# Health Benefits of Fermented Dairy Products for Targeted Populations PROLIFIC Project Innovative fermented dairy products and ingredients for targeted populations

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AHFES Fermentation Webinar
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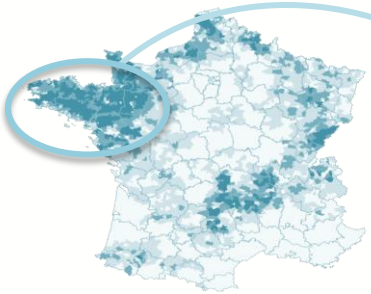
# Health Benefits of Fermented Dairy Products for Targeted Populations

# PROLIFIC Project

## Innovative fermented dairy products and ingredients for targeted populations

# Context: A favorable ecosystem in Great West, France



*Source: CNIEL-French Dairy Board (2018)*


Competitive dairy sector

Strong academic-private partnership

Shared desire to make the best use of "white gold“

Co-construction of ambitious pre-competitive research projects

Ex. PROFIL 2014-2019, PROLIFIC 2020-2025

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# Context

Food fermentations (eg lactic and propionic fermentations) are one of the oldest ways of preserving perishable foods.

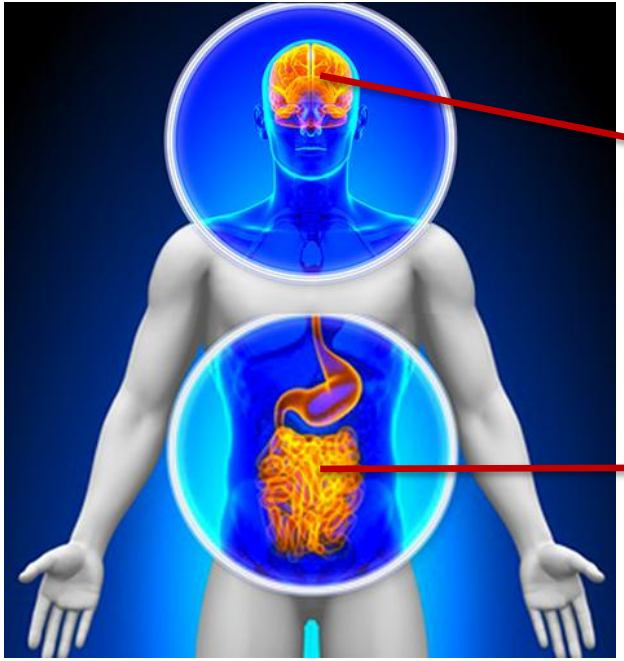
**Can Fermented Dairy Products have a positive effect on digestive functions and on the gut-brain axis?**

In addition to the production of organic acids, the activity of bacteria during these fermentations radically transforms the raw material and generates compounds of interest whose action and benefit can go far beyond a mere preservation.

Nutrient intake, organoleptic qualities, biopreservation,
Immunomodulation, food-microbiota-health interactions, milk microbiota, inflamation, cognition…

# Context

Increasing incidence of chronic digestive and neurological pathologies…



Neurodegenerative pathologies
(Parkinson's, Alzheimer's, cognitive decline)

Neurodevelopmental pathologies

Inflammatory pathologies
(ulcerative colitis, Crohn's)

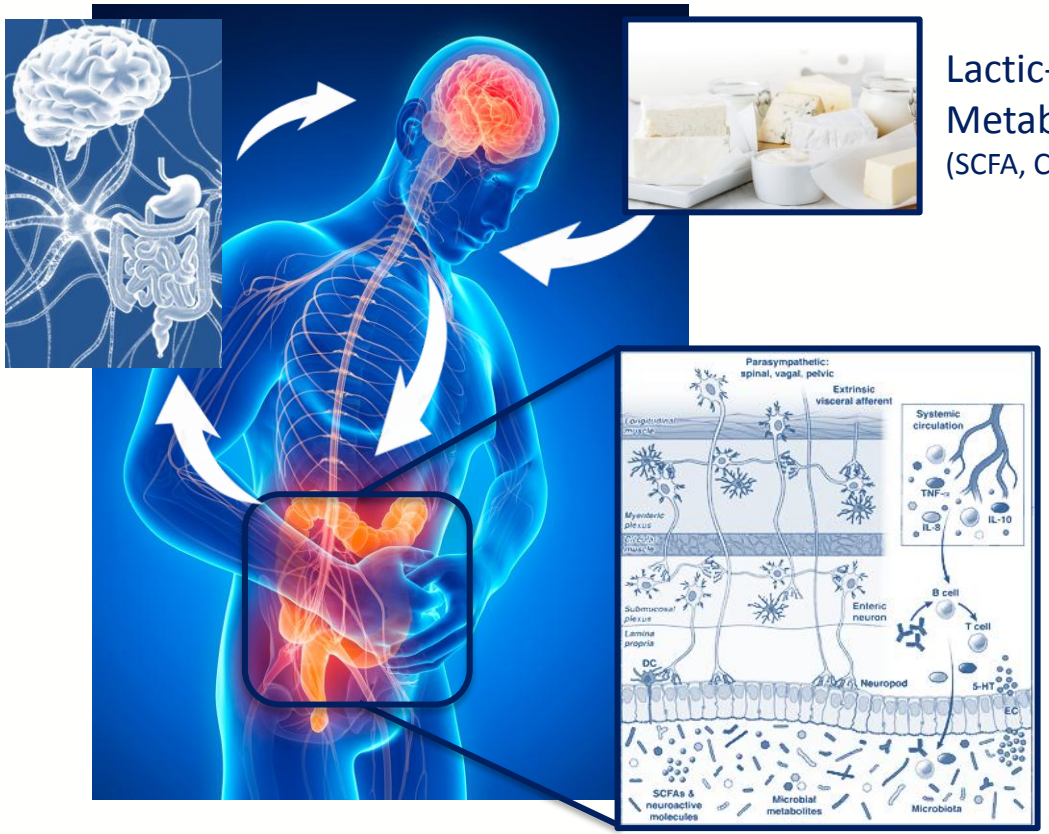
Functional digestive disorders
(IBS; 10-15% population)

Food allergy

… And chronic stress.
(risk factor for chronic diseases)

# PROLIFIC « May your diet be your first medicine »

ENS-Central Nervous System (CNS) interactions

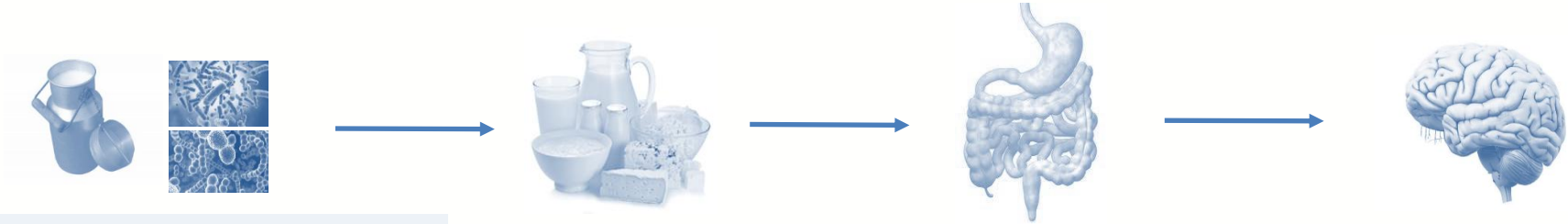



Lactic- and Propionic- Acid bacteria Metabolites of interest
(SCFA, CLA, oligosaccharides, vitamins, etc.)

Food microbiota-intestinal epithelial barrier (IEB) interactions

IEB-Enteric nervous system (ENS) interactions

# Scientific continuum and expertise



Milk Components
Microbiology, Nutrition & Health

Foods
Biological activities

Gut & Microbiota
IBD, allergy

Gut-brain axis
Cognitive Functions

IRISA — LS2N/ComBI — *(bioinformatic)*

CIRM-BIA — STLO — *(microbiology, milk processing)*

bia — *(allergy)*

numecan — *(nutrition, cognition)*

Inserm U1235 — UMR TENS — *(gut-brain axis)*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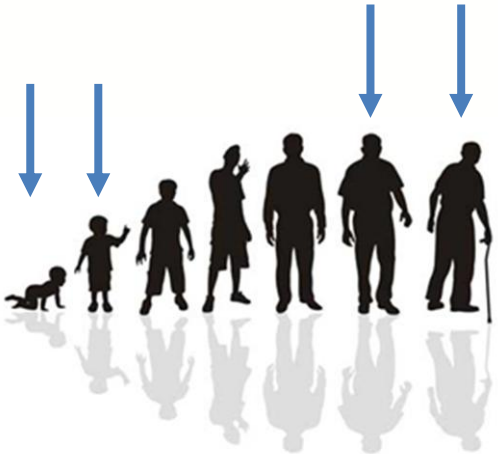
# PROLIFIC « May your diet be your first medicine »

## For which target populations?

The first **1000** days of life (0-6 months and 6 months-3 years)

The **seniors**



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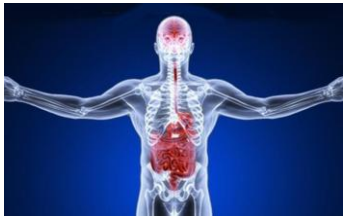
## For which functionalities ?

Colonisation and homeostasis of gut microbiota

Cognitive development /
Neurodegeneration



Inflammation
Tolerance / Allergy

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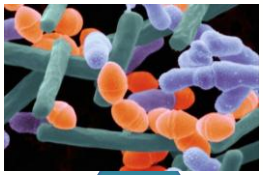
**Bacteria**



Fermentation
Fermentation products

Preservation
Interactions with biological activities

**Health Effect**

**Milk**

Dairy fractions / fermented dairy products
Infant milk powder

**Process**

# Structure of PROLIFIC project

**Project Management**

**Conception and characterization of bacterial consortia**

***In vitro- in vivo* efficiency / Health effects**

**Implementation in model dairy products / target populations**

Cognitive / 1000 days

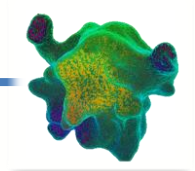
Cognitive / seniors

Immuno / 1000 days

Immuno / seniors

*In silico* screening platform

*In vitro* screening platform



Dairy technololgy plateform

**Industrial implementation**

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# PROLIFIC in figures

## Human ressources

**5** PhD projects (*180 months*)

**4** post-docs (*60 months*)

**5** Contracts Technicians and Engineers (*90 months*)

## Funding

**13,9** M€ Full cost

**7,55** M€ funded by Bba Milk Valley

**1,86** M€ funded by Regions BZH and PDL

# Research Projects

**PhD project 1:** Development of an IF with a complex bacterial component (based on breast milk microbiota): impact on intestinal homeostasis

**PhD project 2:** Fermentation as a lever for improving IFs: design of a fermented formula improving brain development in newborns.

**PhD project 3:** Combined effects of propionic acid bacteria and n-6 polyunsaturated fatty acids on the intestinal barrier.

**PhD project 4:** Com2Brain: Combination of Microbes to Boost Brain functionality. Effects of bacterial metabolites on the Gut-Brain Axis during normal and pathological ageing.

**PhD project 5:** In silico modeling of host-lactic acid bacteria interactions at the EIB

**Post-doc1:** Benefit of a microbial component similar to breast milk in IF / prevention of food allergies (*12 months*)
**Post-Doc2:** Immunomodulation by the Bacterial Surface: towards fermented dairy products as a remedy against allergies (*12 months*)
**Post-doc3:** Optimizing the health effect of the bacterial component of dairy products (OptiBac) (*24 months*)
**Engineer 4**: Ability of fermented dairy products to modulate the activation of the gut-brain axis during axis activation stress (*18 months*)

**Experimentation / screening on organoids** (*Engineer; 18 months*)
**Assembly of bacterial consortia for targeted functionalities** *(Engineer; 18 months)*
**IF and FDP preparation, implementation in model dairy products, scale-up** (T*echnician; 24 months*)

# Thank you for your attention