

The (long-awaited) FAIR Digital Object

Lorentz center
Jointly Designing a Data FAIRPORT
Workshop: 13 - 16 January 2014, Leiden, the Netherlands

Scientific Organizers

- Scott Lusher, NLeSC Amsterdam
- Barend Mons, Leiden UMC

Topics

- Towards a Modular Blueprint 'Floor-plan' of a Safe and Fair Data Stewardship, Trading and Routing Environment
- A Public Private Partnership to Ensure Long Term Solutions for Data In the eScience Era.

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Image Structure Plan: Scripted Report by ICAP Architecture/Leiden; Photo design: Superflex Studio, NL

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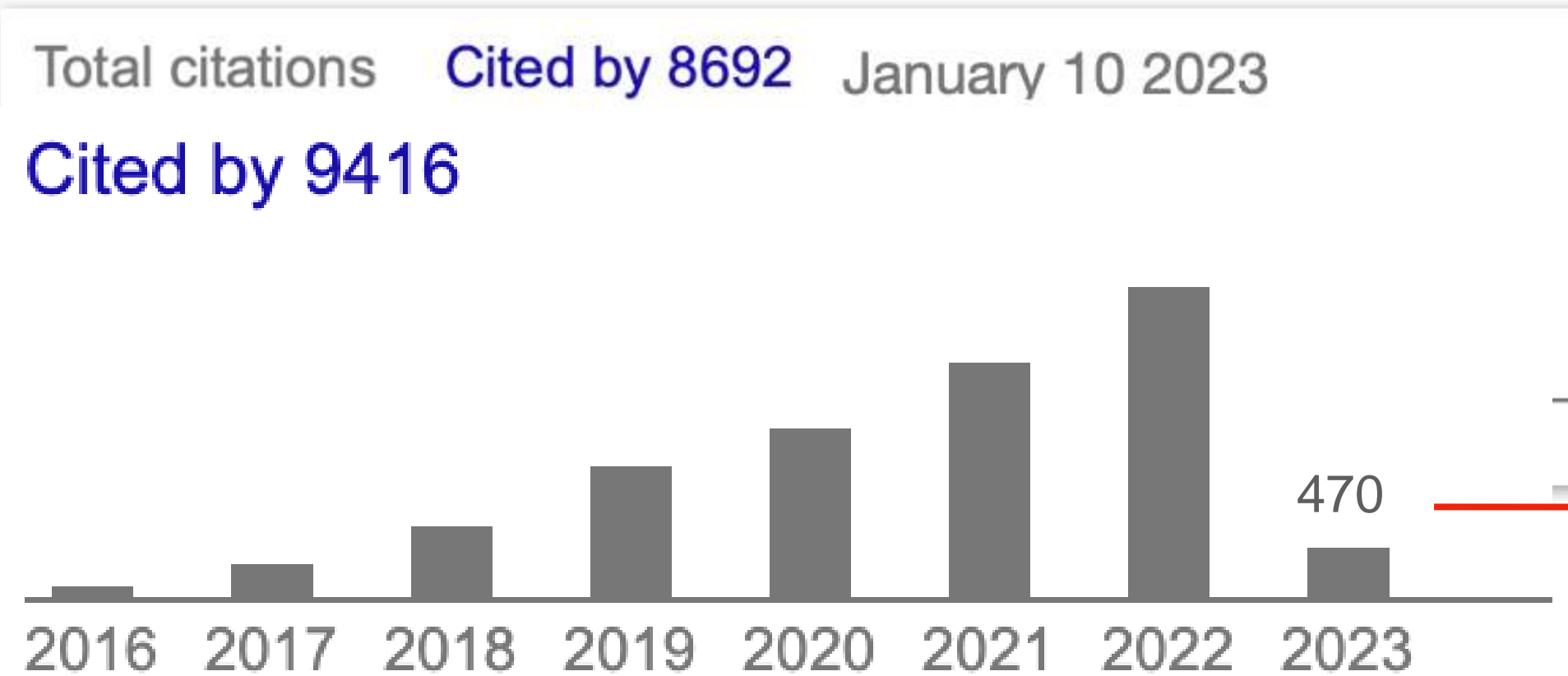
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The FAIR Guiding Principles for scientific data management and stewardship

[Mark D. Wilkinson](#), [Michel Dumontier](#), [IJsbrand Jan Aalbersberg](#), [Gabrielle Appleton](#), [Myles Axton](#), [Arie Baak](#), [Niklas Blomberg](#), [Jan-Willem Boiten](#), [Luiz Bonino da Silva Santos](#), [Philip E. Bourne](#), [Jildau Bouwman](#), [Anthony J. Brookes](#), [Tim Clark](#), [Mercè Crosas](#), [Ingrid Dillo](#), [Olivier Dumon](#), [Scott Edmunds](#), [Chris T. Evelo](#), [Richard Finkers](#), [Alejandra Gonzalez-Beltran](#), [Alasdair J.G. Gray](#), [Paul Groth](#), [Carole Goble](#), [Jeffrey S. Grethe](#), [Jaap Heringa](#), [Peter A.C. 't Hoen](#), [Rob Hooft](#), [Tobias Kuhn](#), [Ruben Kok](#), [Joost Kok](#), [Scott J. Lusher](#), [Maryann E. Martone](#), [Albert Mons](#), [Abel L. Packer](#), [Bengt Persson](#), [Philippe Rocca-Serra](#), [Marco Roos](#), [Rene van Schaik](#), [Susanna-Assunta Sansone](#), [Erik Schultes](#), [Thierry Sengstag](#), [Ted Slater](#), [George Strawn](#), [Morris A. Swertz](#), [Mark Thompson](#), [Johan van der Lei](#), [Erik van Mulligen](#), [Jan Velterop](#), [Andra Waagmeester](#), [Peter Wittenburg](#), [Katherine Wolstencroft](#), [Jun Zhao](#) & [Barend Mons](#) ✉ [— Show fewer authors](#)

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...the FAIR Principles put specific emphasis on **enhancing the ability of machines to automatically find and use the data**, in addition to supporting its reuse by individuals.

pseudo-FAIR

FAIR PRINCIPLES – TECHNOLOGY-RELATED

Findable:

- F1. (meta)data are assigned a globally unique and persistent identifier;
- F2. data are described with rich metadata;
- F3. metadata clearly and explicitly include the identifier of the data it describes;
- F4. (meta)data are registered or indexed in a searchable resource;

Interoperable:

- I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- I2. (meta)data use vocabularies that follow FAIR principles;
- I3. (meta)data include qualified references to other (meta)data;

Accessible:

- A1. (meta)data are retrievable by their identifier using a standardized communications protocol;
 - A1.1 the protocol is open, free, and universally implementable;
 - A1.2. the protocol allows for an authentication and authorization procedure, where necessary;
- A2. metadata are accessible, even when the data are no longer available;

Reusable:

- R1. (meta)data are richly described with a plurality of accurate and relevant attributes;
 - R1.1. (meta)data are released with a clear and accessible data usage license;
 - R1.2. (meta)data are associated with detailed provenance;
 - R1.3. (meta)data meet domain-relevant community standards;

FAIR PRINCIPLES – SOCIAL CONTRACT—RELATED

Findable:

- F1. (meta)data are assigned a globally unique and **persistent** identifier;
- F2. data are described with **rich** metadata;
- F3. metadata clearly and explicitly include the identifier of the data it describes;
- F4. (meta)data are registered or indexed in a searchable resource;

Interoperable:

- I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- I2. (meta)data use vocabularies **that follow FAIR principles**;
- I3. (meta)data include qualified references to other (meta)data;

Accessible:

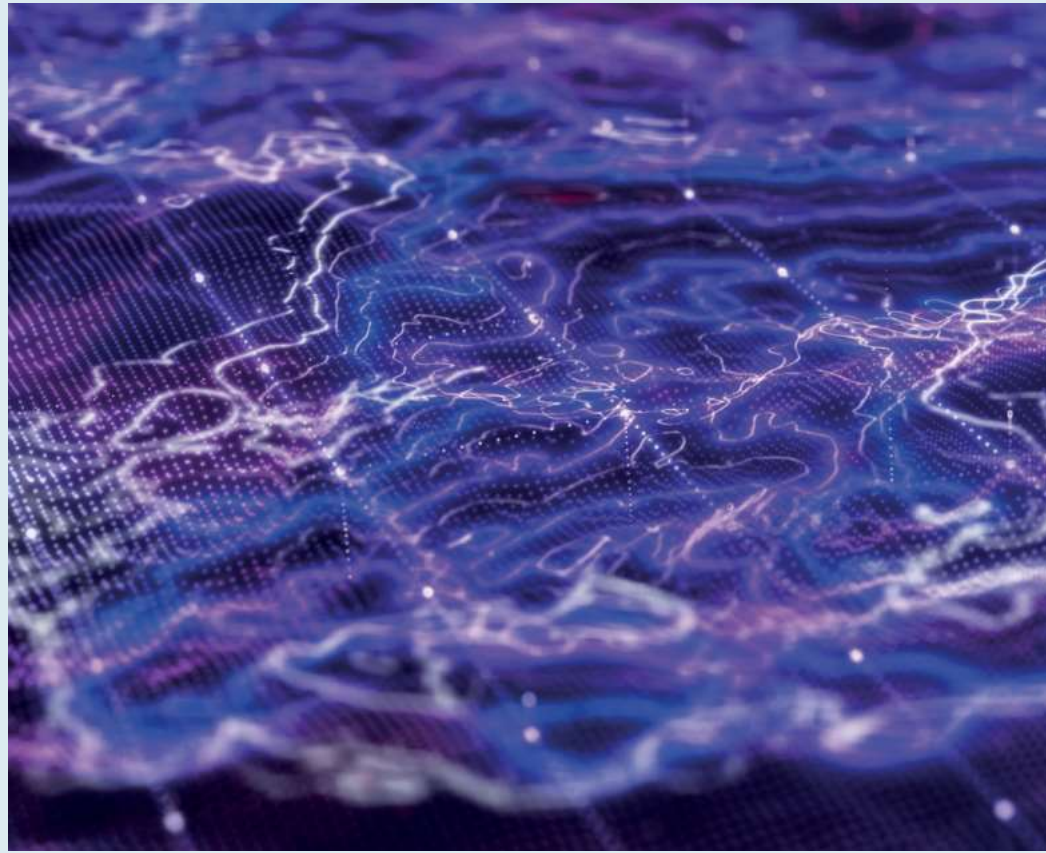
- A1. (meta)data are retrievable by their identifier using a standardized communications protocol;
 - A1.1 **the protocol is open, free, and universally implementable**;
 - A1.2. the protocol allows for an authentication and authorization procedure, where necessary;
- A2. metadata are accessible, **even when the data are no longer available**;

Reusable:

- R1. (meta)data are **richly** described with a plurality of **accurate and relevant** attributes;
 - R1.1. **(meta)data are released with a clear and accessible data usage license**;
 - R1.2. (meta)data are associated with **detailed** provenance;
 - R1.3. (meta)data meet **domain-relevant community** standards;

Failed PIDs and unreliable PID implementations

February 2023



GUPRI

Intended Defined Meaning



The Machine knows what I mean

FAIR ~~≡~~ The next standard

FAIR ~~≡~~ Open by default

FAIR ~~≡~~ (Just) for people

FAIR ~~≡~~ For all data



FAIR → Findable, Accessible, Interoperable, Reusable

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□ [The FAIR Guiding Principles for scientific data management and stewardship](#) 8038 2016
MD Wilkinson, M Dumontier, IJJ Aalbersberg, G Appleton, M Axton, ...
Scientific data 3

Hype term →

- In the top 5% of all research outputs scored by Altmetric
- One of the highest-scoring outputs from this source (#1 of 2,285)
- High Attention Score compared to outputs of the same age (99th percentile)

FAIR →

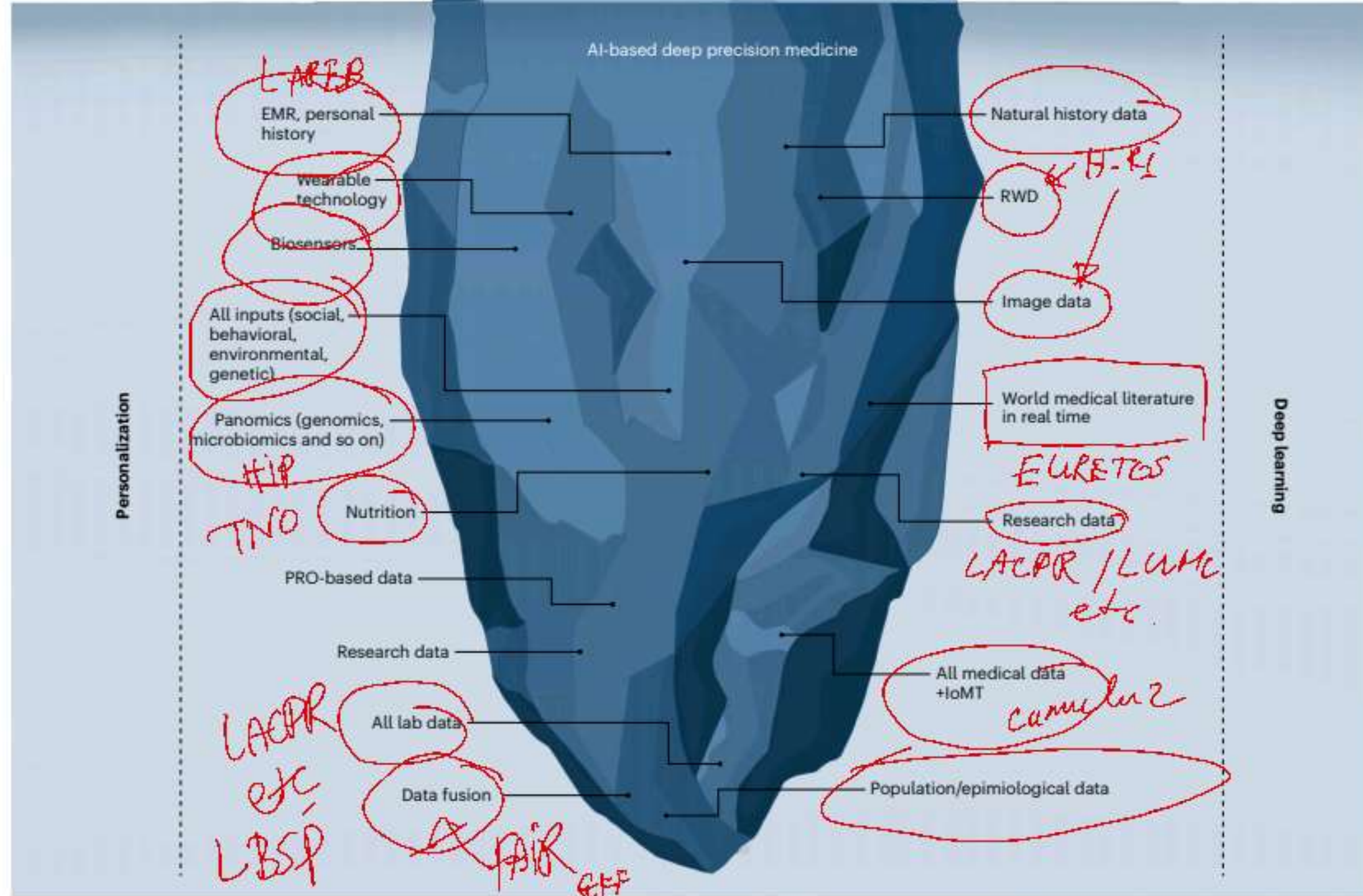
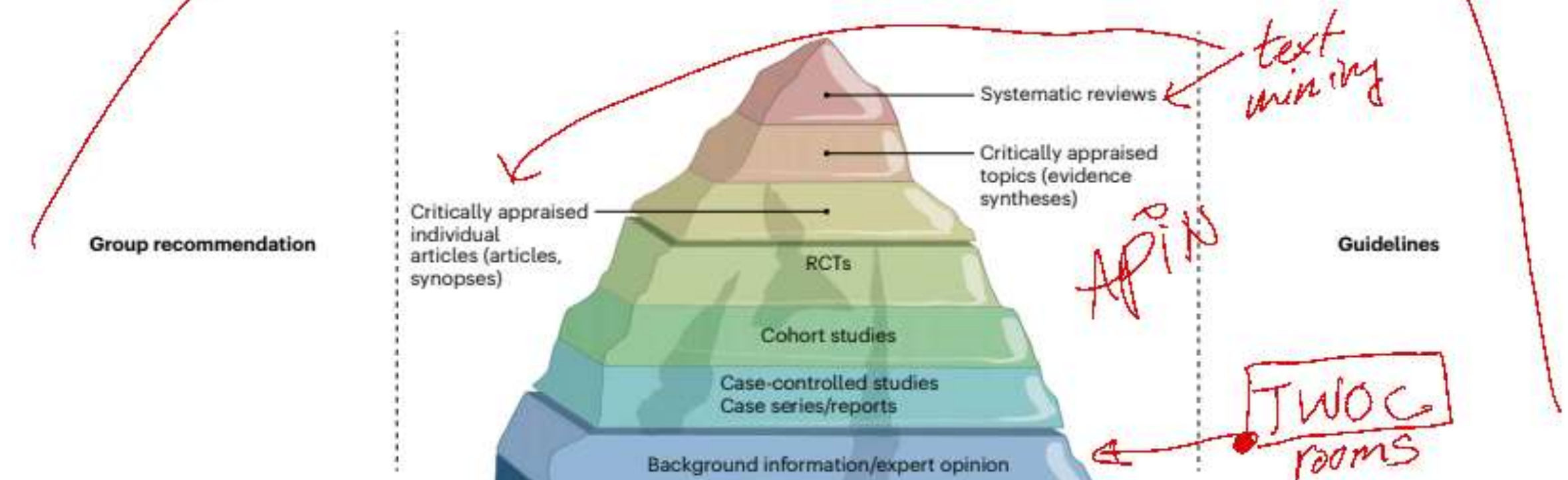
Fully AI Ready →



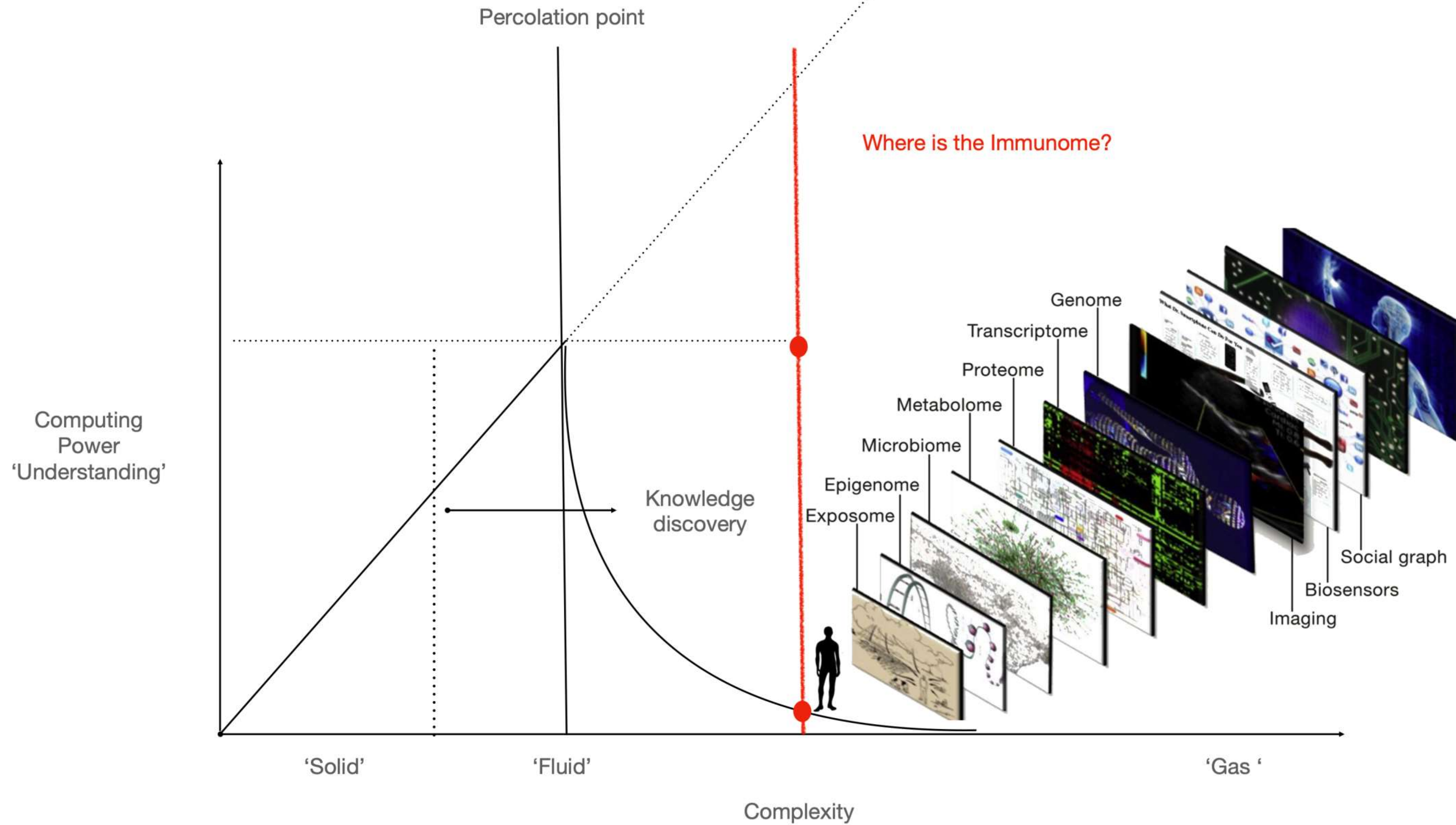
The Machine knows what we mean !

Ah....., as a side effect We know what the machine means

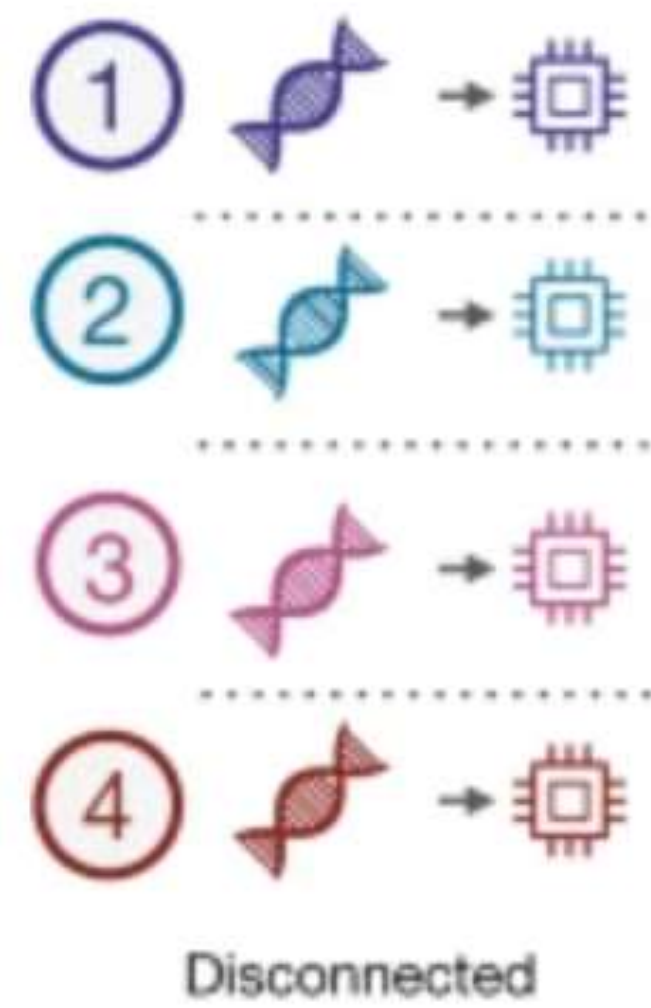
analysis



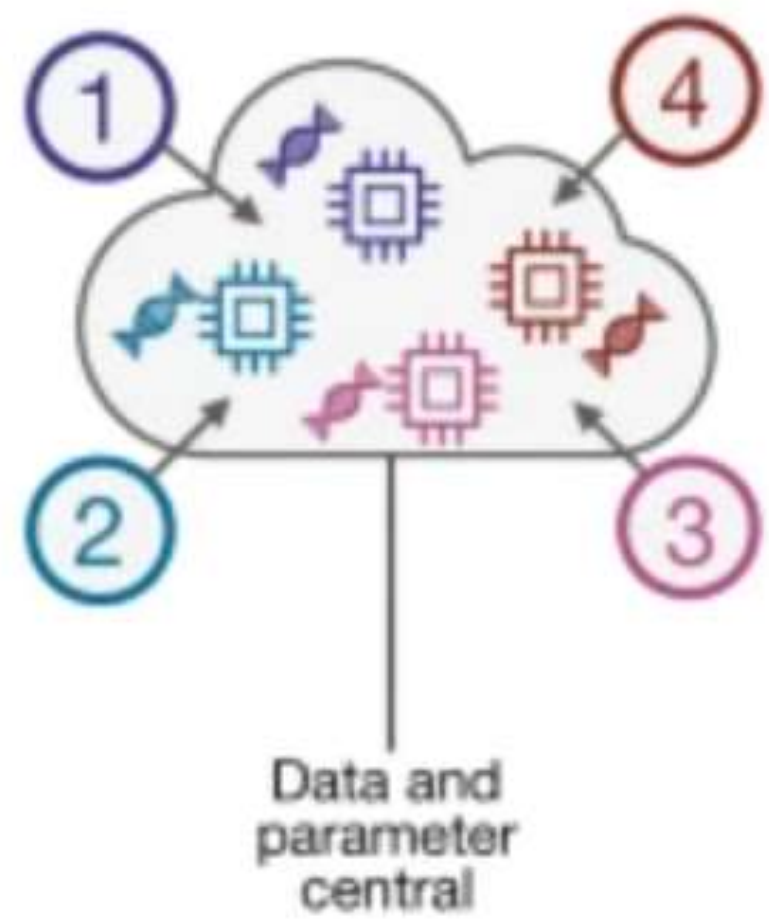
Chaos is just order, but perceived by a lesser mind



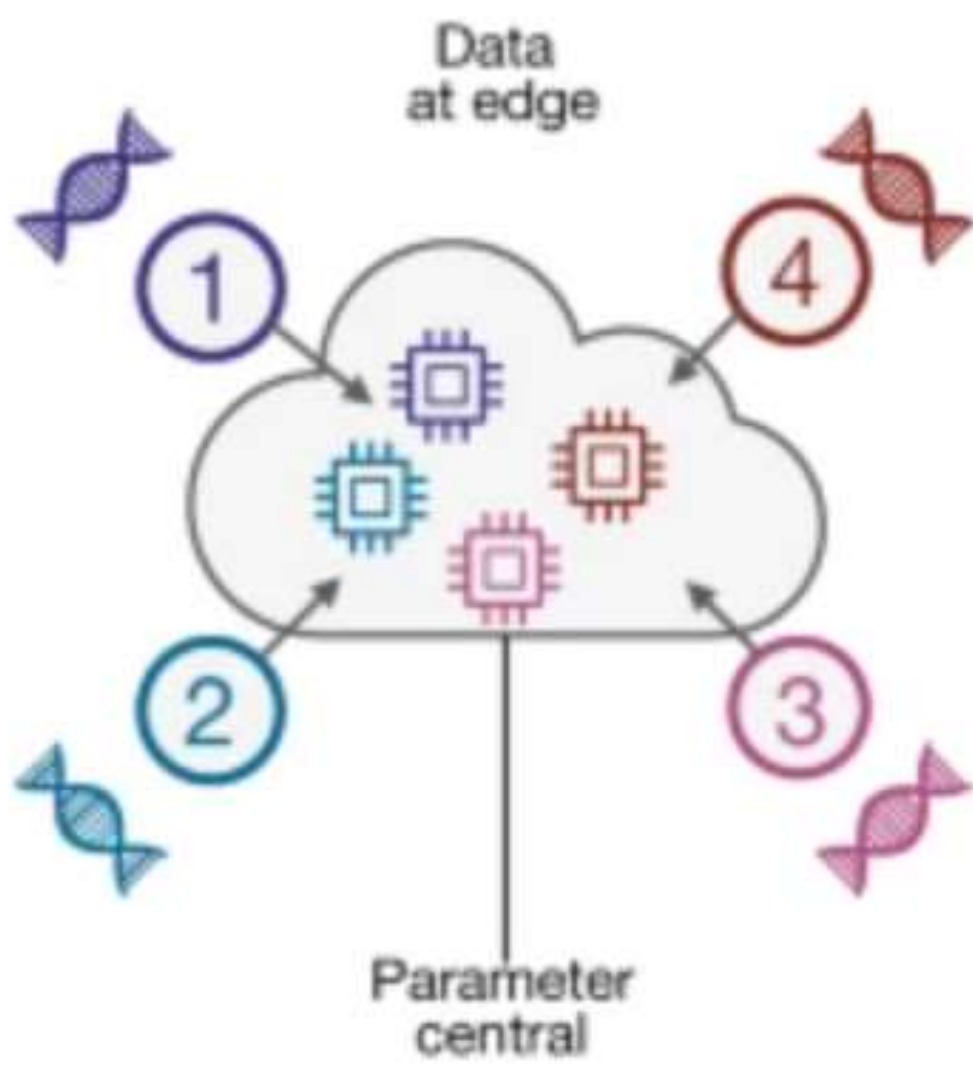
a Local learning



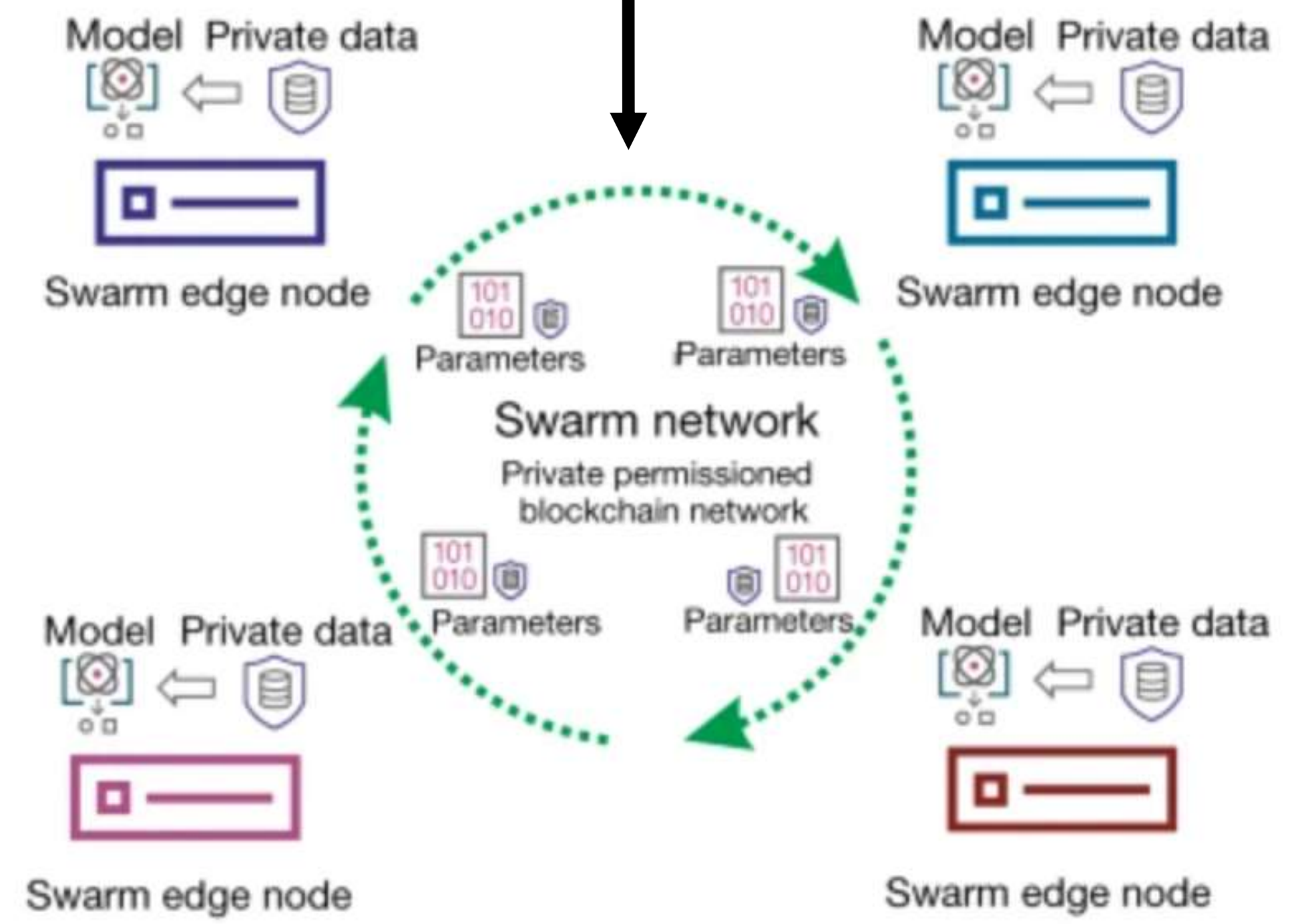
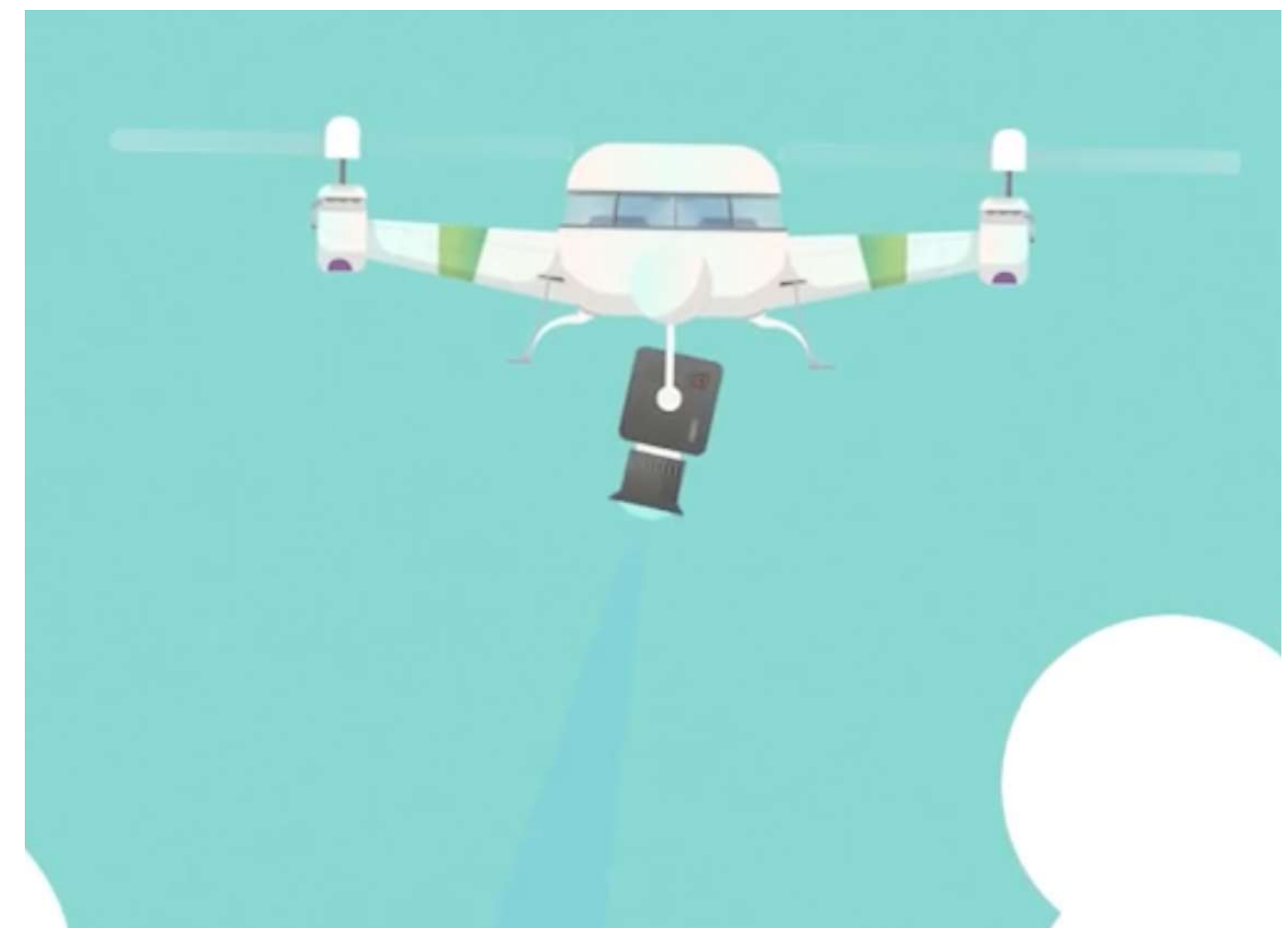
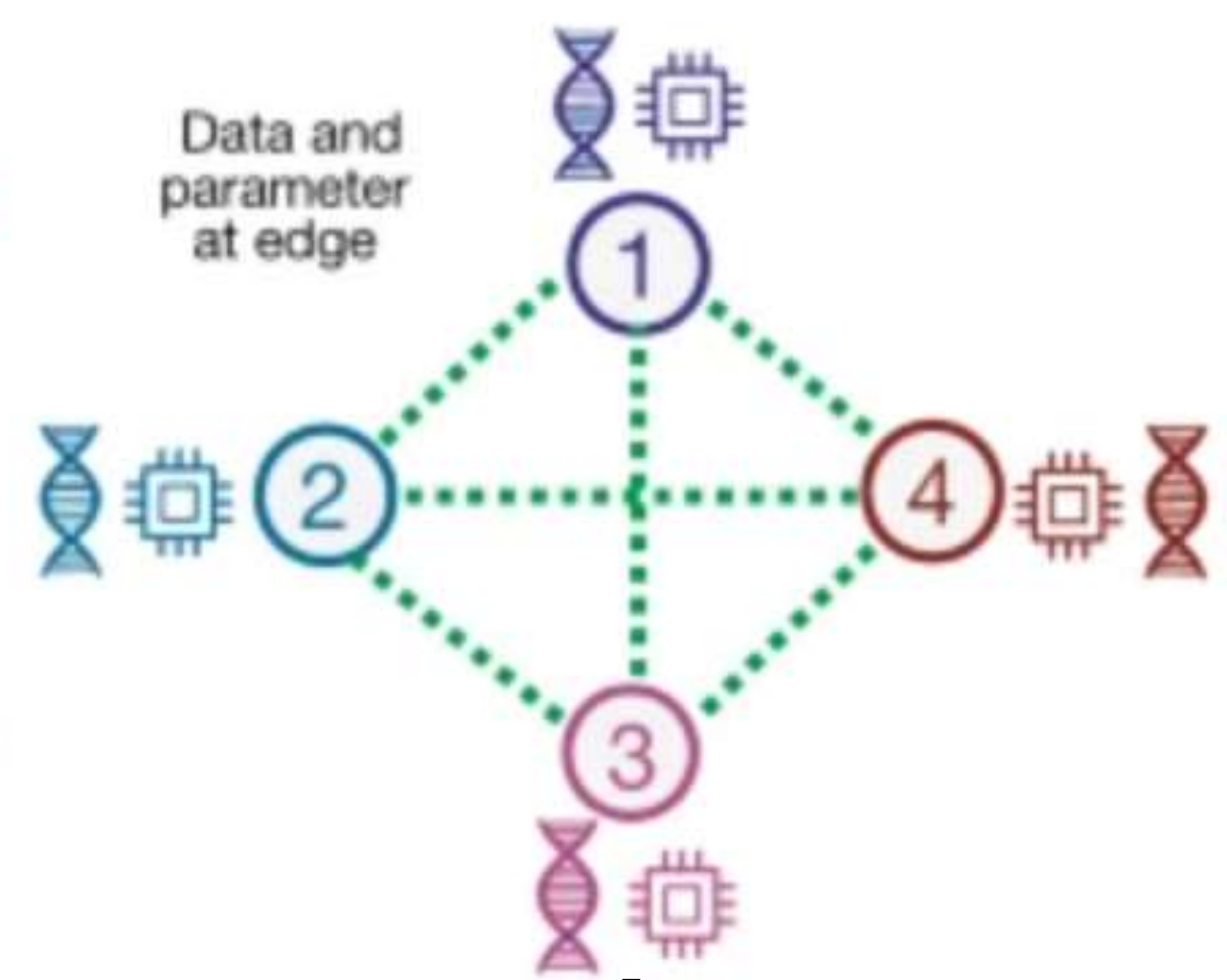
b Central learning



c Federated learning

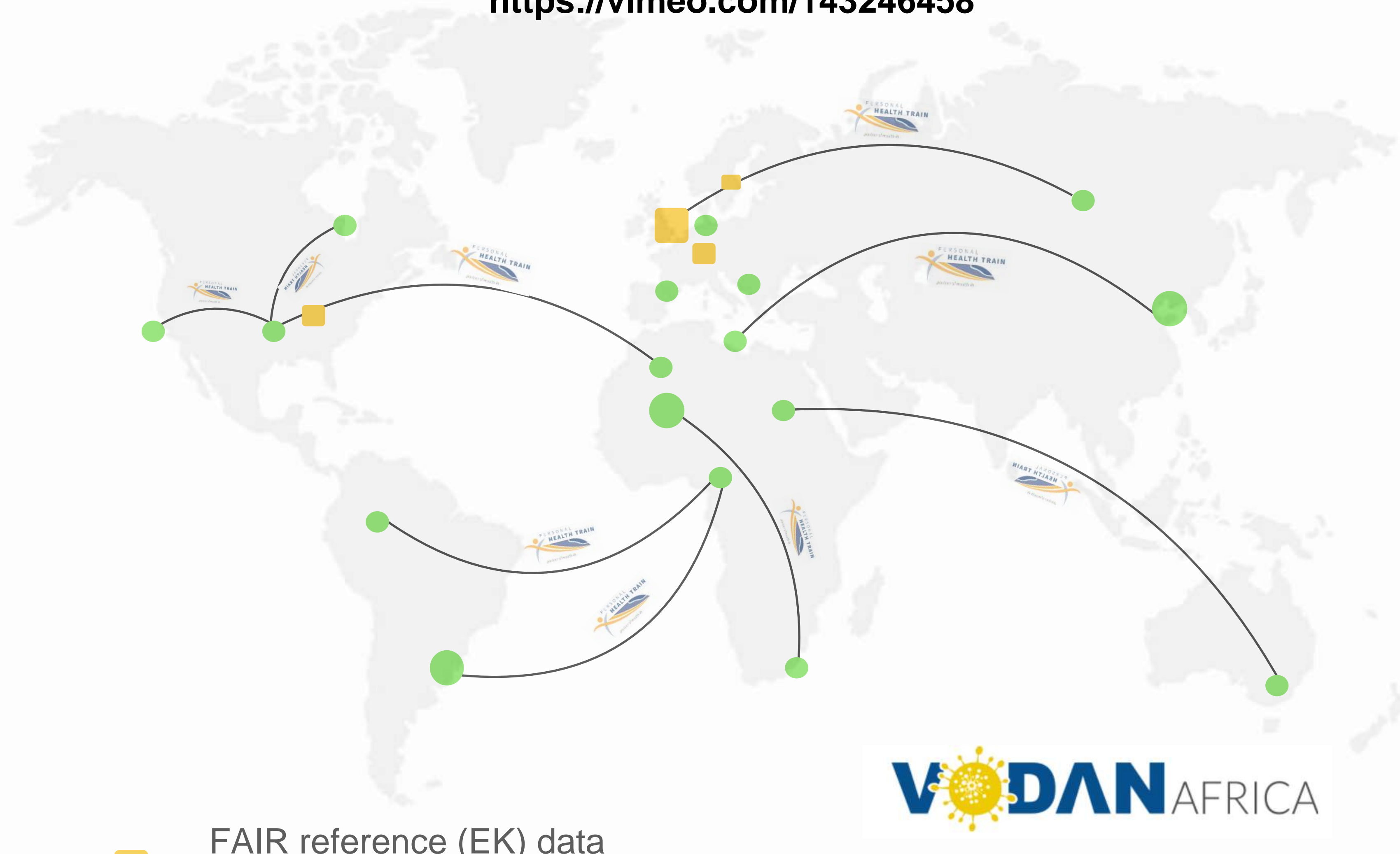


d Swarm Learning



Towards Data Visiting

<https://vimeo.com/143246458>



FAIR reference (EK) data

FAIR RWD data

Trains - FAIR

algorithms



Start Data Visiting!



Barend Mons 08-03-2023



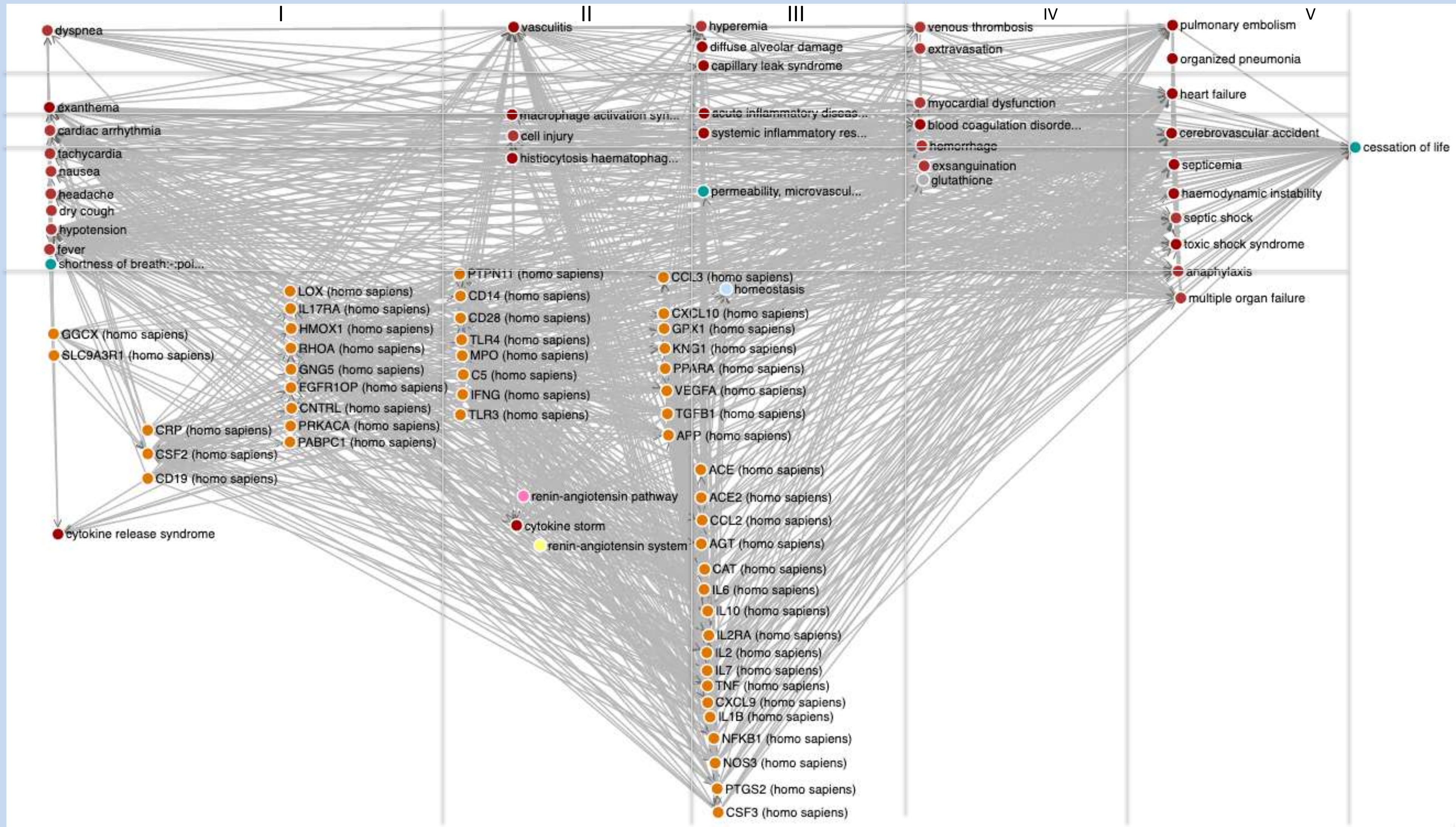
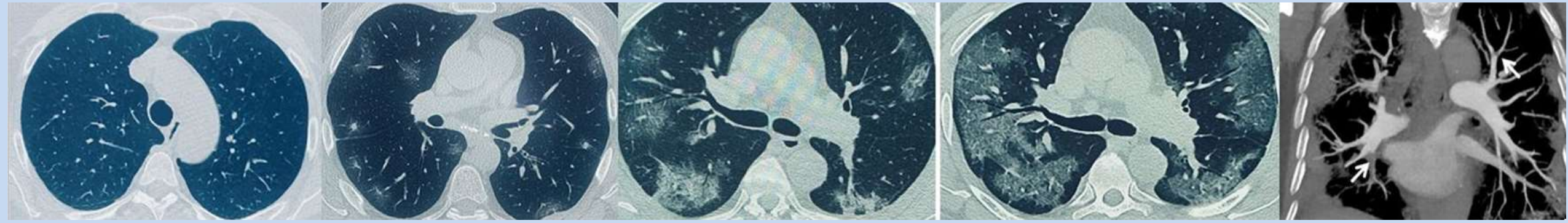
FAIR Connect

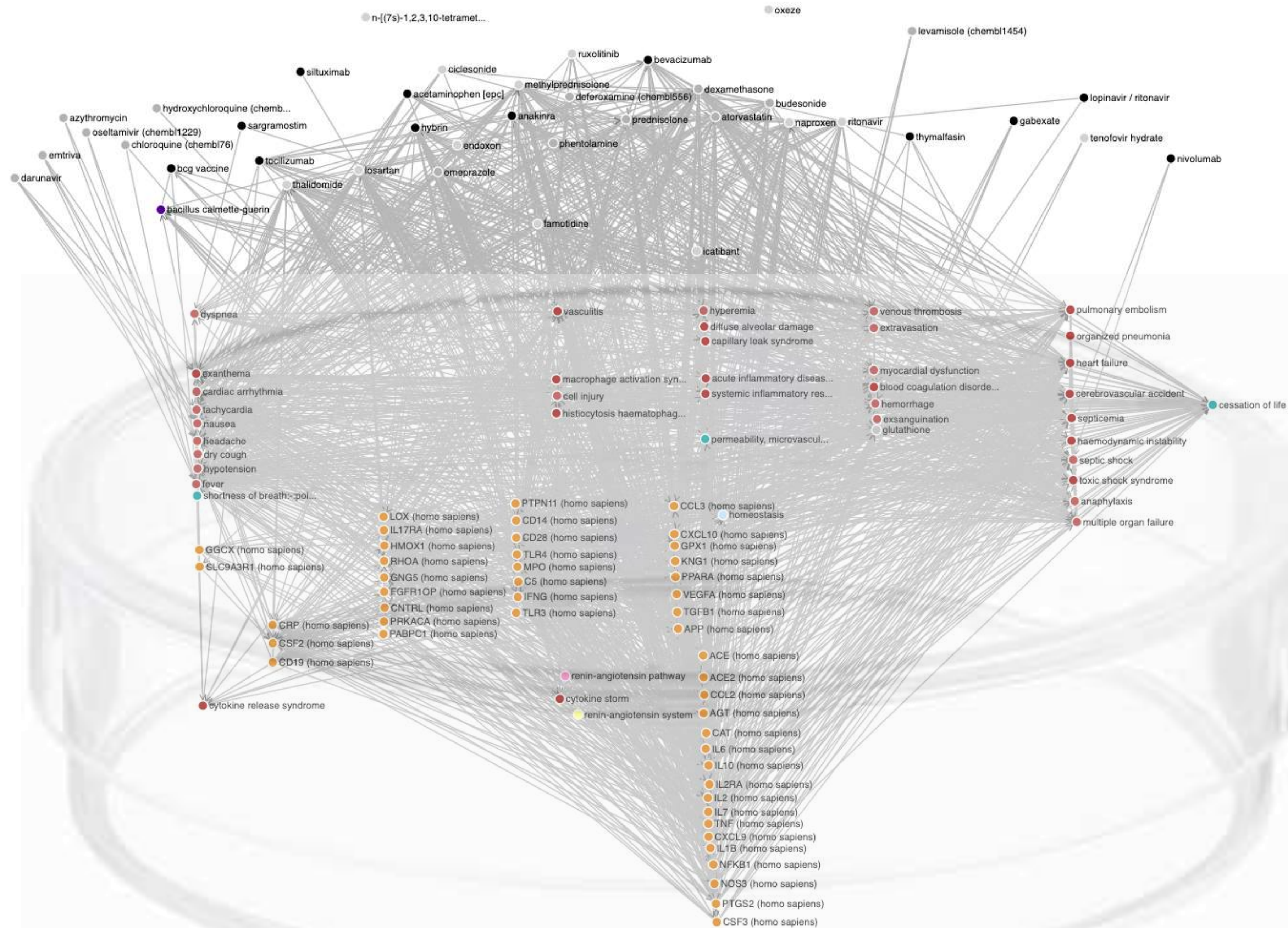
Empowering Data Stewardship

FAIR Connect is an Open Access publishing platform for the development and dissemination of good practices for professional FAIR-Data stewardship.

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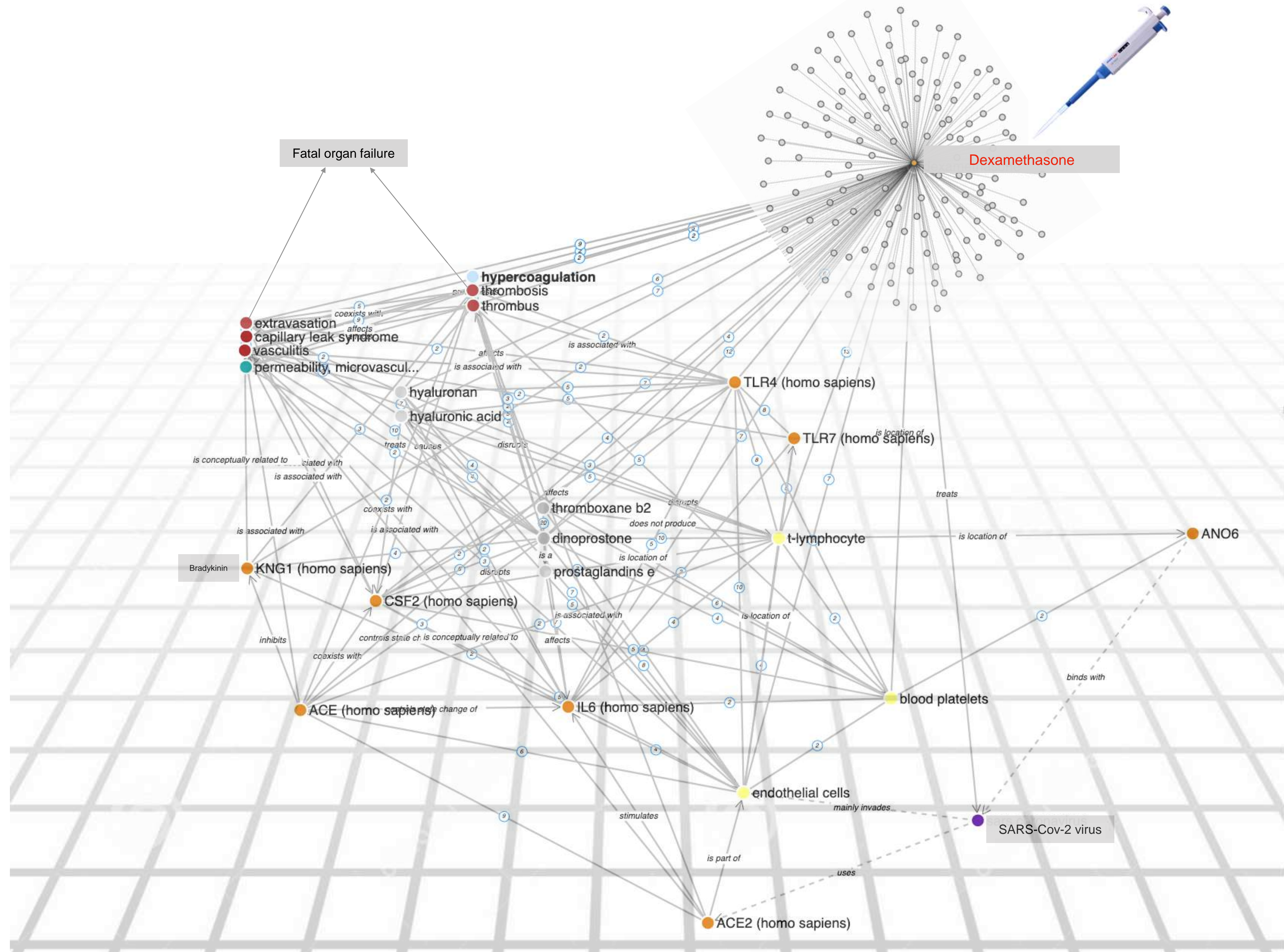
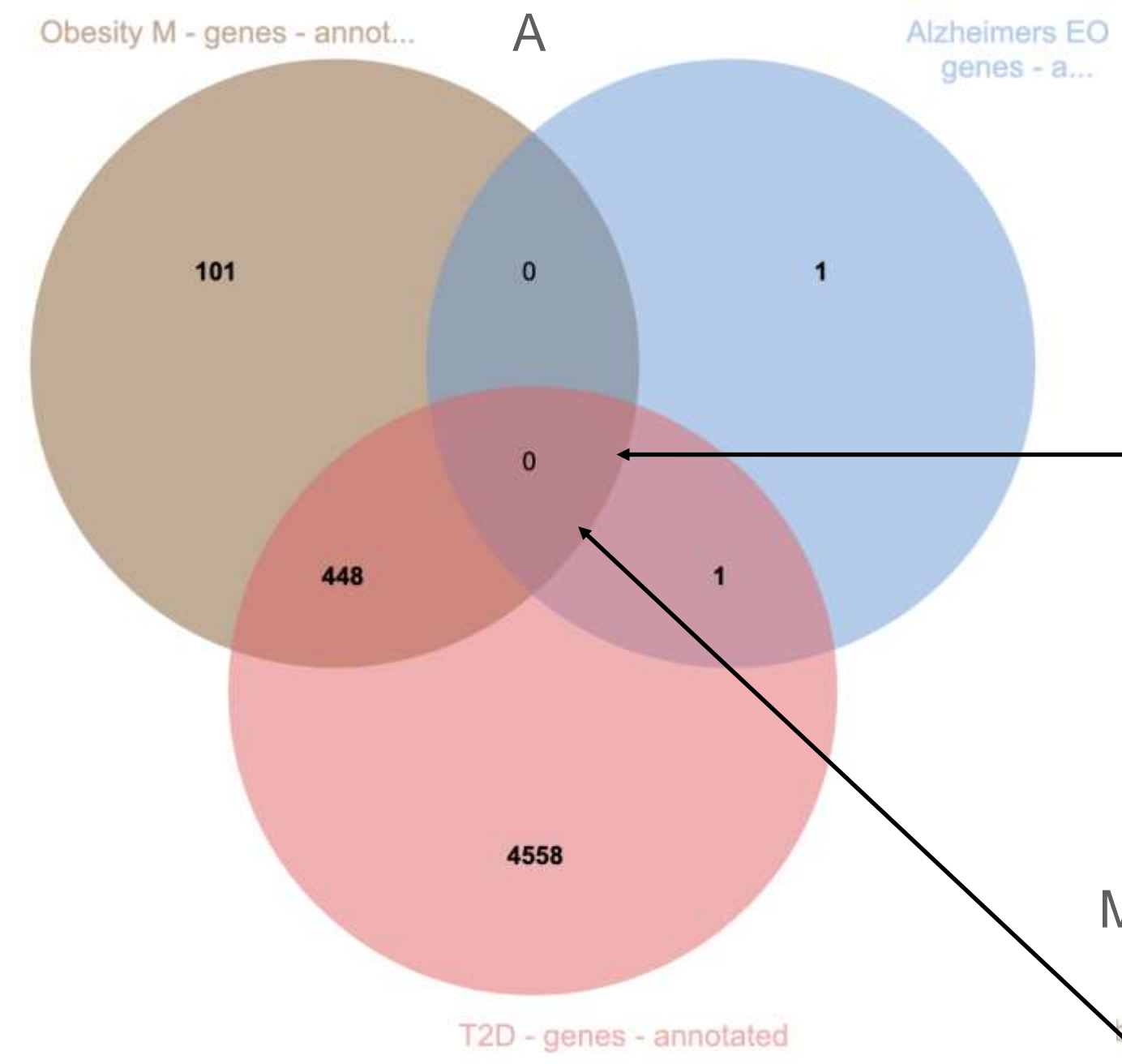
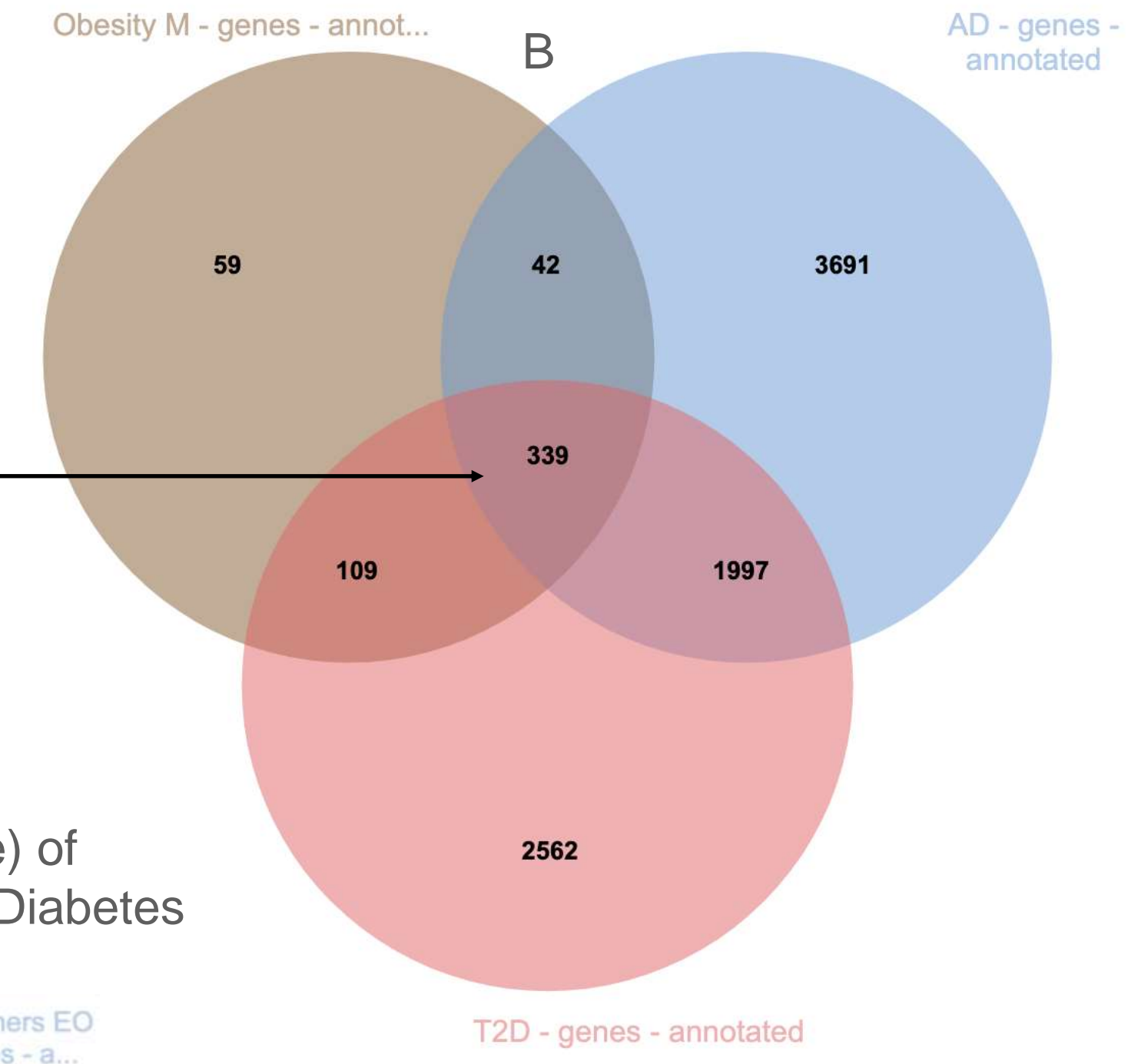


Fig.12

Knowlets (qua-genes, annotated) of Morbid Obesity, Early Onset Alzheimer and Type 2 Diabetes



Knowlets (qua-genes, annotated) of Morbid Obesity, Alzheimer and Type 2 Diabetes



Knowlets (qua-genes, co-occurrence) of Morbid Obesity, Alzheimer and Type 2 Diabetes

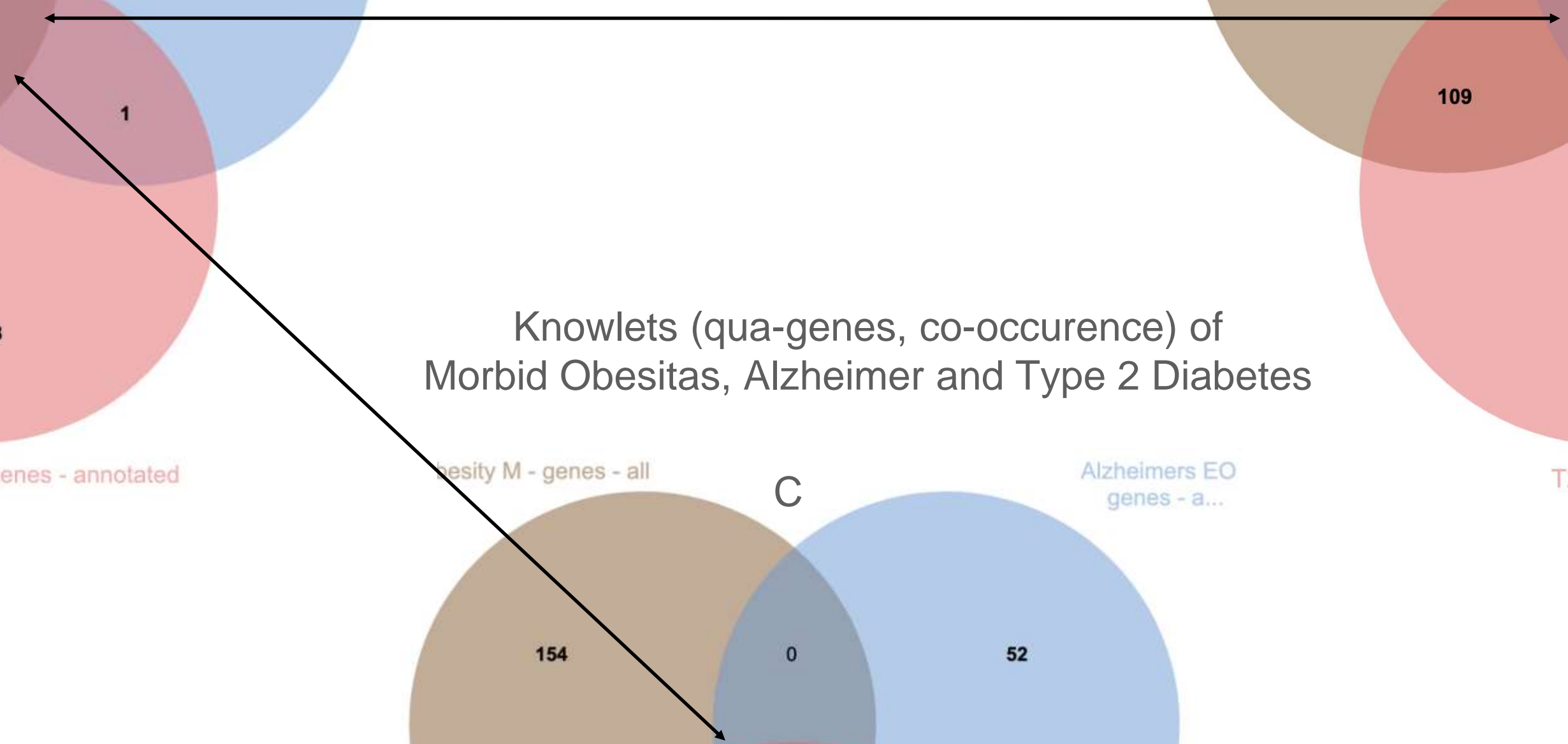
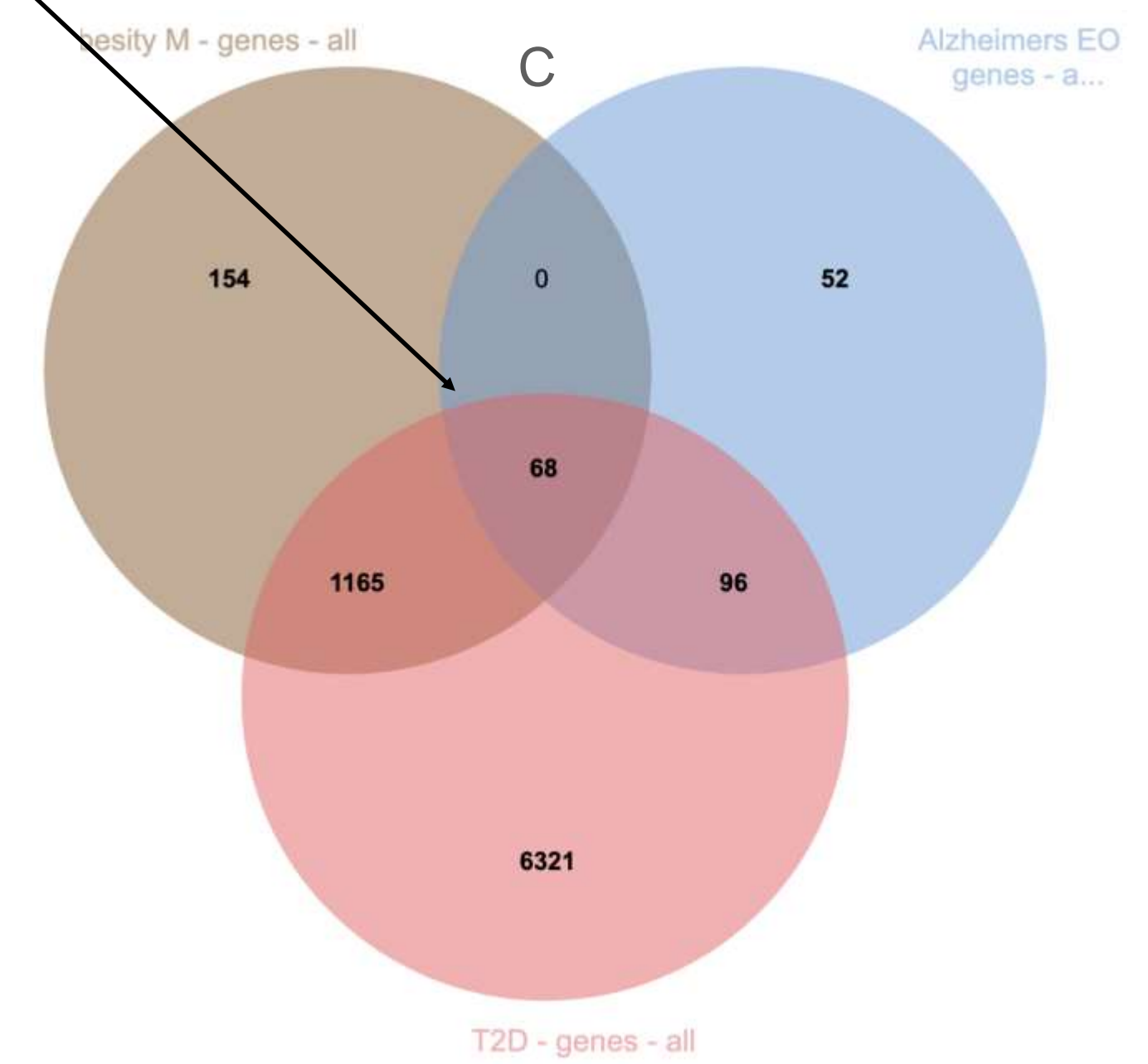
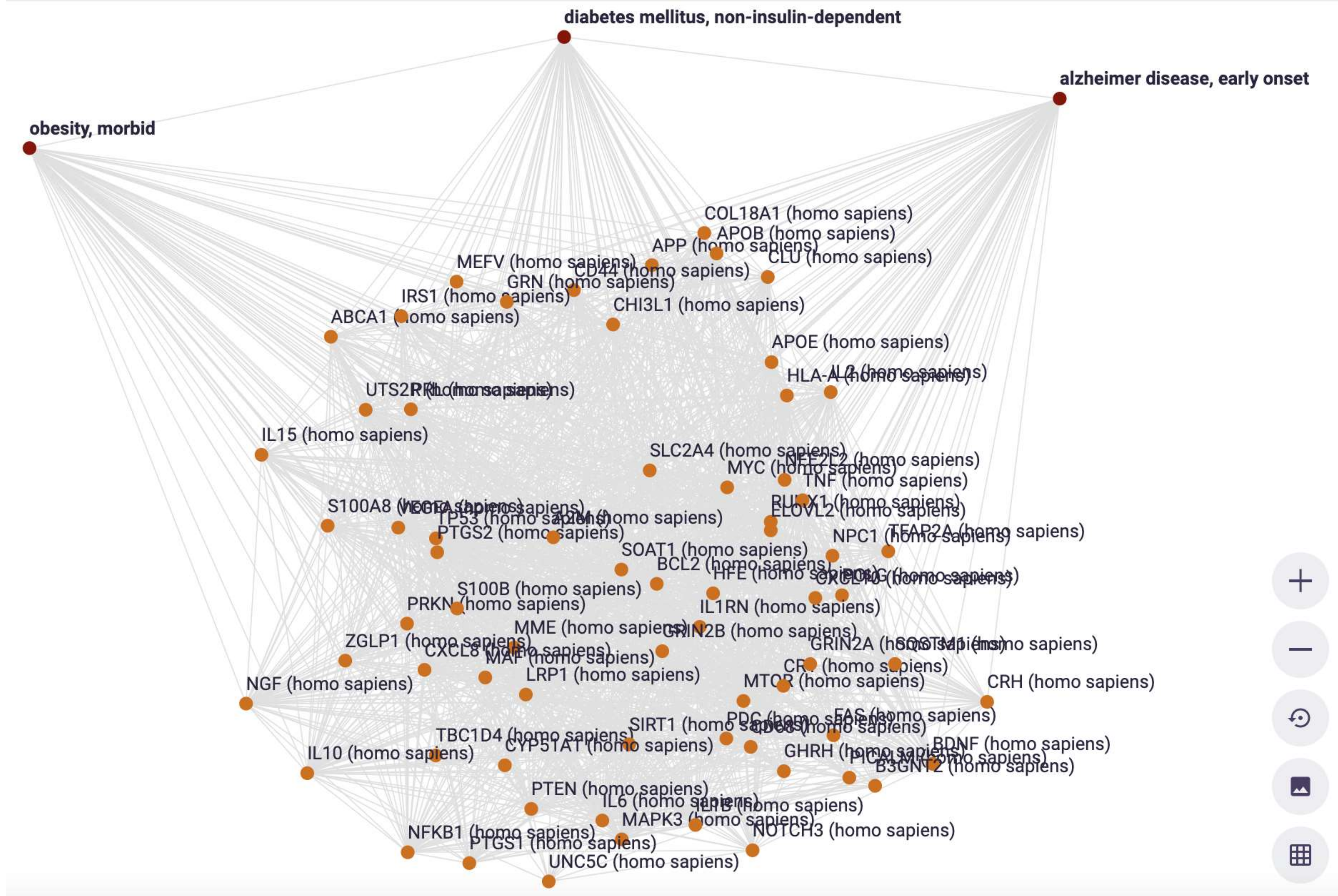


Fig.13



FAIR Digital Twins

