AETIONOMY – Developing a "mechanism based taxonomy" of Alzheimer's and Parkinson's Disease

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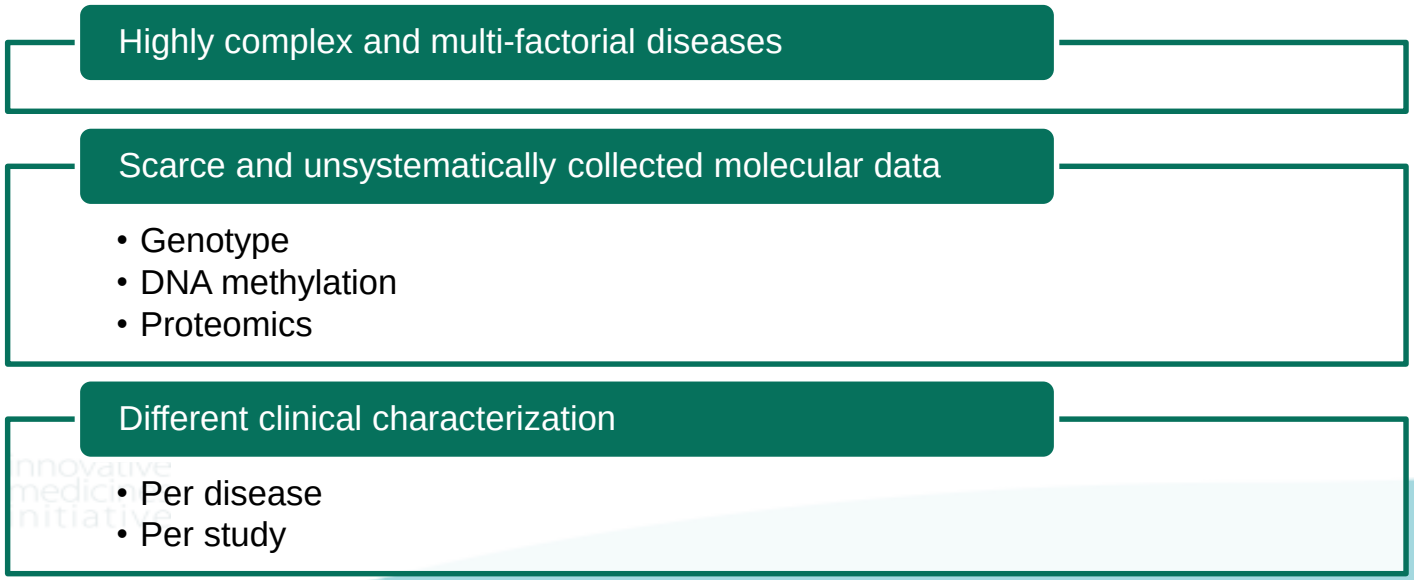
AETIONOMY: Vision & Key Challenges

Developing a "mechanism-based" taxonomy of Alzheimer's and Parkinson's Disease

- Current classification of neuro-degenerative diseases is purely phenotype based
- Vision: a molecular mechanism based classification
  - Potentially new ways of treating patients
- Project goal: **first proof of principle**

Challenges



Scientific Approach

A Truly Collaborative PPP Effort

Fraunhofer SCAI

Fraunhofer-Institut für Algorithmen und Wissenschaftliches Rechnen SCAI

Knowledge base of candidate disease mechanisms

Data management

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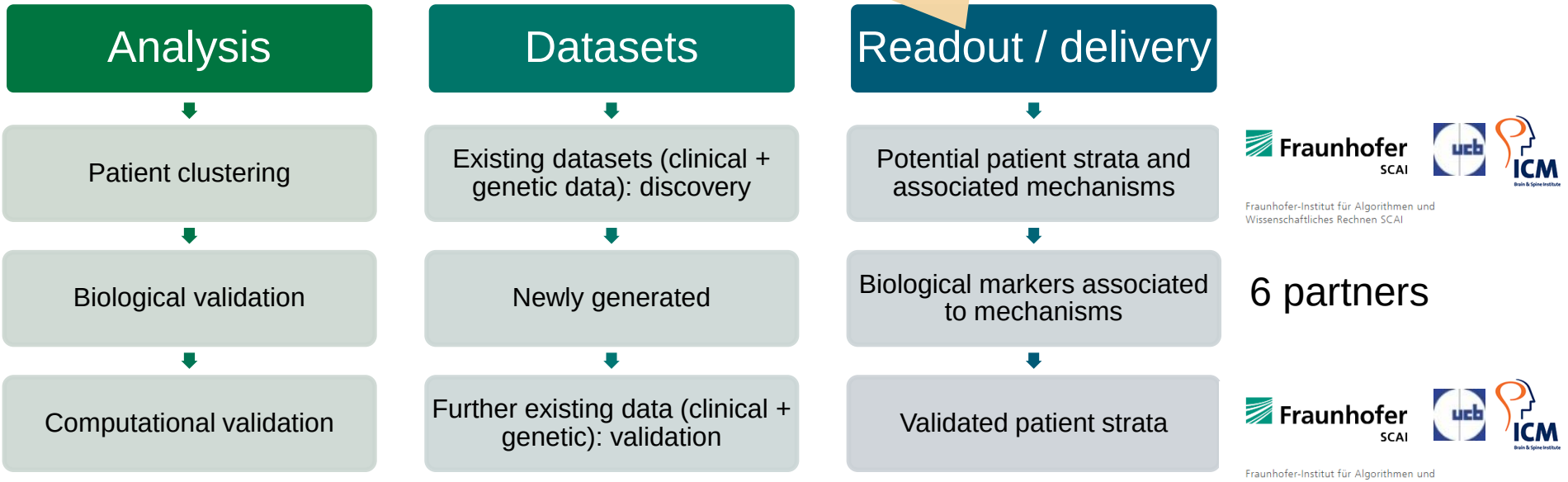

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6 partners

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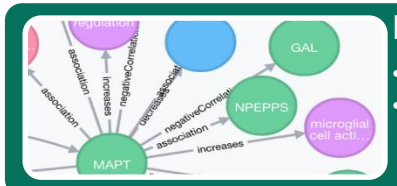
AETIONOMY Key Achievements

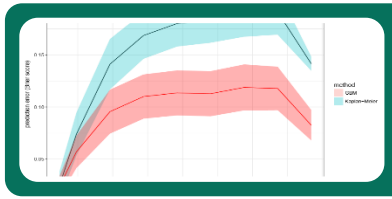


Large scale inventory of mechanistic hypotheses to map disease landscape

- Interactive, search-able
- Sustainable resource for future data mining activities

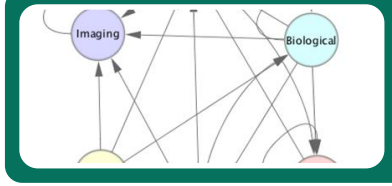
Integration and harmonization of ~100 AD + PD studies into one computational and sustainable environment

- 14 EFPIA datasets

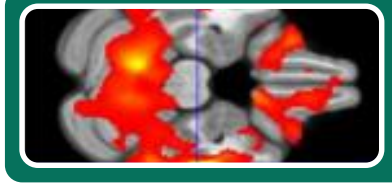


Computational methods to validate stratification potential and use for clinical outcome prediction

- AD risk model
- PD diagnosis model
- Genotype based (joint + separate) stratification of Parkinson‘s and Alzheimer‘s Disease



Concepts and first proof of concepts for simulating virtual patient cohorts



Experimental validation of disease mechanisms and biomarkers

- New link between mitochondrial dysfunction and neuro-inflammation in PD
- DNA methylation patterns in PD candidate mechanisms
- Validation of >15 neuro-inflammatory protein markers in AD
- Validation of YKL40 as a biomarker for AD

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Impact of AETIONOMY

Resources	Inventory of mechanistic hypotheses	Future scientific insights
	Integrated data	
Computational Methods and Tools	Clustering approaches	Experiences and tools for future projects.
	Prediction models	
	Virtual cohorts	
Experiences & insights	New scientific findings	
	How to develop a disease taxonomy?	Role model for future IMI projects.

A first step towards mechanistically driven treatment of neuro-degenerative diseases.

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