteed common quality standards and operation procedures
- Open access

- **Partners:**

- Risk management
- Visibility, common outreach
- Access to new users, funding, technologies

- **Funders:**

- Efficient use of resources
- Alignment of national funding policies



International Mouse Phenotyping Consortium

A comprehensive catalogue of mammalian gene function

An engine for discovering the genetic basis for disease





INFRAFRONTIER and the IMPC



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- INFRAFRONTIER partners are **major contributors** to IMPC mouse production and phenotyping efforts
- **EMMA** is one of the main repositories for the IMPC resources
- **Coordination and common strategies** required

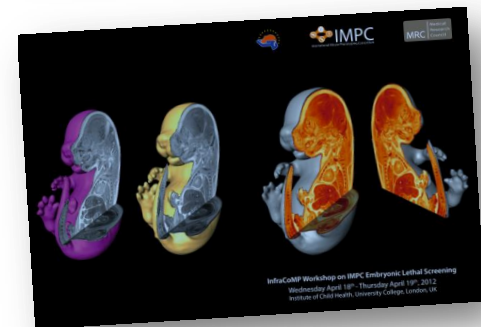


IMPC
International Mouse Phenotyping Consortium



InfraCoMP – Activities

- InfraCoMP Kick-Off – Munich, 14/15 November 2011
 - 78 participants, 4 continents
 - Focus on mouse production, phenotyping SOPs, pipeline, controls
- InfraCoMP Workshop on IMPC Embryonic Lethal Screening – London, 18/19 April 2012
 - 112 participants, 4 continents
 - Focus on IMPC embryonic screening
- INFRAFRONTIER / IMPC Korea Meeting – Jeju Island, 25-27 September 2012
 - 70 participants, 4 continents
 - Focus on Asian and complementary global activities






- IMPC / INFRAFRONTIER Rome Meeting, 02-04 December 2013
 - More than 200 participants
 - Focus on outreach to clinical / translational researchers and to industry
- IMPC / INFRAFRONTIER San Francisco Meeting, 19-20 March 2014
 - More than 60 participants
 - Phenotyping Workshop were to assess tests, progress and phenotype detection, as well as to discuss the test implementation for IMPC Phase II
- INFRAFRONTIER / IMPC Mouse Repository Workshop, Munich, 08/09 May 2014
 - Focus on mouse resource sharing




More information on <https://www.infrafrontier.eu>

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EMMA cryopreservation service

[Learn more](#)

- Archiving of mutant mouse lines free of charge
- Intellectual property rights remain with original producer
- EMMA distributes mutant mouse lines (SPF) worldwide


EMMA strains

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Procedures

Information on service fees, legal issues, health monitoring and animal welfare.
[Read more](#) [»](#)

Knowledgebase

Validated laboratory protocols and a comprehensive list of relevant publications.
[Read more](#) [»](#)

Projects


INFRAFRONTIER runs the EC-funded project INFRAFRONTIER-13 and is a key partner in the Internal Mouse Phenotyping Consortium (IMPC).
[Read more](#) [»](#)

About INFRAFRONTIER


INFRAFRONTIER is the European Research Infrastructure for phenotyping and archiving of model mammalian genomes. The INFRAFRONTIER Research Infrastructure provides access to first-class tools and data for biomedical research, and thereby contributes to improving the understanding of gene function in human health and disease using the mouse model.

The core services of INFRAFRONTIER comprise the systemic phenotyping of mouse mutants in the participating mouse clinics, and the archiving and distribution of mouse mutant lines by the European Mouse Mutant Archive (EMMA). In addition, INFRAFRONTIER provides specialised services such as the generation of germ-free mice (axenic service) and training in state of the art cryopreservation and phenotyping technologies.

European Partnership



INFRAFRONTIER is on the ESFRI Roadmap.
[Read more](#) [»](#)



INFRAFRONTIER is supported by the partner institutions, national research