

6th International Conference and Exhibition on

PROBIOTICS, FUNCTIONAL AND BABY FOODS

October 02-03, 2017 London, UK

Mucus-targeted potential of *Streptococcus thermophilus* in the gut towards new probiotic effects

Muriel Thomas¹, Neike Fernandez¹, Laura Wrzosek¹, Joanna Radziwill-Bienkowska², Belinda Ringot-Destrez³, Marie-Pierre Duviau⁴, Marie-Louise Noordine¹, Valérie Laroute⁴, Véronique Robert¹, Marie-Line Daveran-Mingot⁴, Muriel Coccain-Bousquet⁴, Renaud Léonard³, Catherine Robbe-Masselot³, Véronique Monnet¹, Françoise Rul¹, Eric Ogier-Denis⁵ and Muriel Mercier-Bonin⁶

¹INRA, Micalis Institute, France

²Institute of Biochemistry and Biophysics, Poland

³University of Lille, France

⁴LIBSP, France

⁵Center for Research and Interdisciplinary, France

⁶Toxalim, INRA, France

Statement of the Problem: To establish safer and more sustainable food, we need to support the probiotic allegations of the lactic acid bacteria in performing functional and mechanistic studies. Here, we explored the mucus-targeted potential of *Streptococcus thermophilus* (one of the two yogurt bacteria), i.e. its capacity to adhere, degrade, and/or modulate the intestinal mucus.

Methodology & Results: *In vitro*, on pig gastric mucin or on HT29-MTX intestinal epithelial cells, *S. thermophilus* poorly adhered and did not metabolize mucus sugars. *In vivo*, we evidenced a muco-modulatory effect of *S. thermophilus* in the colon of monoxenic rats, solely housing *S. thermophilus*. Indeed, the number of mucus-producing cells as well as the expression of Muc2 (the main secreted intestinal mucin) and Klf4 (protein involved in the differentiation of mucus-producing cells) were increased. In wild-type mice, housing a complex microbiota, the number of goblet cells remained unchanged after administration of *S. thermophilus* whereas a modification of mucin O-glycosylation was observed with a loss of neutral structures to the benefit of sulfated ones. Changes in Klf4 expression and O-glycan profile were observed in the ileum. In addition, the caecal lactate concentration was increased and that of some short-chain fatty acids (e.g. propionate) was modified in comparison with control animals.

Conclusion & Significance: Thus, *S. thermophilus* exhibits *in vivo* a mucus-targeted potential that is expressed in different rodent models and in different ways. The present work will be valuable to elaborate novel functional food based on these original probiotic properties.

Biography

Muriel Thomas is a Senior Scientist at INRA (DR2), and her projects focus on the health benefits sustained by diet and microbes. She leads the group microbiota and epithelia which has contributed to a better understanding of the dynamic dialogue installed between the intestinal epithelium and microbiota. Her expertise is based on the use of germ-free and gnotobiotic rodents combined with cellular tools and the isolation of new beneficial microbes. Recently, she has developed a new area of expertise around the microbes found in lungs and regulating the susceptibility to respiratory diseases like asthma. The group combines approaches at the frontier between physiology, microbiology and nutrition. In addition, her engagement in public health agency (ANSES) and nutrition-specialized societies (SFNEP) is an asset to adapt her projects with the public health priorities, regulatory framework and food safety policy.

muriel.thomas@inra.fr

Notes: