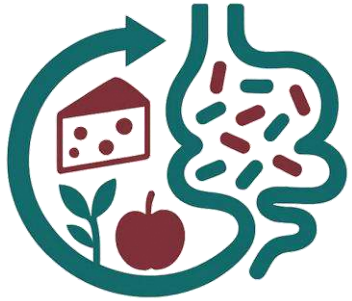


Group: Functionality and Ecology of Beneficial Microorganisms

Contrato FPI asociado a
PID2024-162402OB-I00

Funcionalidad y Ecología de Microorganismos Beneficiosos



MicroHealth

Funcionalidad y Ecología de
Microorganismos Beneficiosos

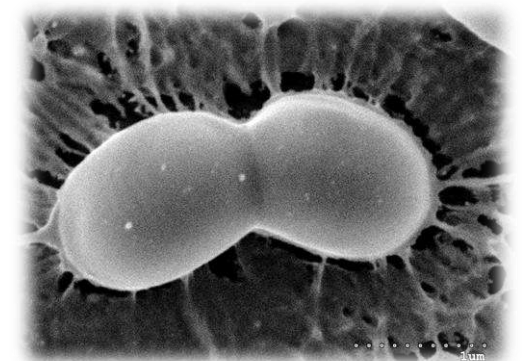
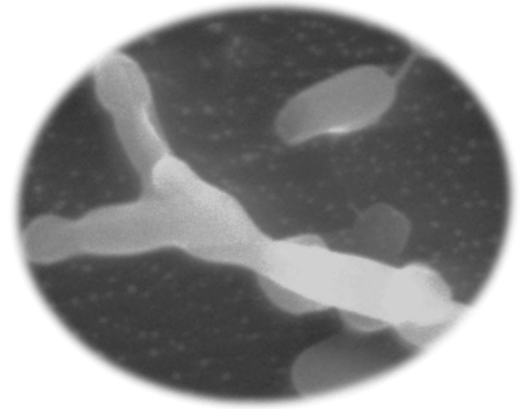
Acronym: **MicroHealth**
CSIC code: 84684I

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DE ASTURIAS



CSIC



Members: 07/11/2025

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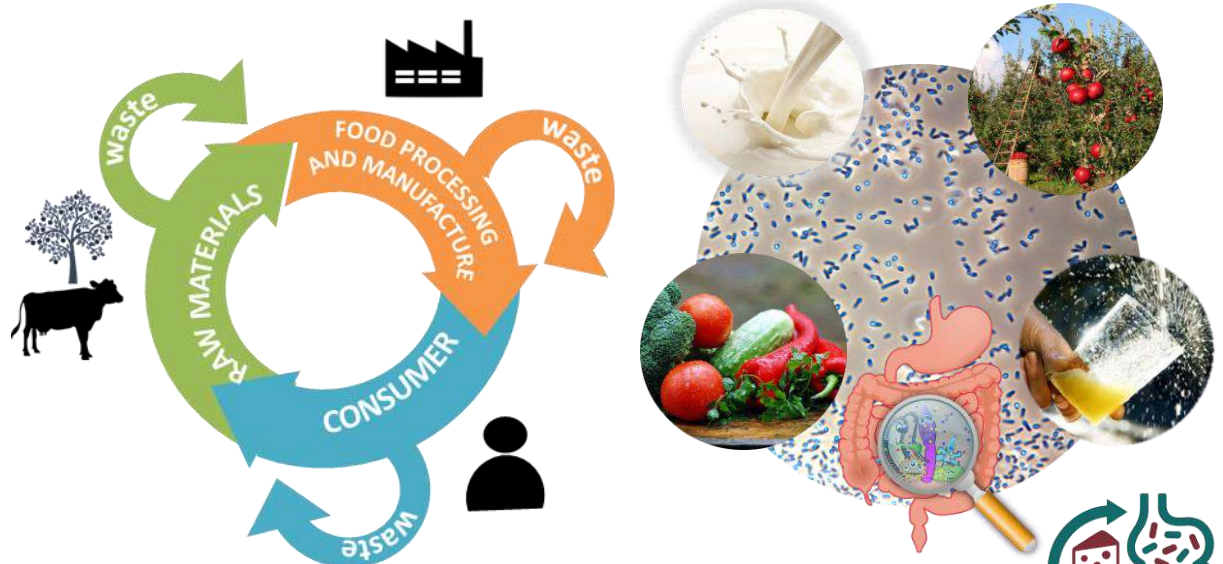
Adela Granja (predoc)

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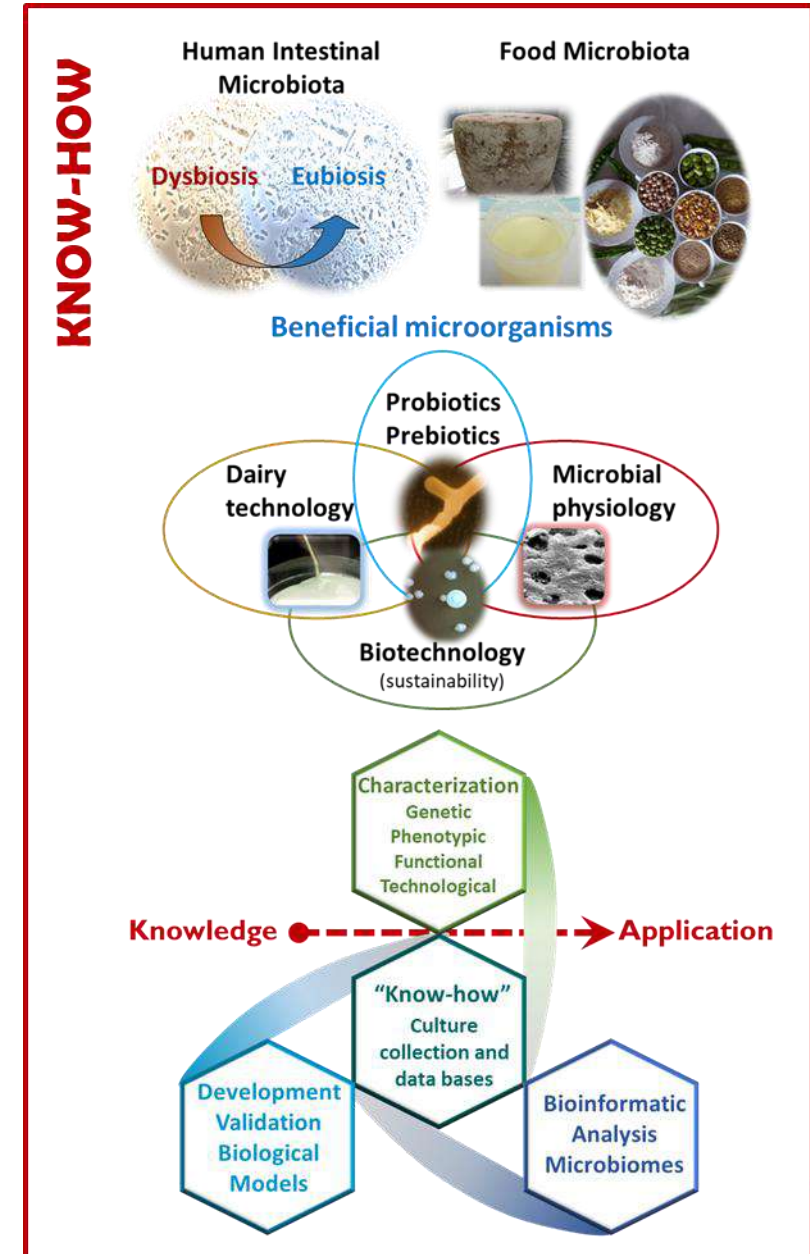
Objective/ Mission:

“To provide solutions from the field of Microbiology to Scientific Challenges related to Human Health and Food Quality and Safety, taking into account the Sustainability of the production and transformation system of raw materials.”



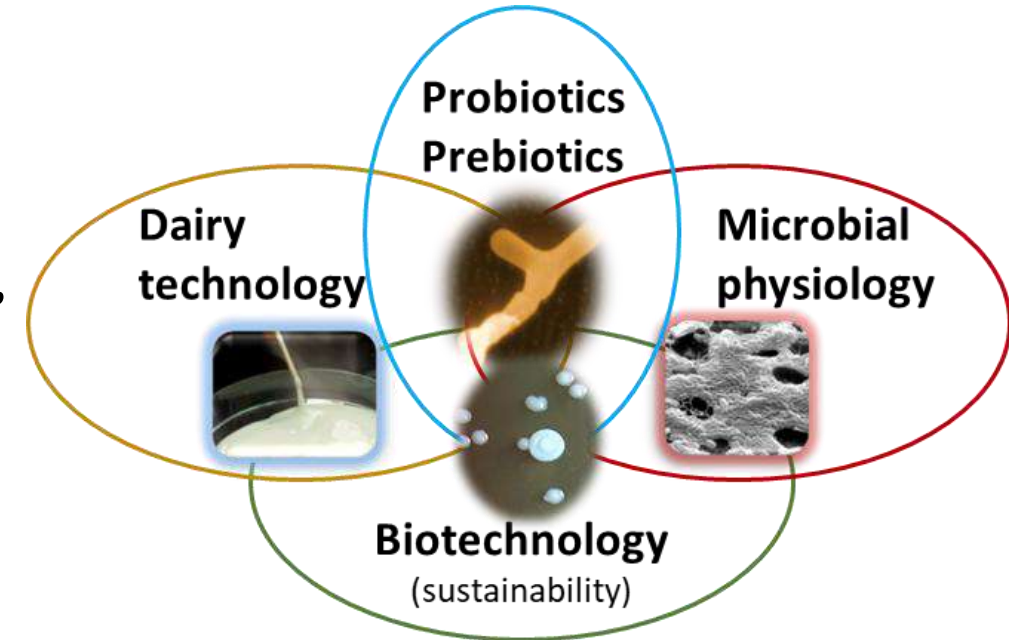
Research Lines:

- 1: Microbiomes in the food chain
- 2: Intestinal microbiota and health
- 3: Functionality of beneficial bacteria
- 4: Development of models of study
- 5: Microbial solutions for the sustainability of the agri-food chain



3. Functionality of beneficial bacteria

- **Probiotics/ Postbiotics:** isolation and characterization of bacteria with potential beneficial effects
- **Components/ functional metabolites:** exopolysaccharides (EPS), enzymes, neuroactives (GABA, etc.), vitamins (riboflavin), etc.
- **Technological functionality:** adaptation to the technological environment and compatibility with different food matrices
- **Biotechnology:** evolutionary adaptation and obtaining of bacteria for agro-food applications



Selected publications in the last 10 years (related to the topic of the Doctoral Thesis proposal)

- Héctor, T., Isabel, C., Ruiz, L*, Ruas-Madiedo, P.* Biofortification of fermented foods with riboflavin-overproducing *Bifidobacterium longum* subsp. *infantis* strains. **International Journal of Food Microbiology** 436: 111210 (2025). <https://doi.org/10.1016/j.ijfoodmicro.2025.111210>.
- Héctor, T., Isabel, C., Vázquez, X., López, P., Ruiz, L*, Ruas-Madiedo, P.* Characterization of riboflavin-overproducing *Bifidobacterium longum* subsp. *infantis* strains selected by roseoflavin treatment. **Food Microbiology** 131, 104799 (2025). <https://doi.org/10.1016/j.fm.2025.104799>.
- Tamayo, M., Olivares, M., Ruas-Madiedo, P., Margolles, A., Espín, J.C., Medina, I., Moreno-Arribas, M.V., Canals, S., Mirasso, C.R., Ortín, S., Beltrán-Sánchez, H., Palloni, A., Tomás-Barberán, F.A., Sanz, Y*. How diet and lifestyle can fine-tune gut microbiomes for healthy aging. **Annual Review of Food Science and Technology** 15: 283–305 (2024) <https://doi.org/10.1146/annurev-food-072023-034458>.
- Requena, T*, Martínez-Cuesta, M.C., Aznar, R., Mohedano, M.L., López, P., Ruas-Madiedo, P. Probiotic characteristics of *Lactiplantibacillus plantarum* CECT 9435 and its survival and competitive properties under simulated conditions of the child gut microbiota. **Probiotics and Antimicrobial Proteins** <https://doi.org/10.1007/s12602-024-10280-w>.
- Tamés, H., Sabater, C., Royo, F., Margolles, A., Falcón, J.M., Ruas-Madiedo, P*, Ruiz, L*. Mouse intestinal microbiome modulation by oral administration of a GABA-producing *Bifidobacterium adolescentis* strain. **Microbiology Spectrum** 12(1): e0258023 (2024). <https://doi.org/10.1128/spectrum.02580-23>.
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- Hevia, A., Ruas-Madiedo, P., Faria, M.A., Petit, V., Alves, B., Alvito, P., Arranz, E., Bastiaan-Net, S., Corredig, M., Dijk, W., Dupont, D., Giblin, L., Graf, B.A., Kondrashina, A., Ramos, H., Ruiz, L., Santos-Hernández, M., Soriano-Romaní, L., Tomás-Cobos, L., Vivanco-Maroto, S.M., Recio, I., Miralles, B*. A shared perspective on in vitro and in vivo models to assay intestinal transepithelial transport of food compounds. **Journal of Agricultural and Food Chemistry** 71, 19265–19276 (2023). <https://doi.org/10.1021/acs.jafc.3c05479>.



Selected publications in the last 10 years (related to the topic of the Doctoral Thesis proposal)

- Vinderola, G*, Cotter, P.D., Freitas, M., Gueimonde, M., Holscher, H.D., Ruas-Madiedo, P., Salminen, S., Swanson, K.S., Sanders, M.E., and Cifelli, C.J. Fermented foods: a perspective on their role in delivering biotics. **Frontiers in Microbiology** 14:1196239 (2023). <https://doi.org/10.3389/fmicb.2023.1196239>
- Tamés, H., Sabater, C., Margolles, A., Ruiz, L*, and Ruas-Madiedo, P*. Production of GABA in milk fermented by *Bifidobacterium adolescentis* strains selected on the bases of their technological and gastrointestinal performance. **Food Research International** 171:113009 (2023) <https://doi.org/10.1016/j.foodres.2023.113009>
- Marcos R, Blanco A, Ruiz L, Margolles A, Ruas-Madiedo P*, Sánchez B*. Towards the isolation of more robust next generation probiotics: the first aerotolerant *Bifidobacterium bifidum* strain. **Food Research International** 165:112481 (2023) <https://doi.org/10.1016/j.foodres.2023.112481>
- Brdaric, E., Sokovic-Bajic, S., Đokic, J., Durkic, J., Ruas-Madiedo, P., Stevanovic, M., Tolinacki, M., Dinic, M., Mutic, J., Golic, N., and Živkovic, M*. Protective Effect of an exopolysaccharide produced by *Lactiplantibacillus plantarum* BGAN8 against cadmium-induced toxicity in Caco-2 cells. **Frontiers in Microbiology** 12:759378 (2021) <https://doi.org/10.3389/fmicb.2021.759378>
- Sokovic-Bajic, S., Cañas, M.A, Tolinacki, M., Badia, J., Sánchez, B., Golic, N., Margolles, A., Baldomá, L., Ruas-Madiedo, P*. Proteomic profile of extracellular vesicles released by *Lactiplantibacillus plantarum* BGAN8 and their internalization by non-polarized HT29 cell line. **Scientific Reports** 10: 21829 (2020) <https://doi.org/10.1038/s41598-020-78920-z>
- Duranti, S., Ruiz, L., Lugli, G.A., Tames, H., Milani, C., Mancabelli, L., Mancino, W., Longhi, L., Carnevali, L., Sgoifo, A., Margoles, A., Ventura, M., Ruas-Madiedo, P* and Turrone, F*. *Bifidobacterium adolescentis* as a key member of the human gut microbiota in the production of GABA. **Scientific Reports** 10: 14112 (2020) <https://doi.org/10.1038/s41598-020-70986-z>
- Castro-Bravo, N., Margolles, A., Wells, J.M., and Ruas-Madiedo, P* Exopolysaccharides synthesized by *Bifidobacterium animalis* subsp. *lactis* interact with TLR4 in intestinal epithelial cells. **Anaerobe** 56: 98-101 (2019) <https://doi.org/10.1016/j.anaerobe.2019.02.014>
- Castro-Bravo, N., Wells, J.M., Margolles, A., and Ruas-Madiedo, P* Interactions of surface exopolysaccharides from *Bifidobacterium* and *Lactobacillus* within the intestinal environment. **Frontiers in Microbiology** 9: 2426 (2018) <https://doi.org/10.3389/fmicb.2018.02426>



Selected publications in the last 10 years (related to the topic of the Doctoral Thesis proposal)

- Inturri, R., Molinaro, A., Di Lorenzo, F., Blandino, G., Tomasello, B., Hidalgo-Cantabrana, C., De Castro, C. and Ruas-Madiedo, P*. Chemical and biological properties of the novel exopolysaccharide produced by a probiotic strain of *Bifidobacterium longum*. **Carbohydrate Polymers** 174: 1172–1180 (2017) <https://doi.org/10.1016/j.carbpol.2017.07.039>
- Hidalgo-Cantabrana, C., Algieri, F., Rodriguez-Nogales, A., Vezza, T., Martínez-Cambor, P., Margolles A., Ruas-Madiedo, P*, and Gálvez, J. Effect of a rpy exopolysaccharide-producing *Bifidobacterium animalis* subsp. *lactis* strain orally administered on DSS-induced colitis mice model. *Frontiers in Microbiology* 7: 868 (2016) <https://doi.org/10.3389/fmicb.2016.00868>
- Valdés-Varela, L., Alonso-Guervos, M., García-Suárez, O., Gueimonde, M. and Ruas-Madiedo, P*. Screening of bifidobacteria and lactobacilli able to antagonize the cytotoxic effect of *Clostridium difficile* upon intestinal epithelial HT29 monolayer. **Frontiers in Microbiology** 7: 577 (2016) <https://doi.org/10.3389/fmicb.2016.00577>
- Živkovic, M., Miljkovic, M.S., Ruas-Madiedo, P., Markelic, M.B., Veljovic, K., Tolinac, M., Sokovic, S., Korac, A., Golic, N.* EPS-SJ exopolysaccharide produced by the strain *Lactobacillus paracasei* subsp. *paracasei* BGSJ2-8 is involved in adhesion to epithelial intestinal cells and decrease on *E. coli* association to Caco-2 cells. **Frontiers in Microbiology** 7: 286 (2016) <https://doi.org/10.3389/fmicb.2016.00286>
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- Sánchez, B., González-Rodríguez, I., Arboleya, S., López, S., Suárez, A., Ruas-Madiedo, P., Margolles, A., and Gueimonde, M*. The effects of *Bifidobacterium breve* on immune mediators and proteome of HT29 cells monolayers. **BioMed Research International**, Article ID 479140, 6 pg. (2015) <https://doi.org/10.1155/2015/479140>
- Živkovic, M., Miljkovic, M., Ruas-Madiedo, P., Strahinic, I., Tolinacki, M., Golic, N., and Kojic, M*. Exopolysaccharide production and rpy phenotype are determined by two gene clusters in putative probiotic strain *Lactobacillus paraplantarum* BGCG11. **Applied Environmental Microbiology**, 81:1387-1396 (2015) <https://doi.org/10.1128/AEM.03028-14>



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KNOW-HOW

Human Intestinal Microbiota
Dysbiosis Eubiosis

Food Microbiota

Beneficial microorganisms

Probiotics
Prebiotics

Dairy technology

Microbial physiology

Biotechnology (sustainability)

Knowledge → **Application**

Characterization
Genetic
Phenotypic
Functional
Technological

“Know-how”
Culture collection and data bases

Development
Validation
Biological
Models

Bioinformatic
Analysis
Microbiomes

- **Microbiomes in the food chain**
- **Intestinal microbiota and health**
 - ✓ Intestinal microbiota in cow's milk protein allergy (CMPA)
 - ✓ Intestinal microbiota and aging
 - ✓ Intestinal microbiota and sport
- **Functionality of beneficial bacteria**
 - ✓ Probiotics/ postbiotics
 - ✓ Biological functionality
 - ✓ Technological functionality
- **Development of models of study**
 - ✓ Colonic batch fermentations
 - ✓ Food fermentations
 - ✓ Food static digestion
 - ✓ Interactions with host
- **Microbial solutions for agri-food chain sustainability**