



**HAL**  
open science

## Impact of the exposure period to GOS/inulin prebiotics on immune system orientation

Pascal Gourbeyre, Nicolas Desbuards, Guilaine Grémy, Olivier O. Tranquet,  
Martine Champ, Sandra Denery-Papini, Marie Bodinier

### ► To cite this version:

Pascal Gourbeyre, Nicolas Desbuards, Guilaine Grémy, Olivier O. Tranquet, Martine Champ, et al..  
Impact of the exposure period to GOS/inulin prebiotics on immune system orientation. 31. Congress  
of the European Academy of Allergy and Clinical Immunology, Jun 2012, Genève, Switzerland. pp.1,  
2012. hal-02808844

**HAL Id: hal-02808844**

**<https://hal.inrae.fr/hal-02808844>**

Submitted on 6 Jun 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Impact of the exposure period to galactooligosaccharides/inulin prebiotics on immune system orientation.

P. Gourbeyre\*, N. Desbuards<sup>D</sup>, G. Grémy\*, O. Tanquet\*, M. Champ<sup>D</sup>, S. Denery-Papini\* and M. Bodinier\*

\* INRA, UR 1268 BIA, Allergy team, rue de la géraudière, BP 71627, 44316 Nantes Cedex 03

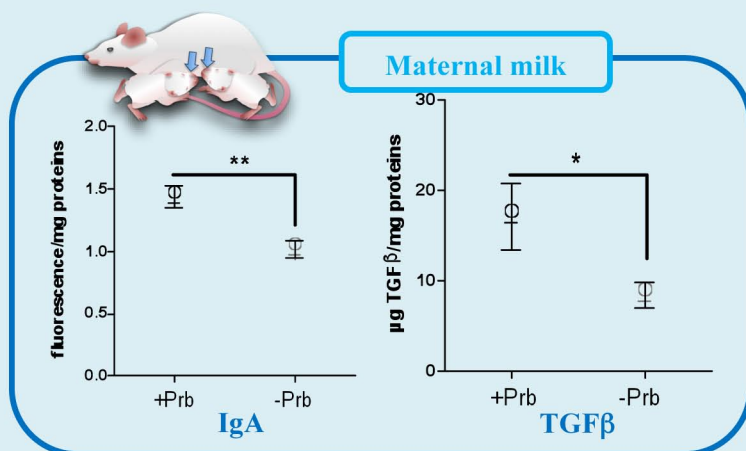
<sup>D</sup> INRA, UMR 1280 PHAN, CHU Hôtel-Dieu, place Alexis Ricordeau, 44093 Nantes Cedex 1

**Aim :** To define the best exposure period (perinatal, postnatal) to a prebiotic mix able to induce immune pathways related to tolerance mechanisms.

**Background :** Prebiotics are digestion resistant molecules able to stimulate intestinal microbiota, acting then on immune system. They constitute emerging tools to alleviate some pathologies including allergies. However, there are not enough data proving their efficacy and their impact on immune system is yet not fully understood.

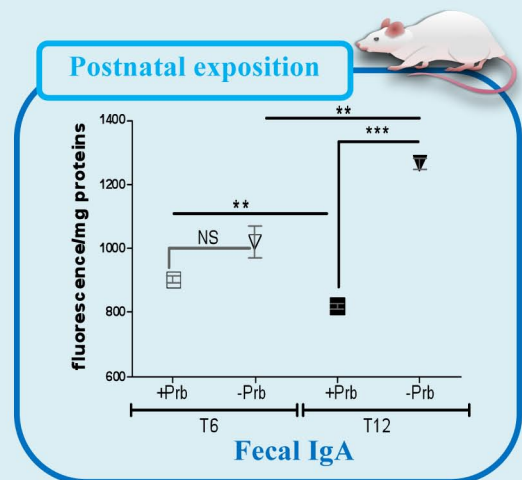
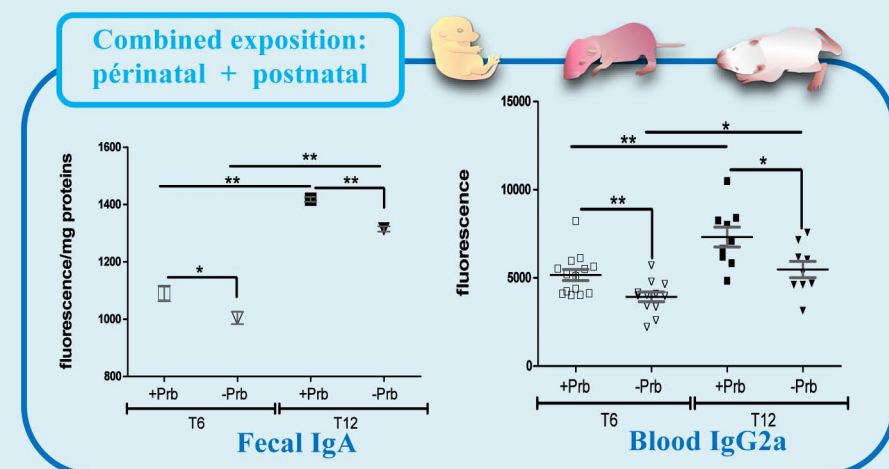
**Methods :** Balb/c mice were fed with a galactooligosaccharides/inulin prebiotic mix enriched diet along perinatal period (gestation, parturition, lactation) and/or postnatal period (from weaning to 12 weeks of age). Some markers of immune pathways related to tolerance mechanisms (T regulatory response : Treg : IgA, IL-10 and TGFβ ; Th1 response : IgG2a and IFNγ) and to allergy (Th2 response : IgE, IgG1 and IL-4) were analysed.

**Results :** When prebiotic enriched diet were introduced only during postnatal period, on the one hand IFNγ levels were increased, while IgG2a levels remain unchanged ; on the other hand TGFβ levels were increased, whereas IgA levels were decreased. Milk from lactating dams fed with prebiotic enriched diet displayed higher concentrations of both IgA and TGFβ. When prebiotics were introduced during both perinatal and postnatal period, IL-10, IgA and IgG2a levels were increased. Whatever the exposition period to prebiotics IgG1, IgE and IL-4 levels remains unchanged (not shown).



	Cytokine concentration (pg/ml)					
	IFN-γ		TGFβ		IL-10	
	+Prb	-Prb	+Prb	-Prb	+Prb	-Prb
<b>Combined exposition</b>	2597 ± 118	2233 ± 289	683 ± 3826	-	152 ** ± 51	1.7 ± 0.7
<b>Postnatal exposition</b>	6430 *** ± 286	5423 ± 274	92* ± 8	34 ± 4	729 ± 26	725 ± 25

\*, \*\*, \*\*\* statistical differences between +Prb and -Prb



**Conclusions :** Prebiotic exposure period exert a major effect on cytokine and immunoglobulin secretion. This study proves that the combined exposure period (perinatal + postnatal) to prebiotic mix must be beneficial to induce Th1 and Treg related immunoglobulin production. This tolerogenic prebiotic effect must be mediated by microbiota and/or by maternal milk immunological active compounds such as IgA or TGFβ. Thus perinatal prebiotic administration may constitute a good tool to induce oral tolerance and to prevent from allergic diseases.