



## PRESS RELEASE

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### **MetaPath research project: public and private players join forces to accelerate innovation in micro-organism consortia.**

Launched in 2021 for a 4-year period, the Metapath project aims to gain a better understanding of microbial consortia, with a view to facilitating the development of new fermented products by fermentation manufacturers. The project will help define the optimum combinations of micro-organisms and fermentation conditions to better meet the needs of manufacturers and the expectations of consumers. Halfway through the project, MetaPath has reached a significant milestone: the validation of omics analysis methods and the development of a first functional version of the software enabling the reconstruction of the metabolic networks involved in the production of molecules of interest.

#### **Glossary**

##### **MetaToul-MetaboHUB**

The Toulouse Metabolomics and Fluxomics Platform provides the scientific community and companies with concepts, tools, methods and expertise for the functional analysis of metabolism in cells, tissues and organisms.

##### **Omics analysis methods**

Metagenomic, metatranscriptomic, metabolomic and volatilomic analysis methods enable us to map and study, respectively, all the genes carried by the micro-organisms in a consortium, the genes actually expressed and the metabolites actually produced, including the volatile molecules responsible for odors under industrial fermentation conditions.

##### **Microbial consortia**

Refers to all the micro-organisms that make up an ecosystem and interact to give this ecosystem its properties, particularly its metabolic properties.

##### **Metabolic network**

Refers to all biochemical reactions involving the production and degradation of molecules, which determine the physiological and biochemical properties of a cell.



## A partnership to accelerate fermentation research and innovation

Awareness of the impact of food on health and the environment is generating new expectations among consumers. As a result, they are turning more and more to natural, healthy and eco-responsible foods, which are no less tasty and accessible. Fermentation, because it is natural and offers a wide range of possibilities, opens up tremendous opportunities to meet these expectations. The aim of the MetaPath project is to develop a solution that will enable the description, prediction and control of microbial consortia to accelerate the design of new fermented food products with improved sensory qualities and shelf life.

All the methods, experimental strategies and data generated during this project will also help reveal the infinite potential of the microbial consortia responsible for fermentation.

The first stage of this project was the development and validation of specific ecosystem analysis methods to generate the data on which to base the reconstruction of metabolic networks. Bel and Lesaffre developed metagenomic or genomic, metatranscriptomic and volatilomic methods applied to sourdough (for Lesaffre) and cheese (for Bel). MetaToul has developed metabolomic analysis methods for the same 2 applications. At the same time, Abolis Biotechnologies, through its Microbiome Studio division, has built the software's technical base and developed the algorithms needed to process the omics data used to reconstruct and model the metabolic networks. In particular, this solution will make it possible to use complementary information from these different data sets to reconstruct reliable metabolic networks, whereas current tools analyze these data individually.

In the next stages, Bel, Metatoul and Lesaffre will provide data for each application. These data will enable Abolis Biotechnologies to further develop tools for processing, visualizing and modeling metabolic networks on concrete industrial cases, also drawing on public databases.

## Saving time and relevance in the design of fermented products

Laureate of the 9th call for "Projets Structurants Pour la Compétitivité" (Structuring Projects for Competitiveness), this project is supported by the French government, under the "Plan d'Investissements France 2030" (France 2030 Investment Plan) financed by Bpifrance. MetaPath will result in the design of a software program called Microbiome Studio, which will provide a detailed understanding of the microbial ecosystem on a molecular scale.

It will not only be a tool for understanding microbial ecosystems, but also an aid to innovation, thanks to its highly accurate predictions of the complex metabolic behavior of microbial consortia, which will serve all the applications in which such consortia are involved (fermented beverages, sourdoughs, dairy products and fermented dairy analogues...). Thanks to its ability to interconnect large quantities of data and its intuitive interface designed for biologists, this solution will guide the choice of microorganisms making up the ecosystem, the selection of raw materials and the definition of manufacturing recipes to produce the desired molecules.

*"The collaborative, partnership-based approach to this project is perfectly in keeping with the spirit of open innovation that we cultivate at Lesaffre. By joining forces with the other members of the consortium in a constructive approach, we were able to achieve the significant milestones in the development of this project on schedule. It will have a major impact on our practices, and will enable us to innovate even faster,"* emphasizes Christine M'Rini, Lesaffre's Chief R&D Officer.

*"Fermentation is a key process for meeting the challenges of naturalness, nutrition and veganization, which are among the main challenges to be met to support the food transition. A better understanding of microbial ecosystems and the prediction of the behavior of microorganisms and their metabolism will be decisive for the development of sustainable healthy offers that are as tasty as ever for our consumers. The Bel Group is therefore extremely proud to participate in and contribute to this consortium of public-private partners directly involved in these major advances,"* adds Anne Pitkowski, the Group's Director of Research and Applications.



*"The MetaPath project is fully aligned with Abolis Biotechnologies' vision of understanding and using the incredible metabolic potential of microbes to design healthier, more sustainable products. We are proud to be working daily with our MetaPath partners, both private and public, to develop this vision for today's food challenges, in an open atmosphere of sharing experience and know-how,"* concludes Sylvia Julien, Head of the Microbiome Studio Business Unit at Abolis Biotechnologies and leader of the MetaPath consortium.

### **About Abolis Biotechnologies**

Abolis Biotechnologies develops high-impact innovations in the field of biotechnologies, supporting industries in their ecological transition to build a better future in collaboration with nature. The company offers customized industrial solutions based on micro-organisms.

Founded in 2014, Abolis is made up of a team of over 50 people. The company is determined to become a key player in the ecological transition. It combines expertise in biology, fermentation, IT, robotics, analytics and industrial property to reinvent the future of many industries - from food and health to cosmetics and chemicals.

Abolis is a laureate of the Plan de Relance 2030.

For more information: [www.abolis.fr](http://www.abolis.fr) and [www.linkedin.com/company/abolis-biotechnologies/](https://www.linkedin.com/company/abolis-biotechnologies/)

### **About Bel**

Bel is a French family-owned group that has become a major international player in the food industry. It offers portions of dairy, fruit and vegetable "bien-manger" through iconic brands such as The Laughing Cow®, Babybel®, Kiri®, Boursin®, Pom'Potes® and Nurishh®. In 2022, the Group achieved sales of 3.6 billion euros.

10,800 employees in nearly sixty subsidiaries around the world contribute to the Group's mission of providing healthier, more responsible food for all. Its products are produced at 30 production sites and distributed in nearly 120 countries.

More information on : [groupe-bel.com](http://groupe-bel.com)

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### **About Lesaffre**

A key global player in fermentation for more than a century, Lesaffre, with a 2,7 billion euro turnover, and established on all continents, counts 11,000 employees and 96 nationalities. On the strength of this experience and diversity, we work with customers, partners and researchers to find ever more relevant answers to the needs of food, health, naturalness and respect for our environment. Thus, every day, we explore and reveal the infinite potential of microorganisms.

To nourish 9 billion people, in a healthy way, in 2050 by making the most of our planet's resources is a major and unprecedented issue. We believe that fermentation is one of the most promising answers to this challenge.

Lesaffre – Working together to better nourish and protect the planet

More information on [www.lesaffre.com](http://www.lesaffre.com)

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### **About TBI and its MetaToul platform**



Toulouse Biotechnology Institute (TBI) Bio & Chemical Engineering is a fundamental and applied biotechnology research laboratory located on the campus of the Institut national des sciences appliquées de Toulouse (INSA Toulouse) and also attached to CNRS and INRAE, combining scientific excellence with economic and societal relevance. The laboratory, with strong disciplinary skills in life sciences and engineering sciences, pursues a multi-scale, multidisciplinary and interdisciplinary scientific strategy to meet the challenges of the bioeconomy, involving a large network of public and private collaborators.

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MetaToul is TBI's metabolomics and fluxomics platform in Toulouse. It provides the scientific community with concepts, tools (MS, NMR) and methods for analyzing metabolism at the scale of a biological system (cell, tissue, organism). Since 2013, MetaToul has been a founder and partner of the MetaboHUB National Metabolomics Infrastructure, funded by the French government's "Investissements d'avenir" program.

More information on <https://mth-metatoul.com/>

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### About Bpifrance

Bpifrance finances companies - at every stage of their development - with credit, guarantees and equity capital. Bpifrance supports them in their innovation and international projects. Bpifrance also supports their export activities through a wide range of products. Consulting, university, networking and acceleration programs for startups, SMEs and ETIs are also part of the services offered to entrepreneurs. Thanks to Bpifrance and its 50 regional offices, entrepreneurs benefit from a single, close and efficient contact to help them meet their challenges.

More information on : [www.bpifrance.fr/presse.bpifrance.fr](http://www.bpifrance.fr/presse.bpifrance.fr)

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### About the Plan d'Investissement France 2030

**-It reflects a dual ambition:** to transform key sectors of our economy (healthcare, energy, automotive, aeronautics and space) through technological innovation, and to position France not just as a player, but as a leader in the world of tomorrow. From fundamental research, to the emergence of an idea, to the production of a new product or service, France 2030 supports the entire life cycle of innovation, right through to industrialization.

**-The scale of the program is unprecedented:** €54 billion will be invested so that our companies, universities and research organizations can successfully make the transition to these strategic sectors. The aim is to enable them to respond competitively to the ecological and attractiveness challenges of the world to come, and to nurture the future leaders of our sectors of excellence. France 2030 is defined by two cross-functional objectives: to devote 50% of its spending to decarbonizing the economy, and 50% to emerging, innovative players, without spending money that is detrimental to the environment (in line with the Do No Significant Harm principle).

**-Will be implemented collectively:** designed and deployed in consultation with economic, academic, local and European players to determine the strategic orientations and flagship actions. Project leaders are invited to submit their applications via open, demanding and selective procedures, in order to benefit from government support.

**-Managed by the Secrétariat Général pour l'Investissement** on behalf of the Prime Minister, and implemented by the Agence de la Transition Ecologique (ADEME), the Agence Nationale de la Recherche (ANR), Bpifrance and the Banque des Territoires.

For more information: [france2030.gouv.fr](http://france2030.gouv.fr) | @SGPI\_avenir



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