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# Development of innovative fermented products by exploiting the diversity of immunomodulatory properties and fermentative activity of lactic and propionic acid bacteria

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➤ Development of innovative fermented products by exploiting the diversity of immunomodulatory properties and fermentative activity of lactic and propionic acid bacteria

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<https://www6.rennes.inrae.fr/stlo>



- Ce projet a été sélectionné suite à l'appel à projet du Fond Unique Interministériel, FUI 25



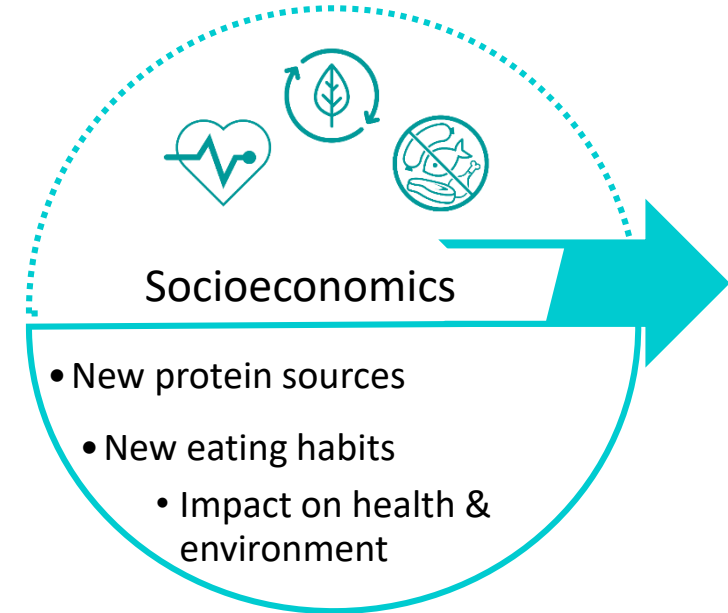
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# > A quest for a greener diet

**Consumer habits evolution**  
Vegan & flexitarian

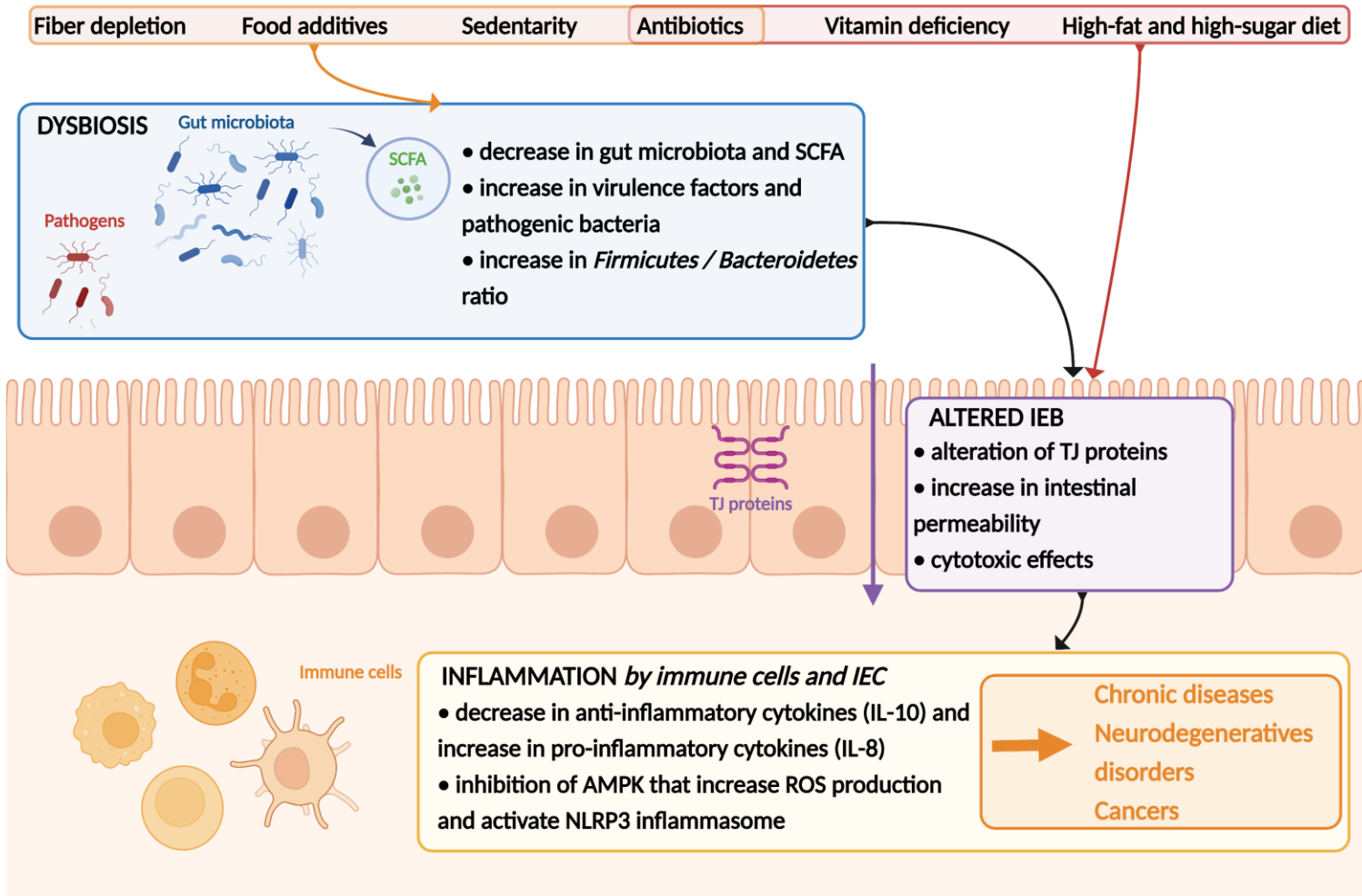


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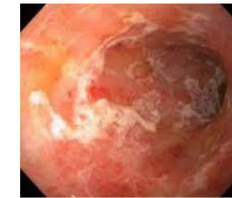


# ➤ A quest for immunomodulatory food



## Colitis

- GIT Chronic inflammation



Ulcerative Colitis



Beneficial effects of selected probiotics

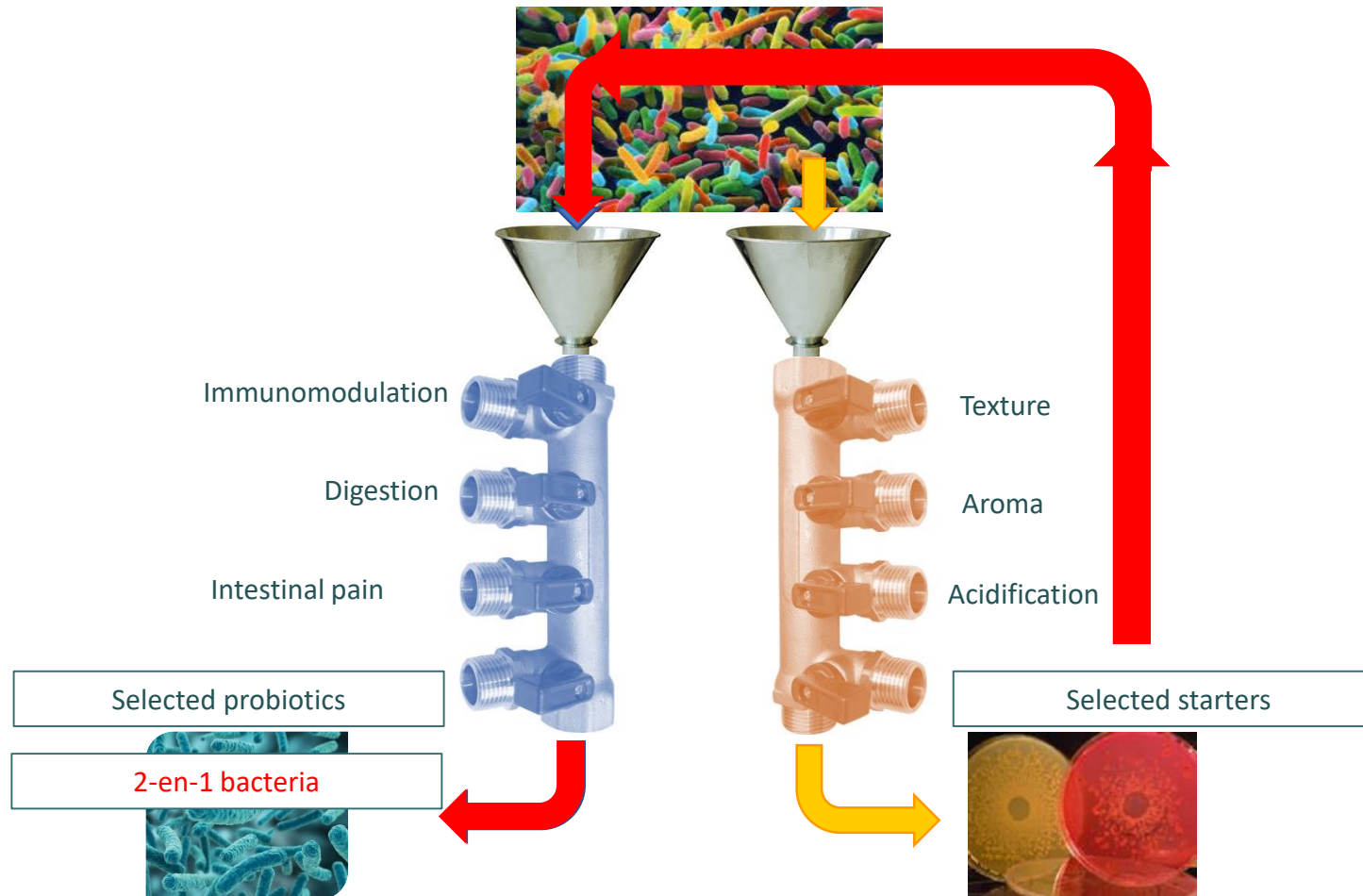


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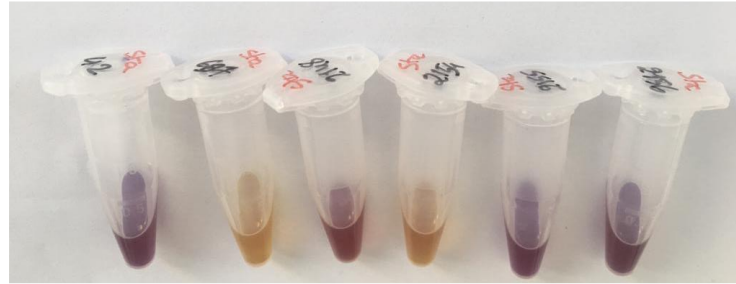
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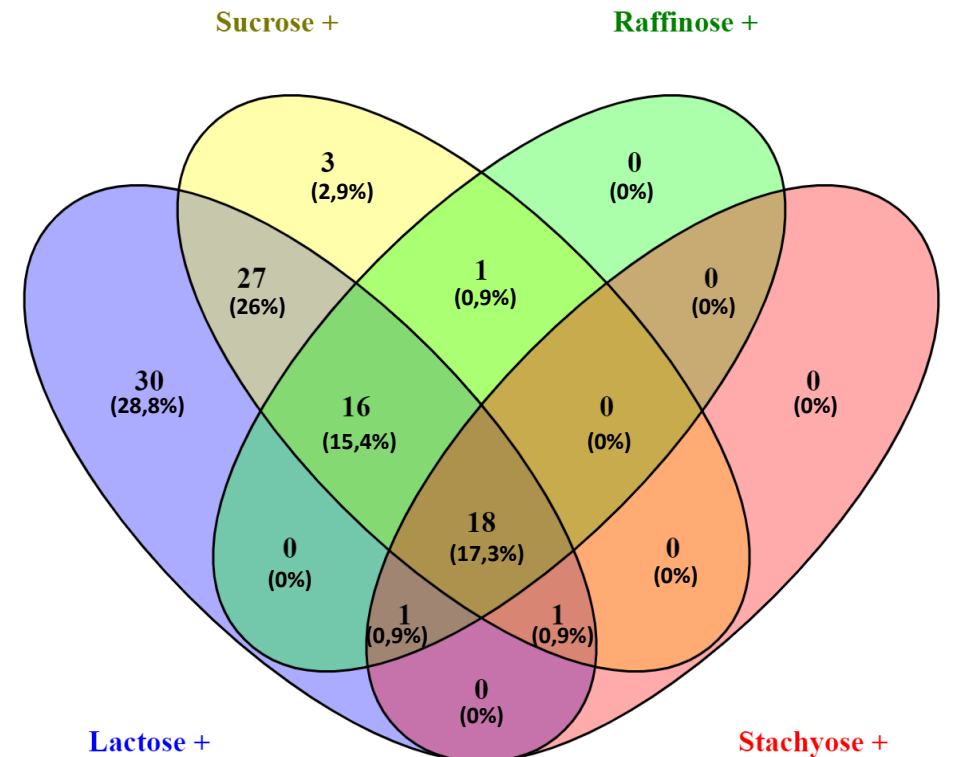
## ➤ A quest for 2-in-1 bacteria



# ➤ Screening 104 strains for the ability to ferment plant or milk carbohydrates



	Number of strains	Lactose +	Sucrose +	Raffinose +	Stachyose +	lac-, suc-, raf-, sta-	lac+, suc+, raf+, sta+
<i>P. freudenreichii</i>	10	8	2	1	0	2	0
<i>A. acidipropionici</i>	10	10	10	9	7	0	6
<i>L. delbrueckii</i> subsp. <i>bulgaricus</i>	8	8	0	1	1	0	0
<i>L. delbrueckii</i> subsp. <i>lactis</i>	10	10	8	2	2	0	2
<i>L. plantarum</i>	12	12	12	12	5	0	6
<i>L. rhamnosus</i>	11	7	5	1	0	4	0
<i>S. thermophilus</i>	10	9	10	0	0	0	0
<i>L. fermentum</i>	8	7	8	7	2	0	1
<i>L. helveticus</i>	12	10	1	0	0	1	0
<i>L. acidophilus</i> / <i>L. johnsonii</i>	4	3	3	3	3	1	3
<i>Lc. Lactis</i>	9	9	7	0	0	0	0
<b>Total number</b>	<b>104</b>	<b>93</b>	<b>66</b>	<b>36</b>	<b>20</b>	<b>8</b>	<b>18</b>
<b>%</b>	<b>100.0</b>	<b>89.4</b>	<b>63.5</b>	<b>34.6</b>	<b>19.2</b>	<b>7.7</b>	<b>17.3</b>



# ➤ Screening 104 strains for the ability to acidify goat milk and vegetable milk analogs



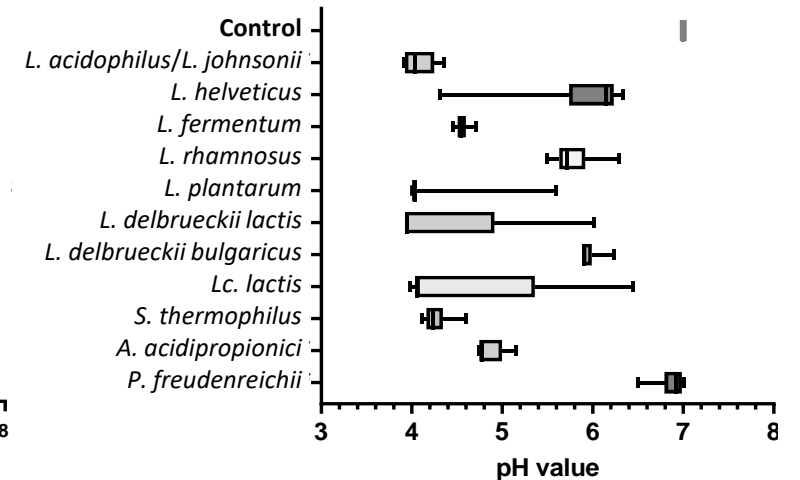
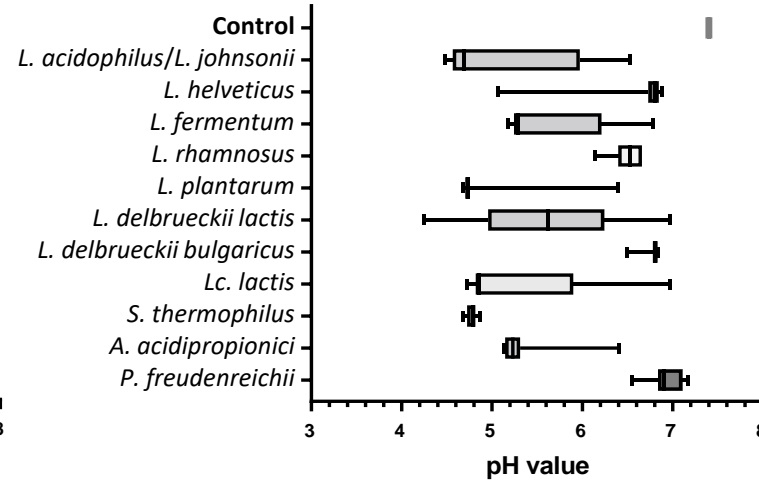
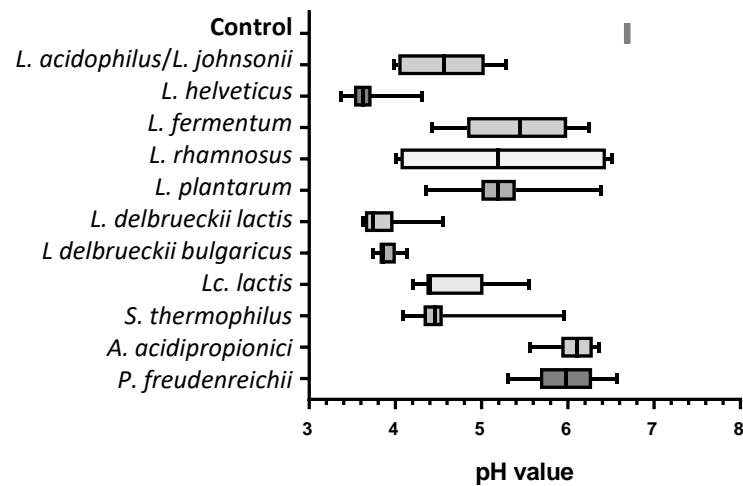
Goat milk



Soy milk analog



Hemp milk analog



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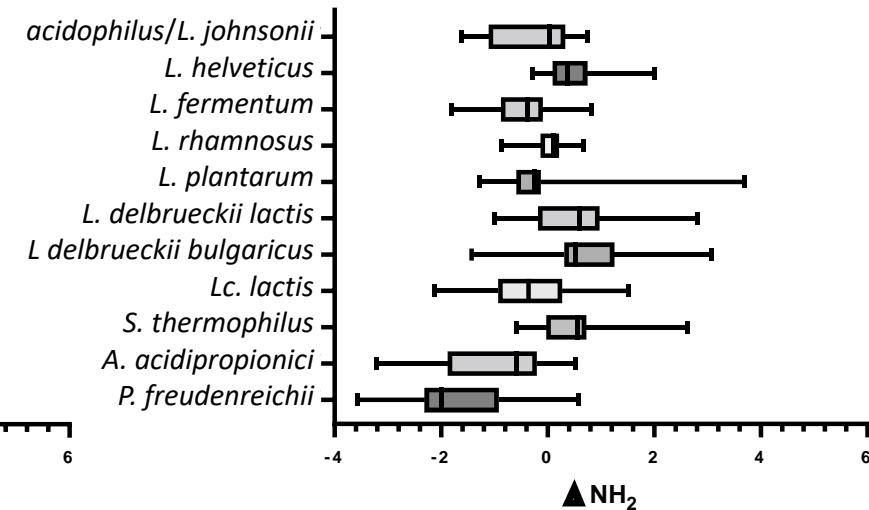
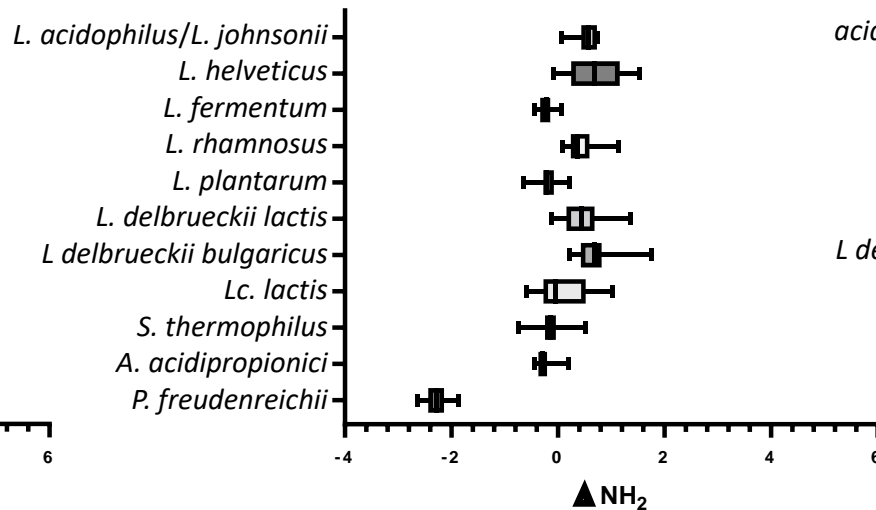
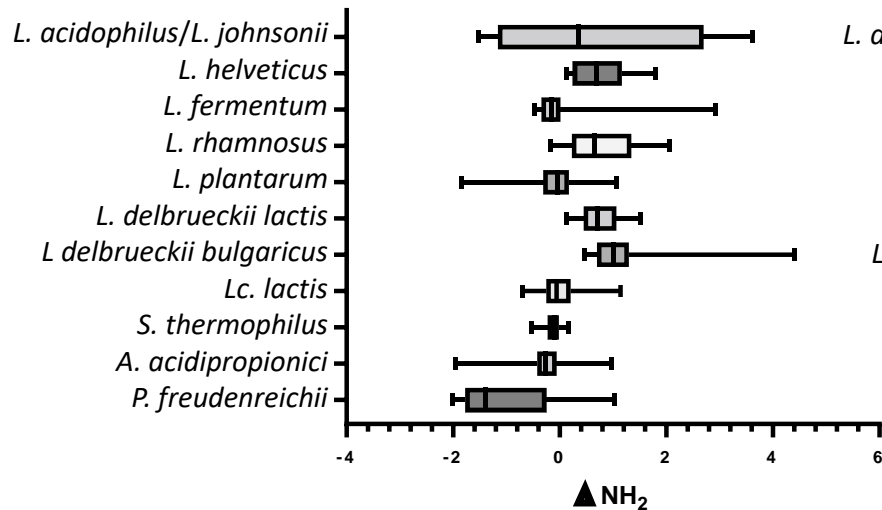
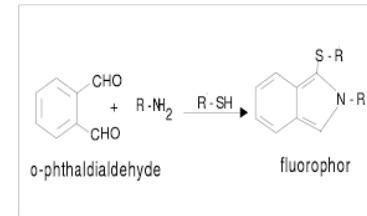




# ➤ Screening 104 strains for the ability to utilize goat milk or vegetable proteins



+

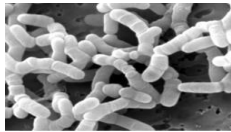


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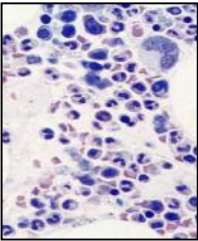
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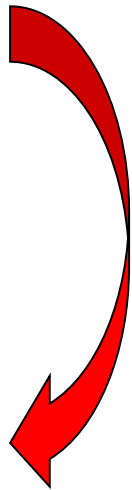
# ➤ Screening 104 strains for the ability to induce IL-10 in human PBMCs



+



24 h

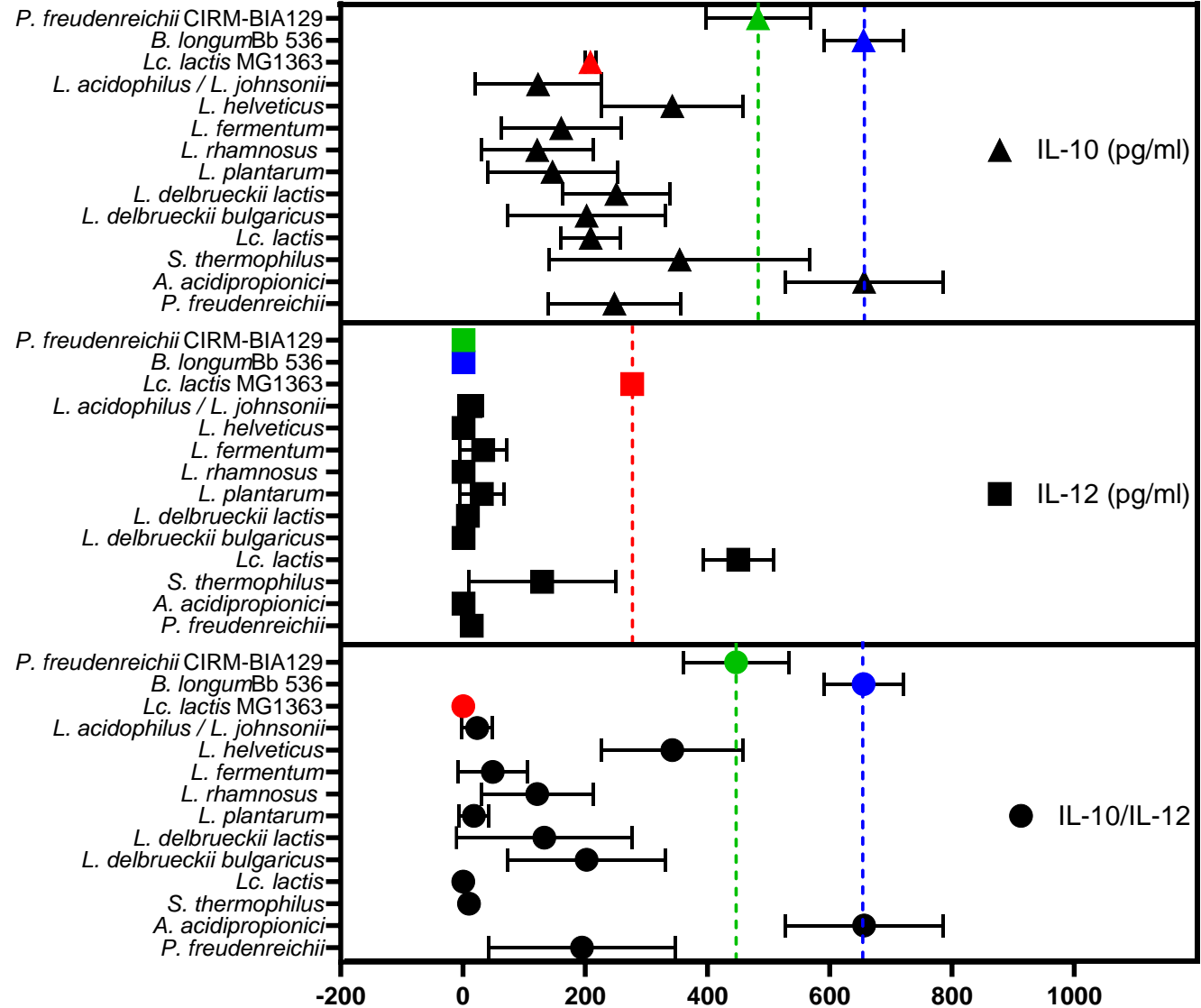


IL-10

IFN $\gamma$

IL-12

TNF $\alpha$

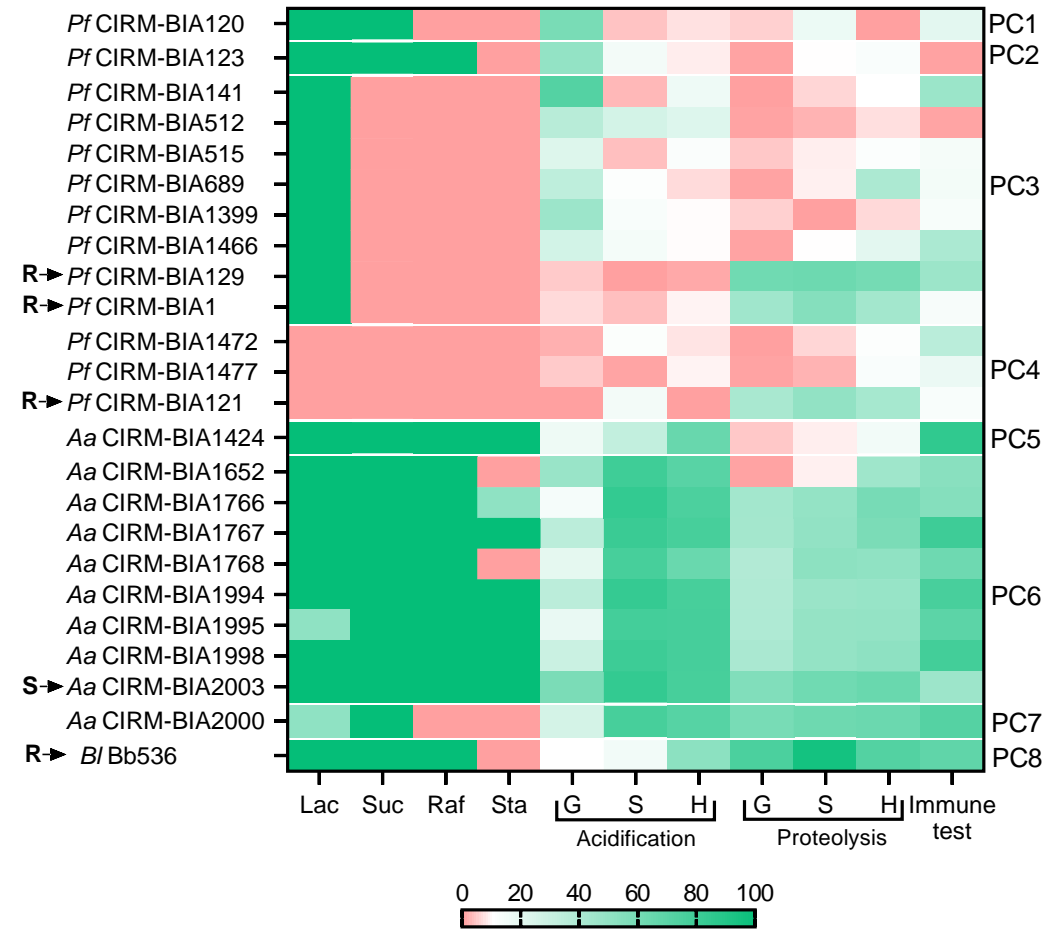


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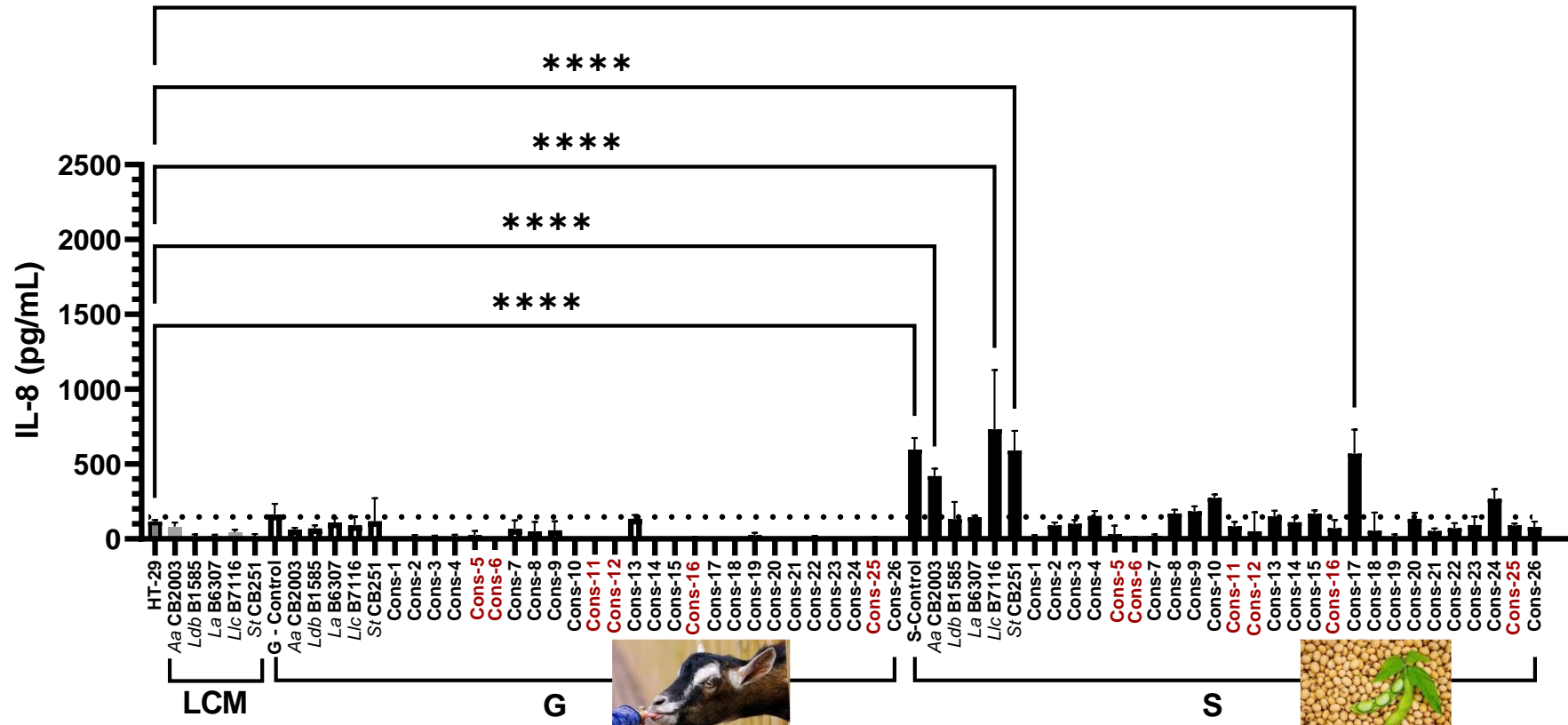
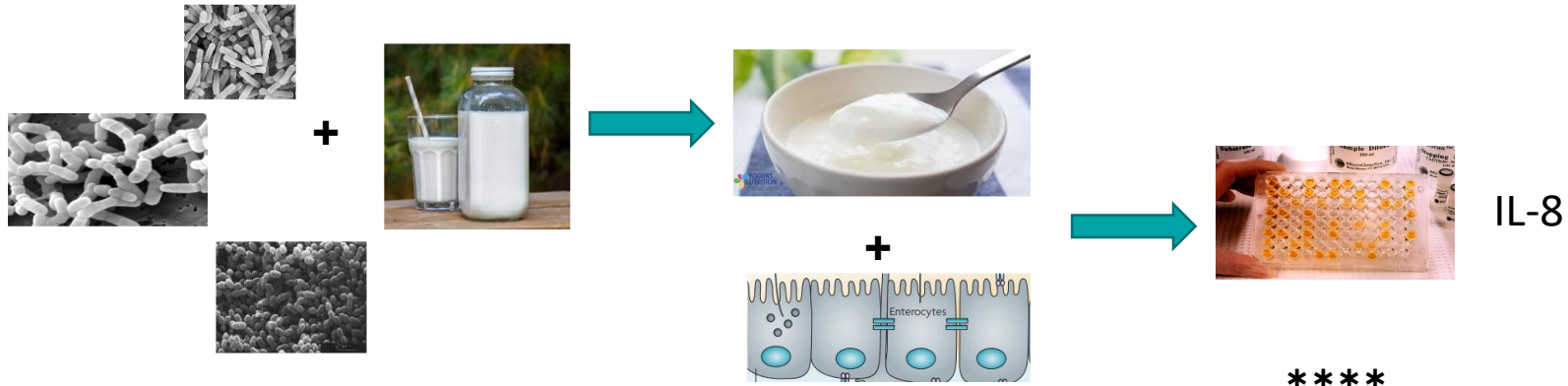
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# ➤ Clustering 104 strains according to technological and probiotic abilities



# ➤ Developing anti-inflammatory fermented vegetable products

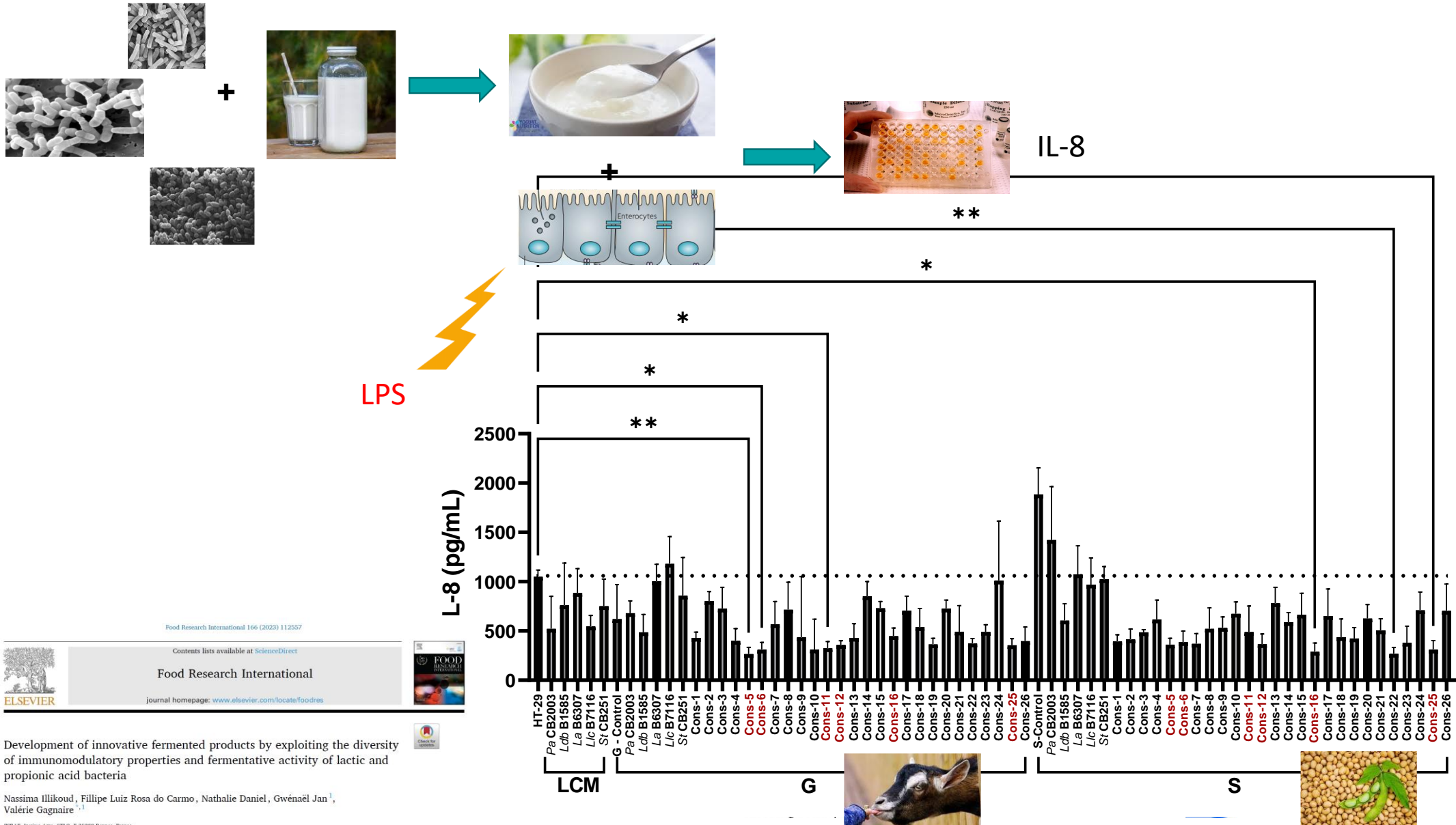


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# ➤ Developing anti-inflammatory fermented vegetable products



# ➤ Towards preclinical studies

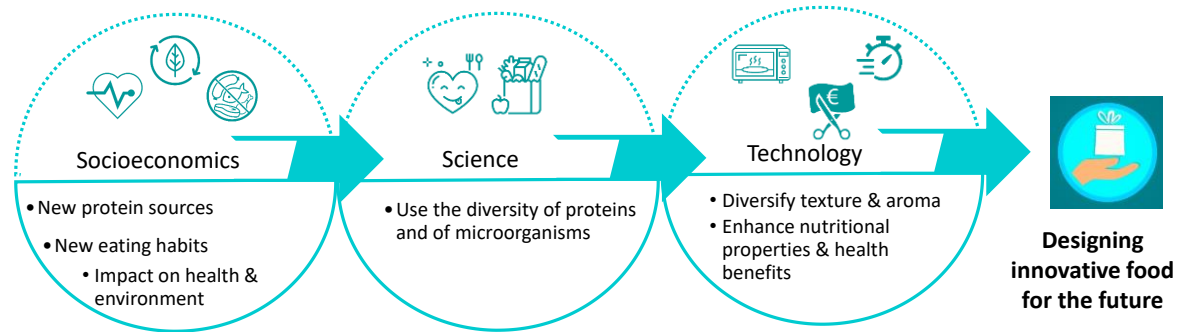


Modèles IBD, IBS

Impact sur l'inflammation

Impact sur la douleur intestinale

Impact sur le microbiote intestinal



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# > What next?



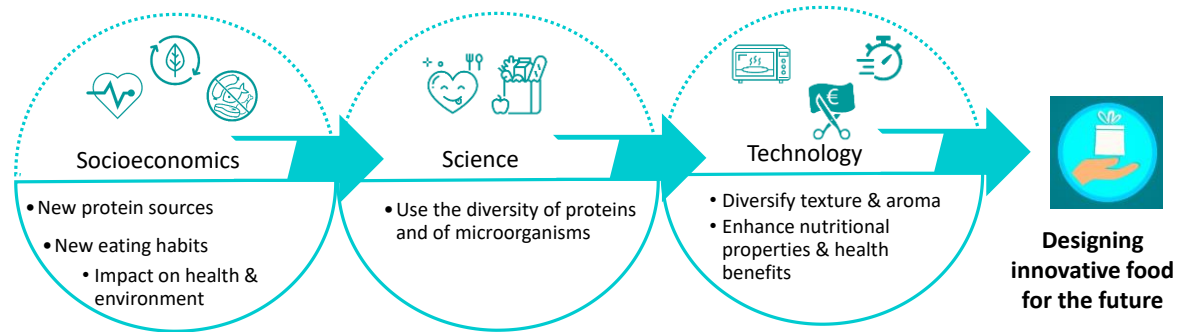
The PRIMA programme is supported and funded under Horizon 2020, the Framework European Union's Programme for Research and Innovation



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# > Thank You for your attention



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