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## **Siduri: an integrative information system for next generation fermented foods**

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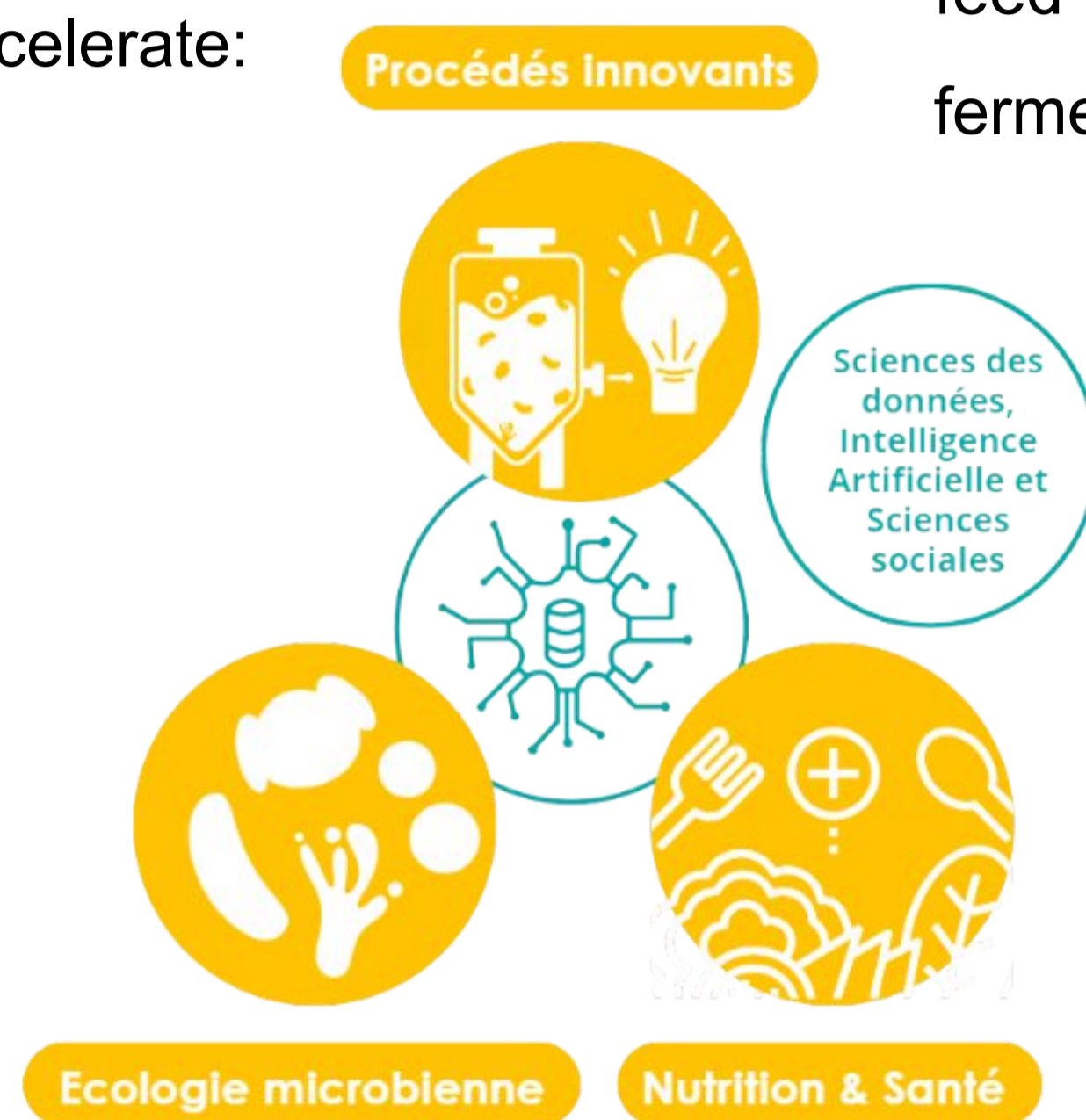
# Siduri : an integrative information system for next generation fermented foods

With the increase in environmental and climatic risks, society's expectations in terms of food have radically evolved towards safer, healthier and more sustainable food. It is in this context that the Ferments du Futur (FdF) program led by INRAE and Ania was launched in autumn 2022, funded with 48,3 M€ by France 2030 [1]. This program and its public-private consortium aim to accelerate research and innovation in ferments, fermented foods and biopreservation over the next 10 years (<https://www.fermentsdufutur.eu>).

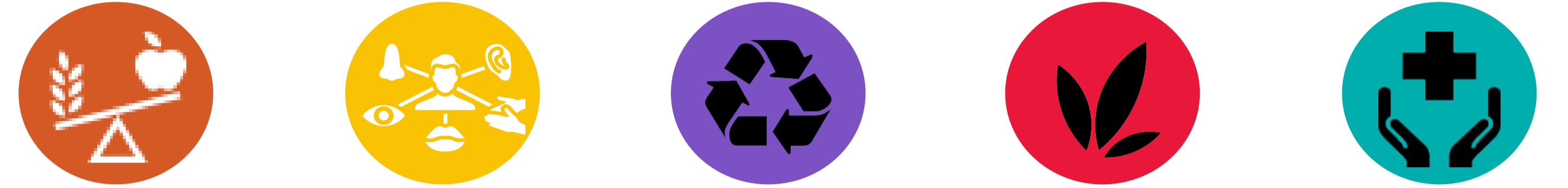
## 4 strategic axes for research and innovation

The FdF program is a **public-private** partnership that will accelerate:

- 1 The design of stable microbial communities derived from natural biodiversity and adapted to target matrices/processes.
- 2 The development of optimized fermentation processes up to pilot scale.
- 3 Optimizing interactions between fermented foods, microbiota and health.
- 4 A cross-disciplinary use of data sciences and artificial intelligence.



NUTRITION    SENSORY    DURABILITY    NATURALNESS    HEALTH



The Migale bioinformatics facility coordinates the development of the FdF data warehouse, which aims to gather all the information on microorganisms and microbial consortia that can be involved in food fermentation. This data is varied in nature (omics, phenotypes, metabolic capacities, sensory analyses, etc.) and will feed into the predictive approaches developed in the program for the design of new fermented foods.

1 call for pre-competitive projects each year

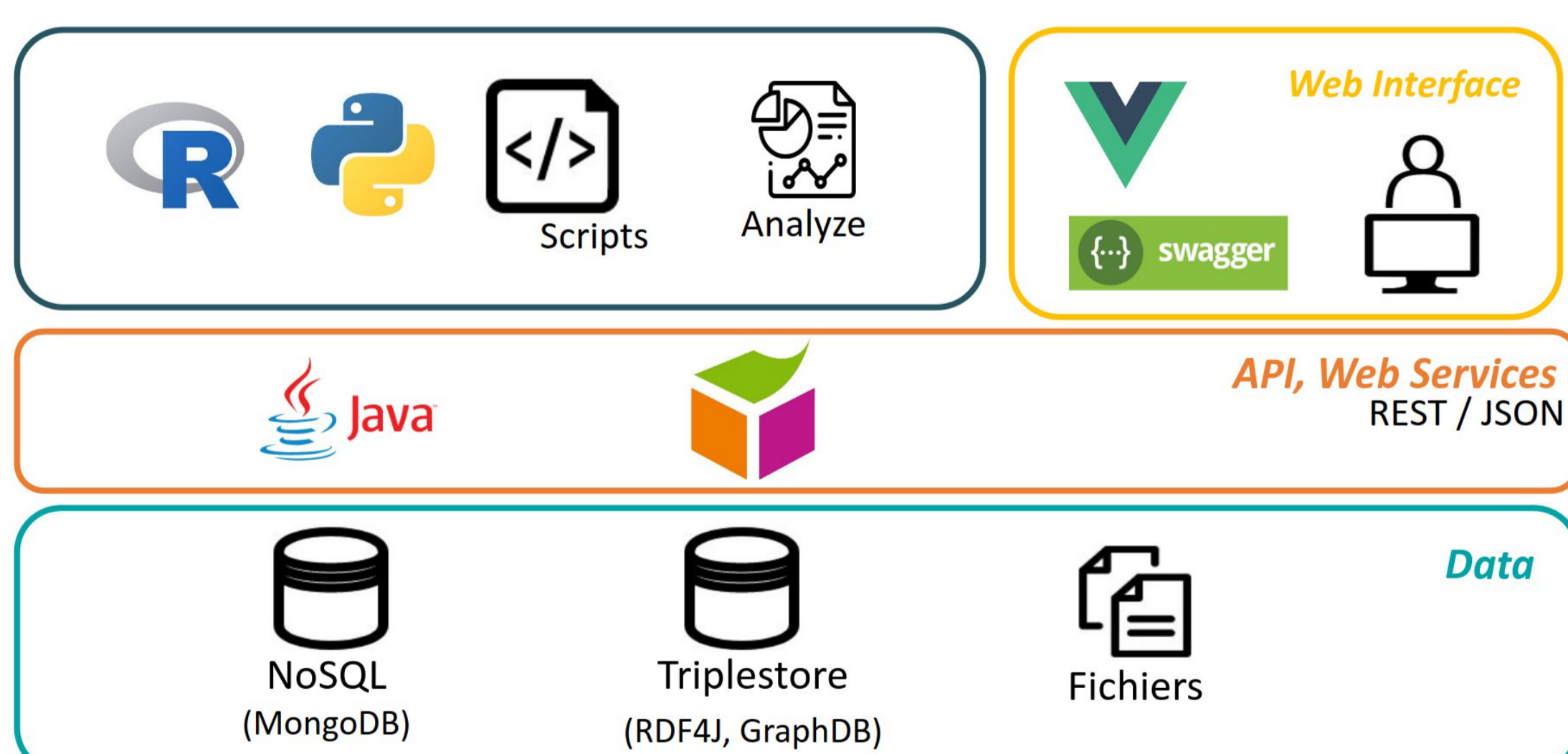
All French public labs wishing to participate in this dynamic and ecosystem can apply.

The laureates will have access to FdF last cutting-edge equipment distributed across 7 laboratories in France.

## FdF

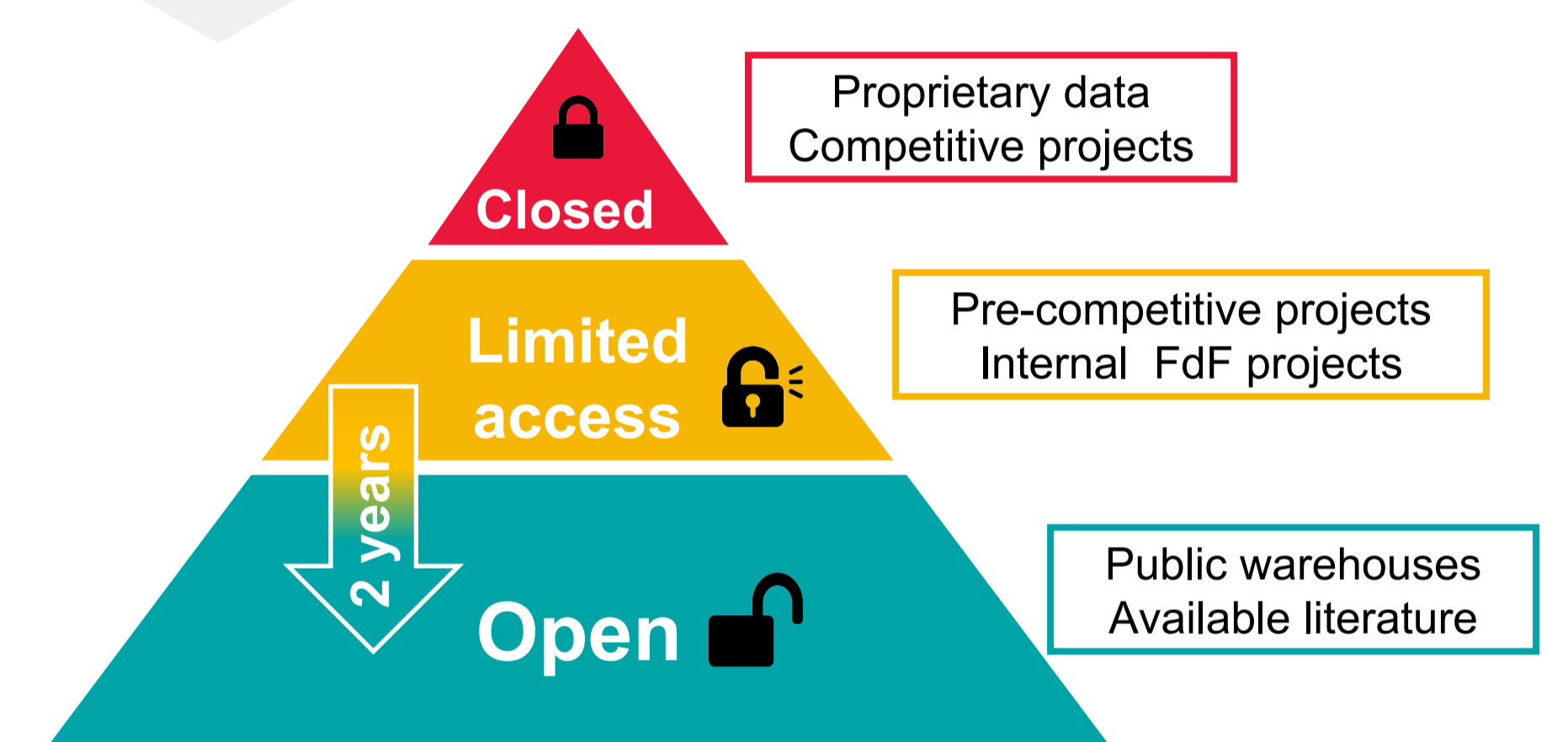
- Siduri is based on OpenSILEX [2], an **ontology-driven** information system, developed by the MISTEA research unit (INRAE Montpellier, France) using modern web technologies.
- OpenSILEX can be used to create information systems to manage **large quantities of experimental data annotated** with ontologies specific to a field of study.
- The data stored in the warehouse will be in line with **FAIR principles**.
- The model has been adapted to manage data from the different FdF projects (see right).

## OpenSILEX Architecture



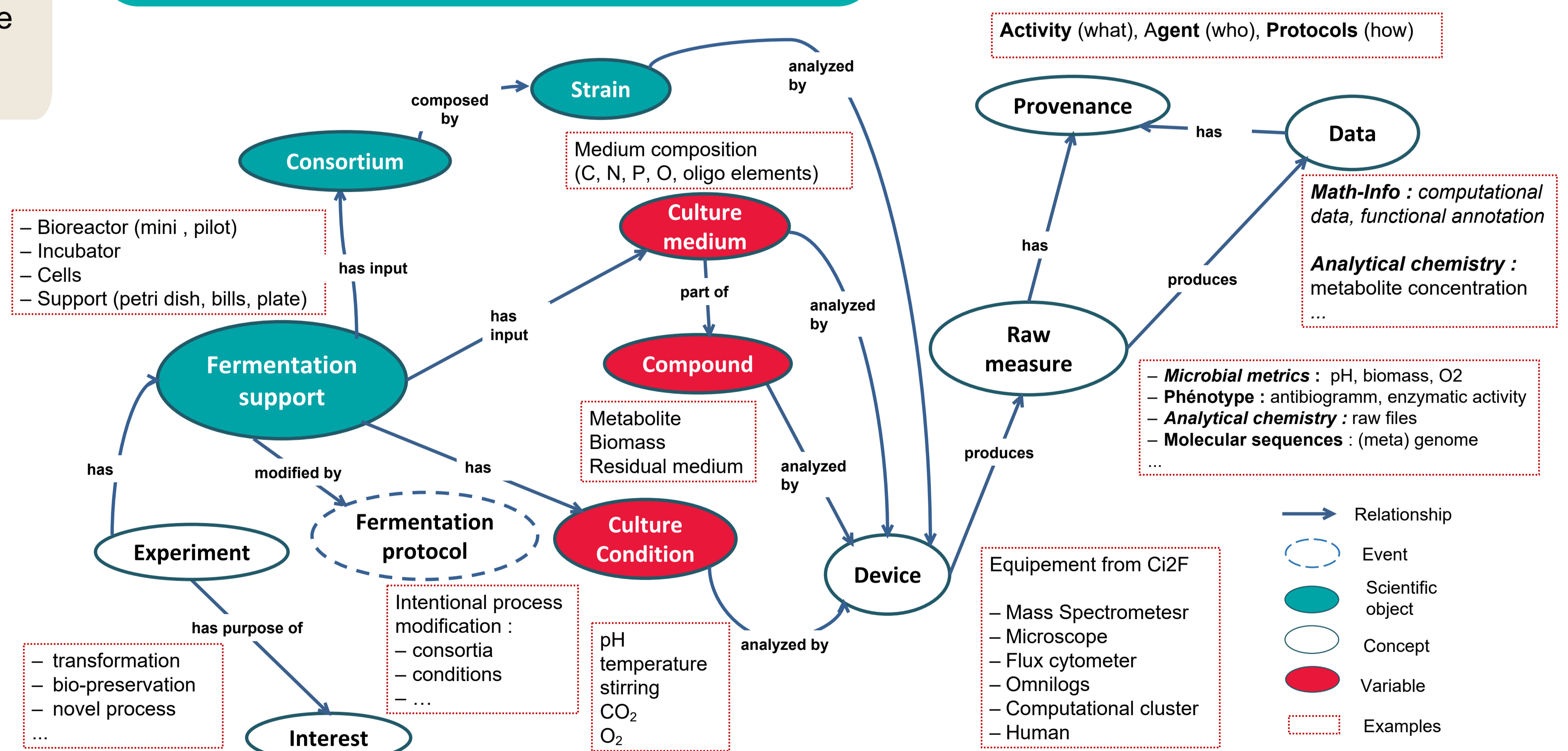
## Siduri

The data warehouse named Siduri will be accompanied by a user-friendly interface allowing simple data integration, fine-grained data exploration and efficient querying for learning algorithms. Bioinformatics pipelines will also be developed to produce secondary data for storage in the warehouse.



Coexistence of several data types finely defined on the Data Management Plan

## Model of Scientific Objects in Siduri



## Perspectives

- Siduri is an information system under construction that aims to be a reference knowledge base for fermented food experiments.
- The data that will be structured in Siduri over the next decade will be used by predictive models to boost the development of new fermented products.

## References

1. <https://www.inrae.fr/actualites/innover-l'alimentation-démar-lancement-operationnel-du-grand-defi-ferments-du-futur>
2. Neveu et al. (2019) Dealing with multi-source and multi-scale information in plant phenomics: the ontology-driven Phenotyping Hybrid Information System. *New Phytologist*, 221 (1), pp.588-601.

## Acknowledgment

This work benefited from French government funding managed by the Agence Nationale de la Recherche as part of France 2030 under the reference ANR-22-GDFF-0001.

## Ferments du Futur is hiring !



Data Steward



Bioinformatician

