



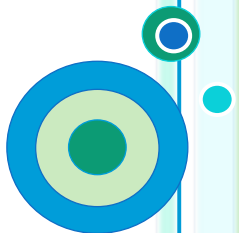
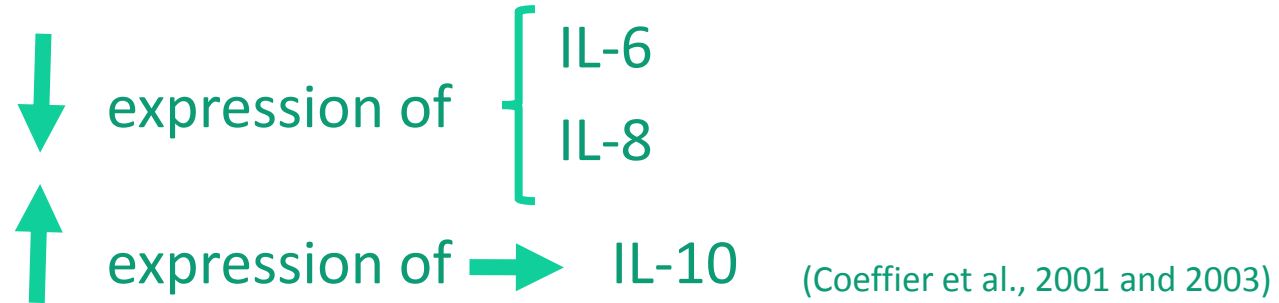
# Effect of Arginine and Glutamine supplementation of rabbit does on translocation and immune response of their litters

Delgado R., Nicodemus N., Abad-Guamán R., Menoyo D., García J., Carabaño R.  
Departamento de Producción Agraria. Universidad Politécnica de Madrid. Spain



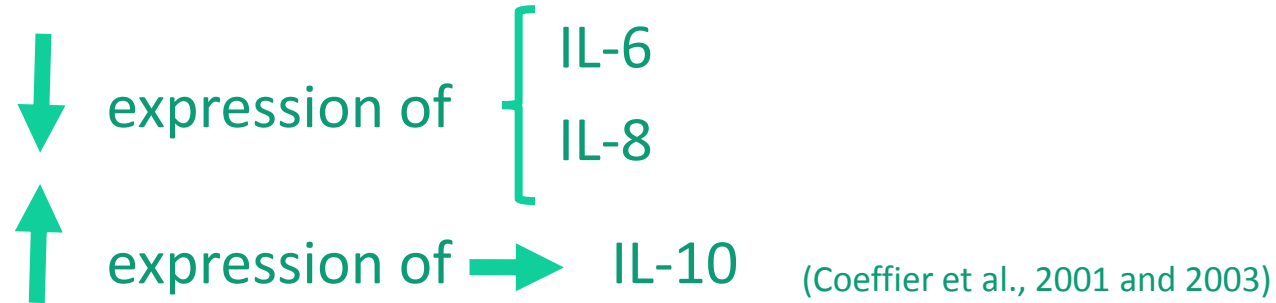
## ✓ Glutamine

Synthesis of glycoproteins (Wu et al 2001; Wang et al., 2006)



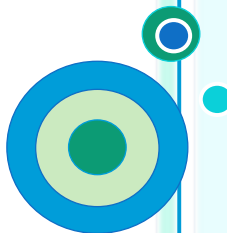
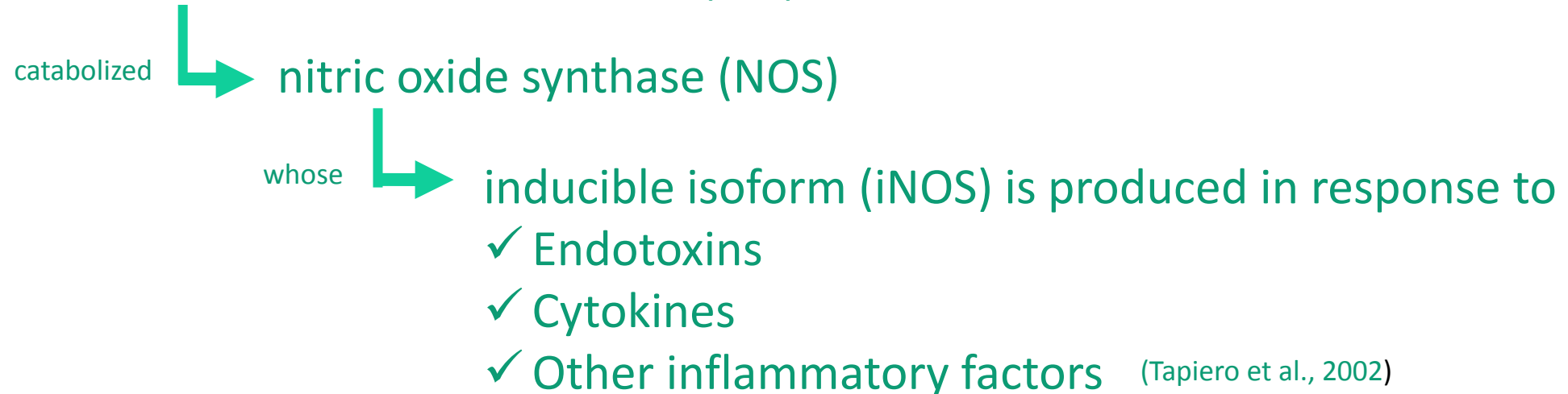
## ✓ Glutamine

Synthesis of glycoproteins (Wu et al 2001; Wang et al., 2006)



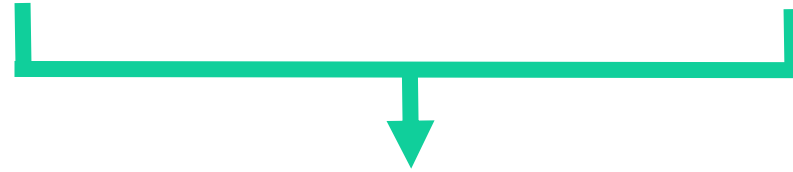
## ✓ Arginine

Precursor for the nitric oxide (NO)



**Glutamine**

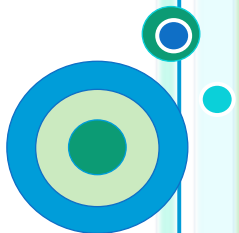
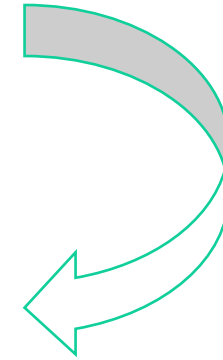
**Arginine**



**Maintained intestinal barrier**  
**Enhancing immune response**

**integrity**  
**functionality**

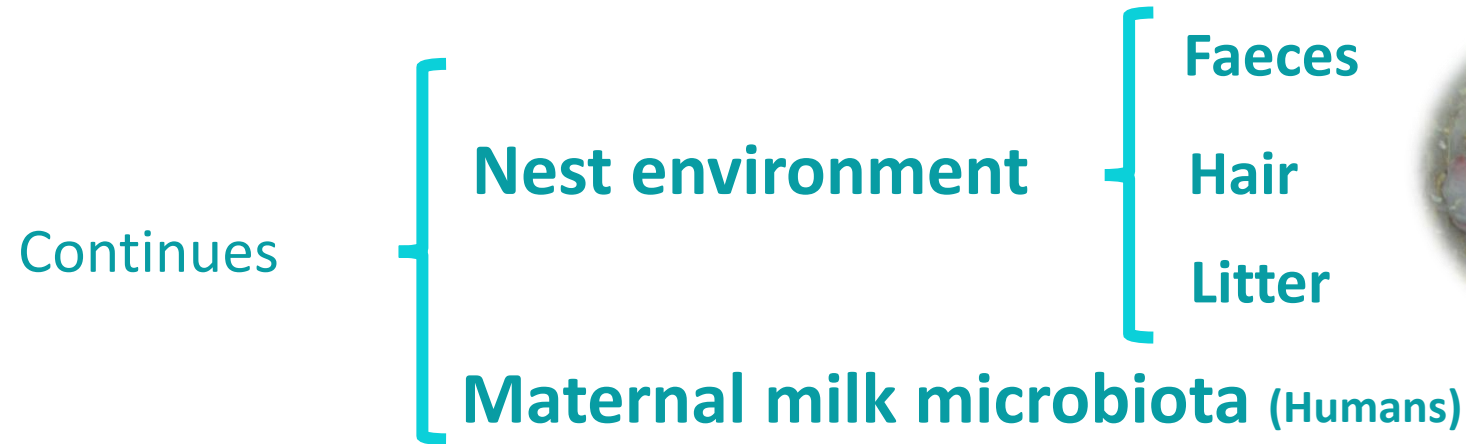
**Regulate bacterial translocation mechanisms**





✓ **Microbial colonization of neonates:**

Start → **Microbiota canal birth**



(Heikkila y Saris,2003; Martín et al., 2004; Donnet-Hughes eta l., 2010)

✓ **Bacterial translocation in rabbits:**



**Newborn (6 days of age)**

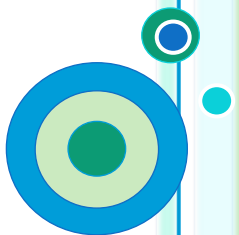
Due to



**Spontaneous bacterial translocation**

**Immaturity of the GALT**

Urao et al., 1996



## Objectives:

1. Confirm the presence of bacteria  
in the mesenteric lymph nodes

In rabbits at 6 days of age

2. Evaluate the influence of does supplementation with

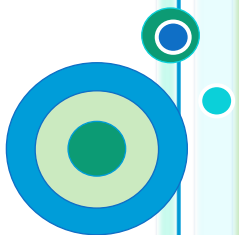
✓ 0.4 % Arginine

✓ 0.4 % Glutamine

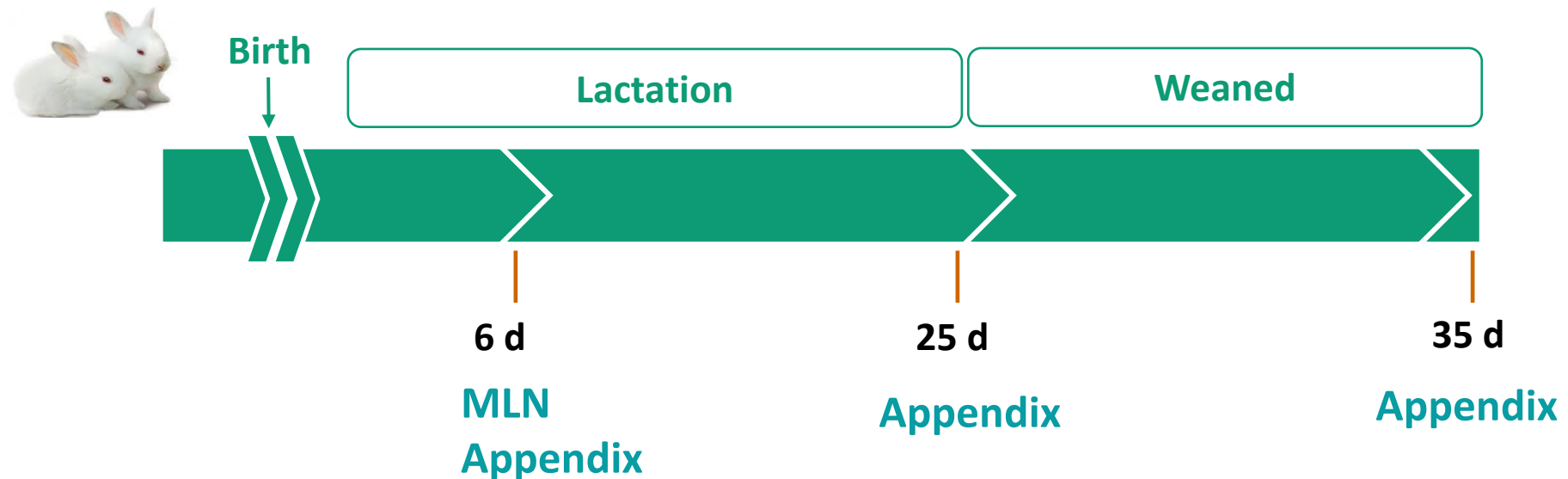
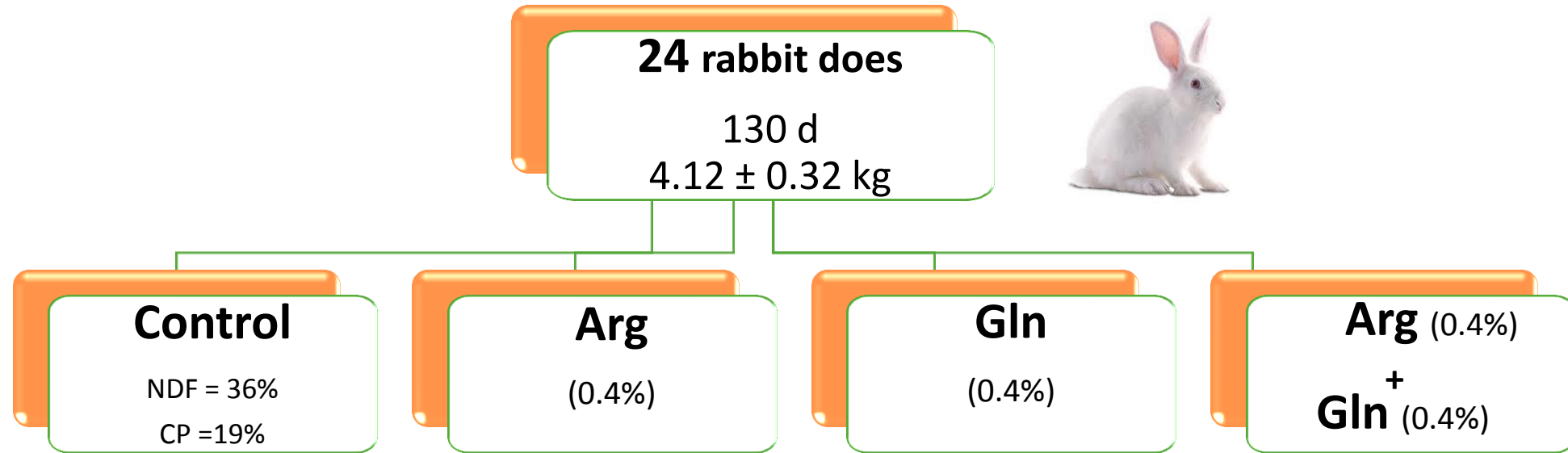
✓ 0.4 % Arginine + 0.4% Glutamine

On {  
Immune response  
Bacterial translocation

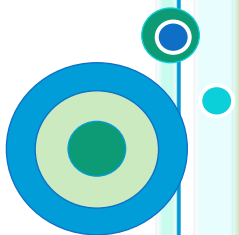
Of their litters



# Materials and Methods



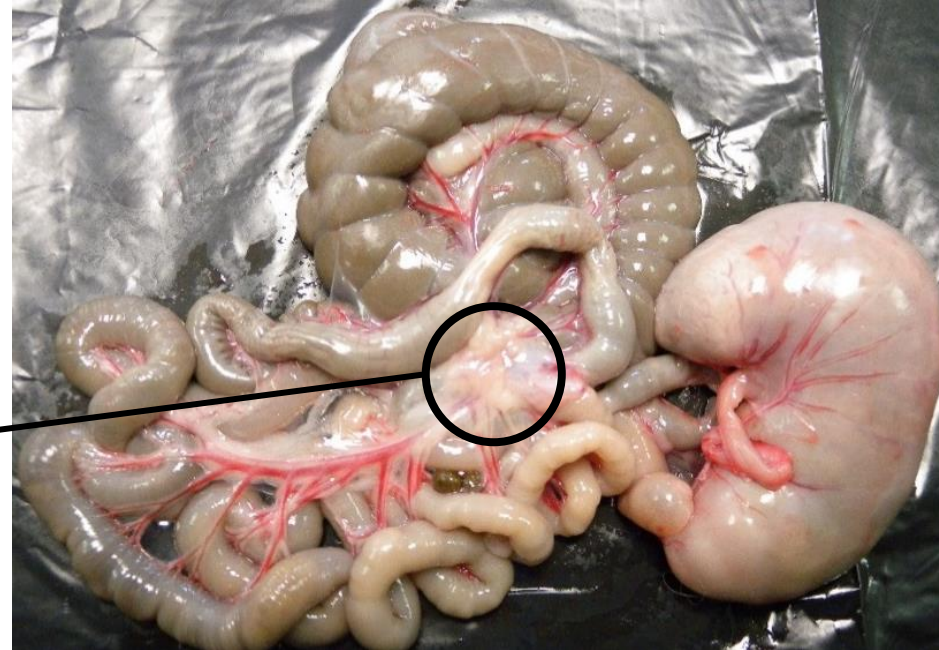
Appendix: principal lymphopoietic organ → Lymph B synthesis





Six days after parturition

One kit per litter (6 litters/diet)



Mesenteric Lymph Nodes

Analyzed for cultures



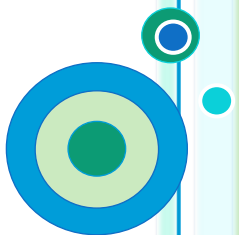
Mesenteric Lymph Nodes



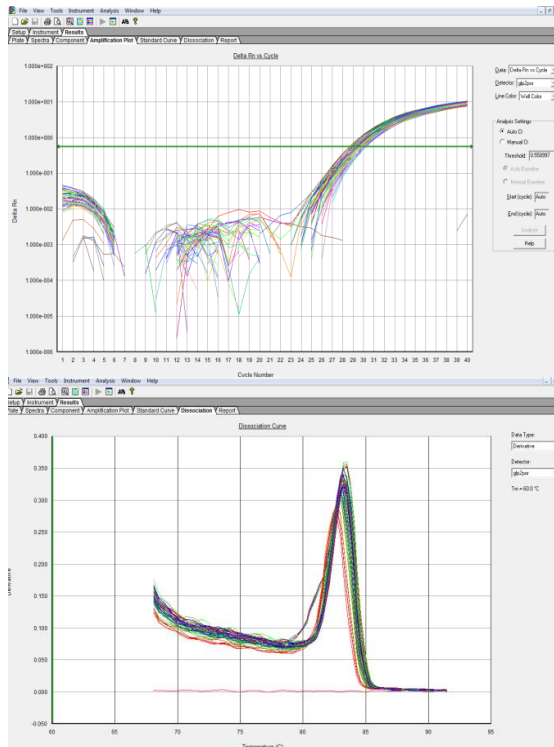
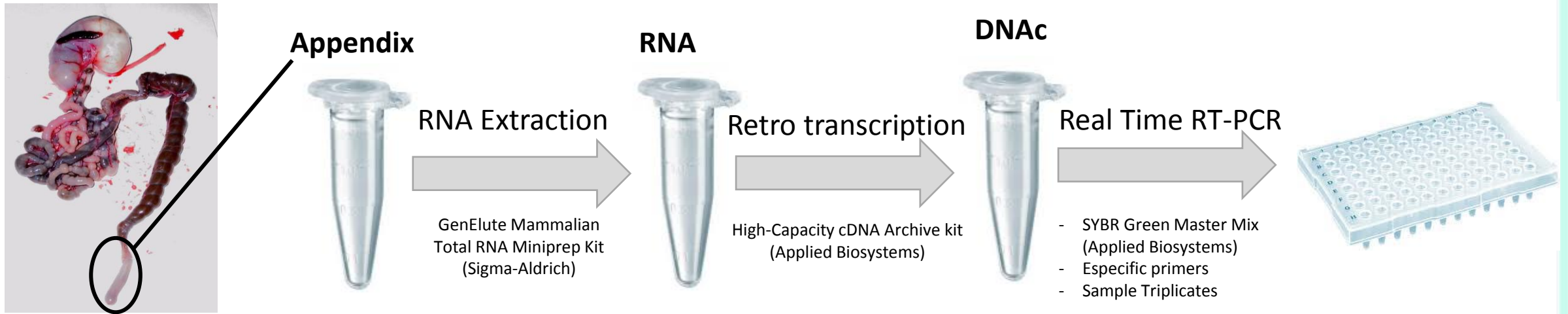
Aerobes

Anaerobes

Facultative anaerobes



## Cytokine expression

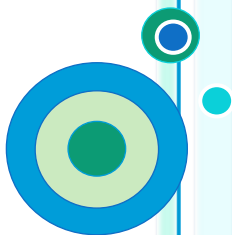


## ✓ Studied genes

- Interferon-gamma (IFN- $\gamma$ )
- Inducible oxide nitric synthase (iNOS)
- Interleukin 2 (IL-2)
- Interleukin 6 (IL-6)
- Interleukin 8 (IL-8)
- Interleukin 10 (IL-10)

## ✓ Reference genes

- Hypoxanthine Phosphoribosyltransferase (HPRT)
- Glyceraldehyde 3-phosphate dehydrogenase (GADPH)



## Statistical analyze

### ✓ Bacterial cultures

Variance analysis (GLM procedure, SAS)

Fix effects

Arginine level

Glutamine level

Interaction Arginine \* Glutamine

### ✓ Cytokine expression

Repeated measurements model (Mixed procedure, SAS)

Fix effects

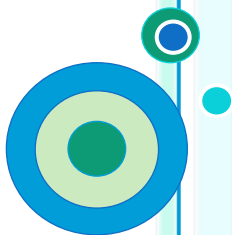
Arginine level

Glutamine level

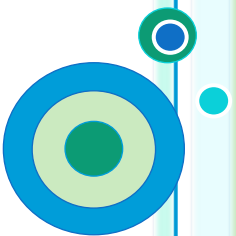
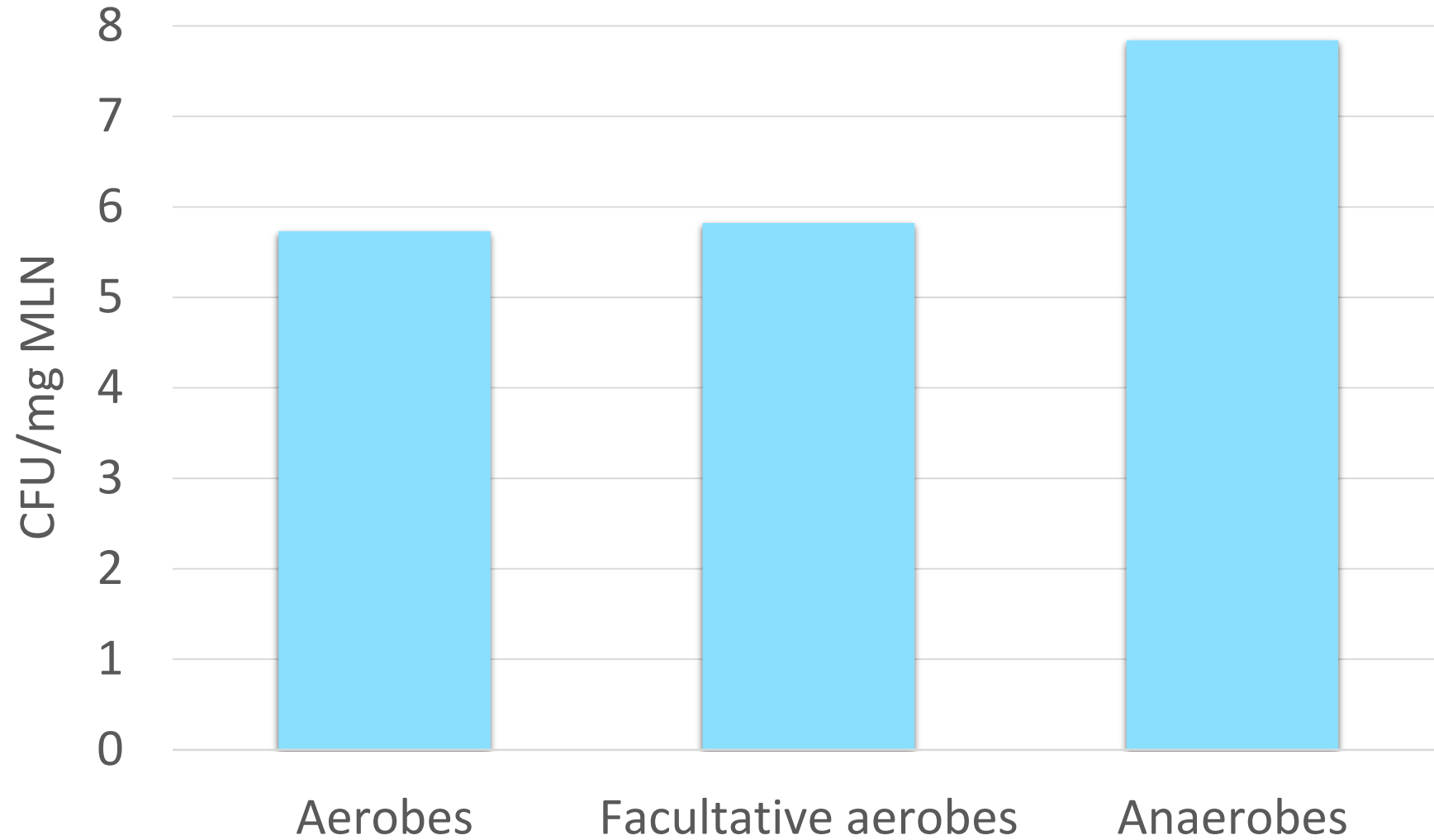
Interaction Arginine \* Glutamine

Age (repeated measurement)

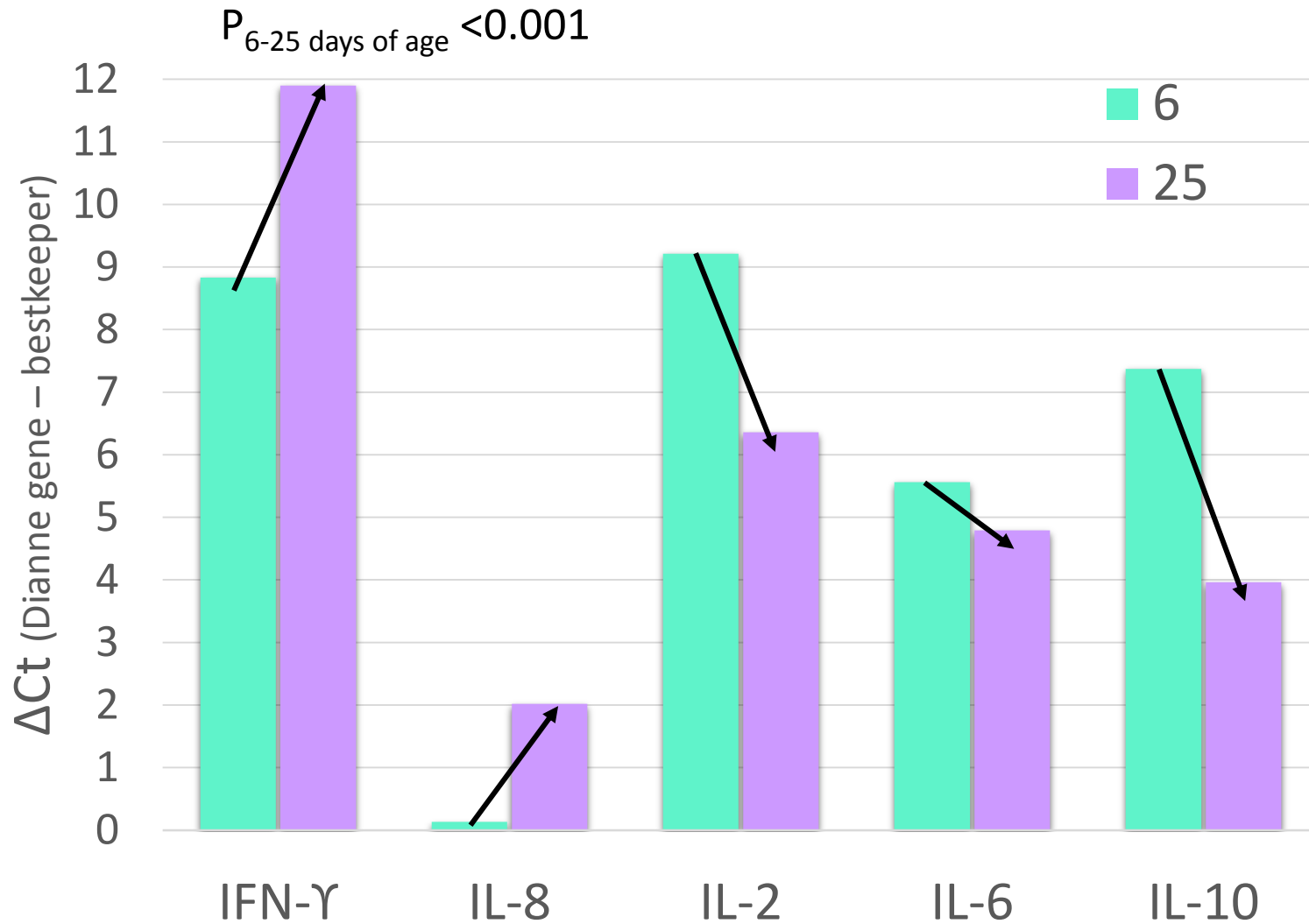
Random effects → Litter



✓ Microbial translocation at 6 days of age



## ✓ Cytokines expression at 6, 25 and 35 days of age



### ➤ Previous studies:

✓ Dasso et al., 2000

✓ Campín et al., 2013

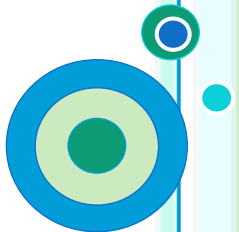
From 18 to 26 days of age

### ➤ Pro-inflammatory response

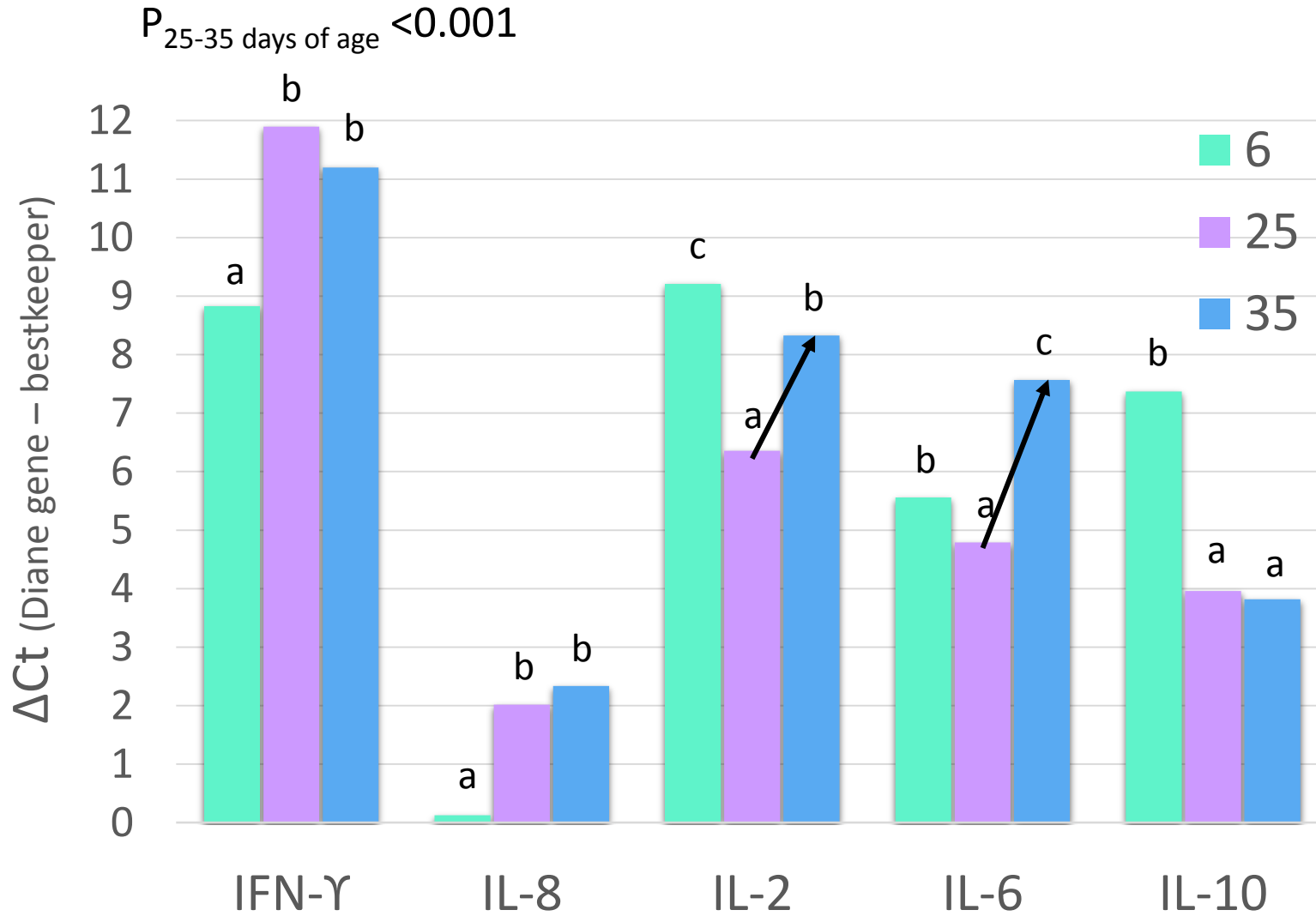
✓ Bacterial colonization

✓ New antigens


⇓ Ct Increase  $\longrightarrow$  ⇑ Gen expression



## ✓ Cytokines expression at 6, 25 and 35 days of age



### ➤ Previous studies:

✓ Delgado et al., 2010

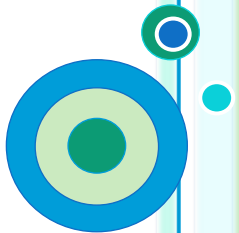
From 26 to 38 days of age

### ➤ Tolerance response

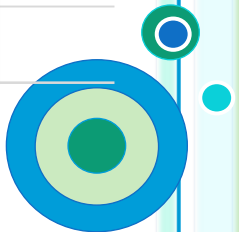
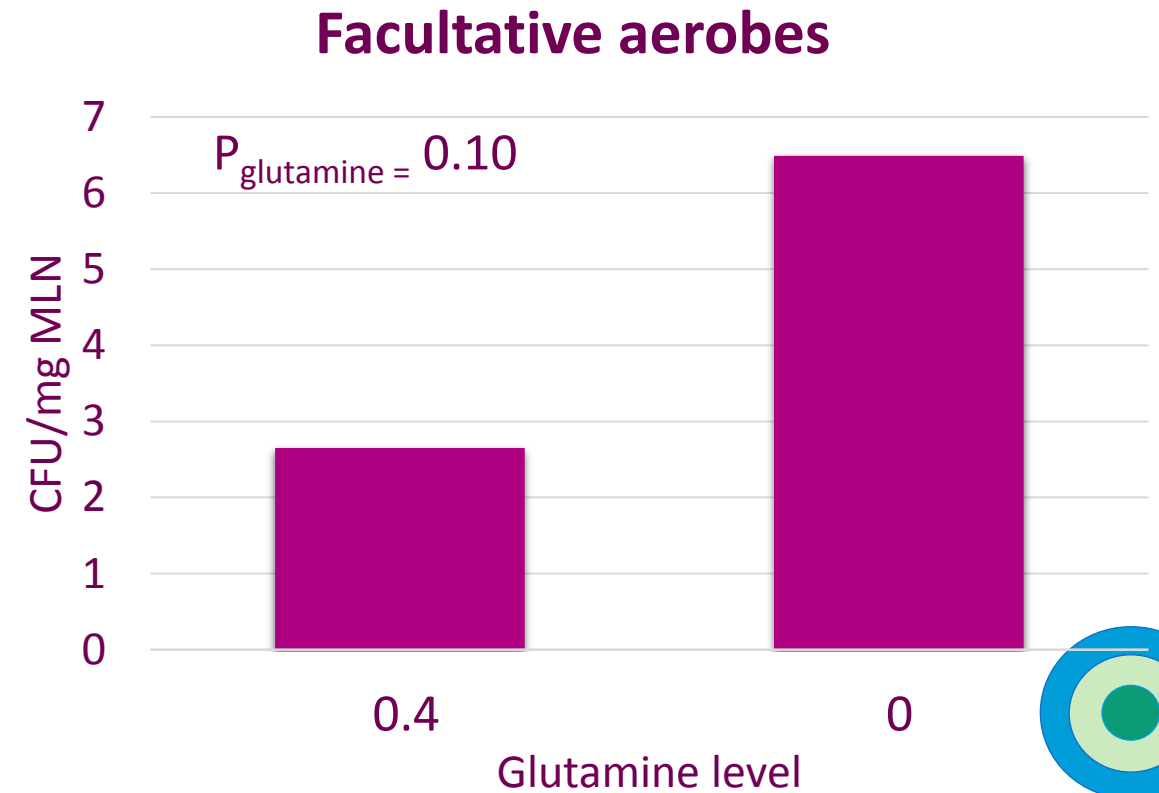
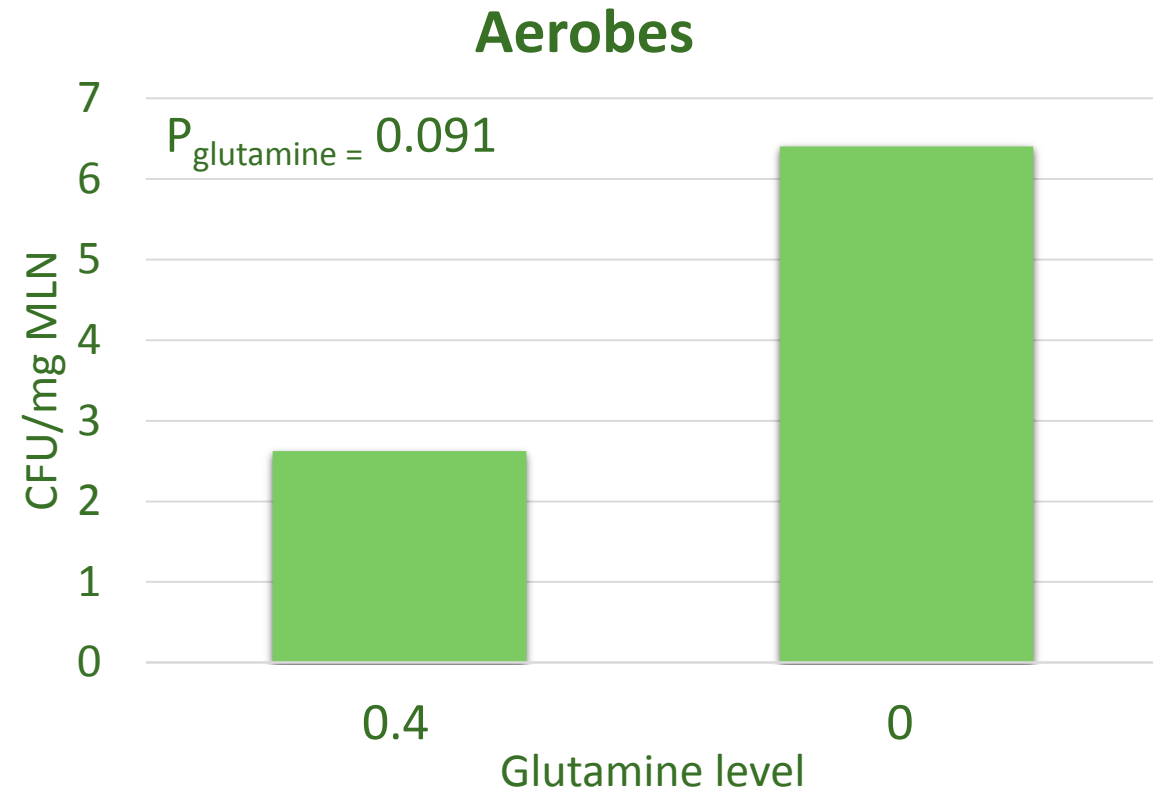
✓ Bacterial colonization

✓ New antigens

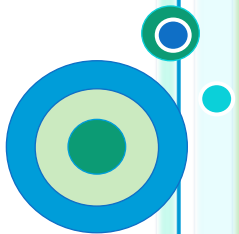
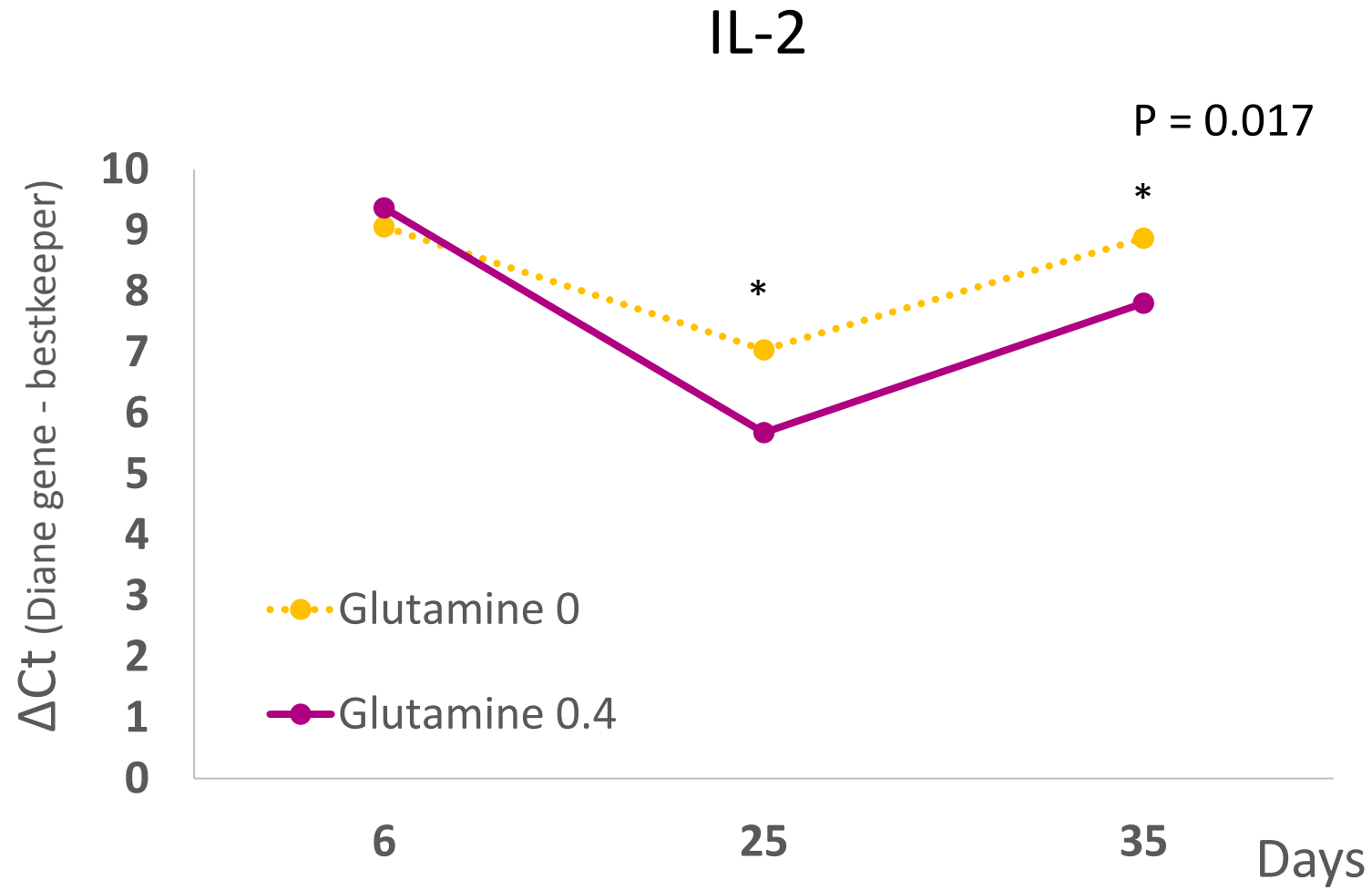
↑↑ Ct Increase → ↓↓ Gen expression



## ✓ Microbial translocation at 6 days of age

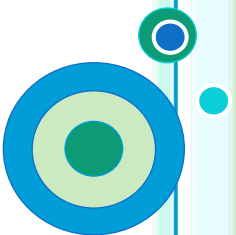
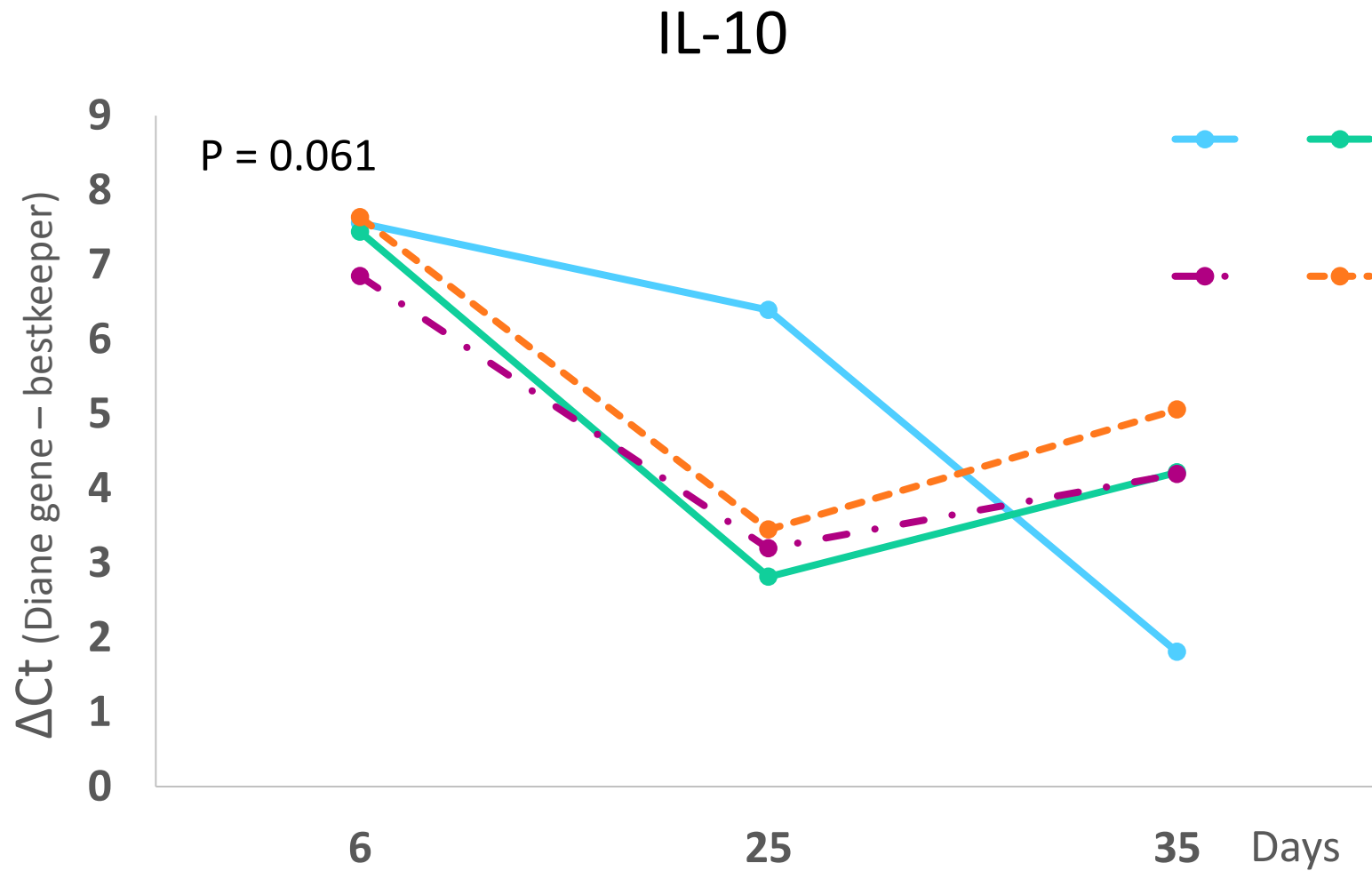


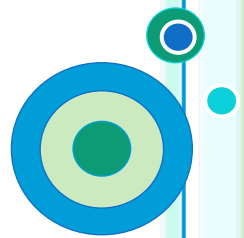
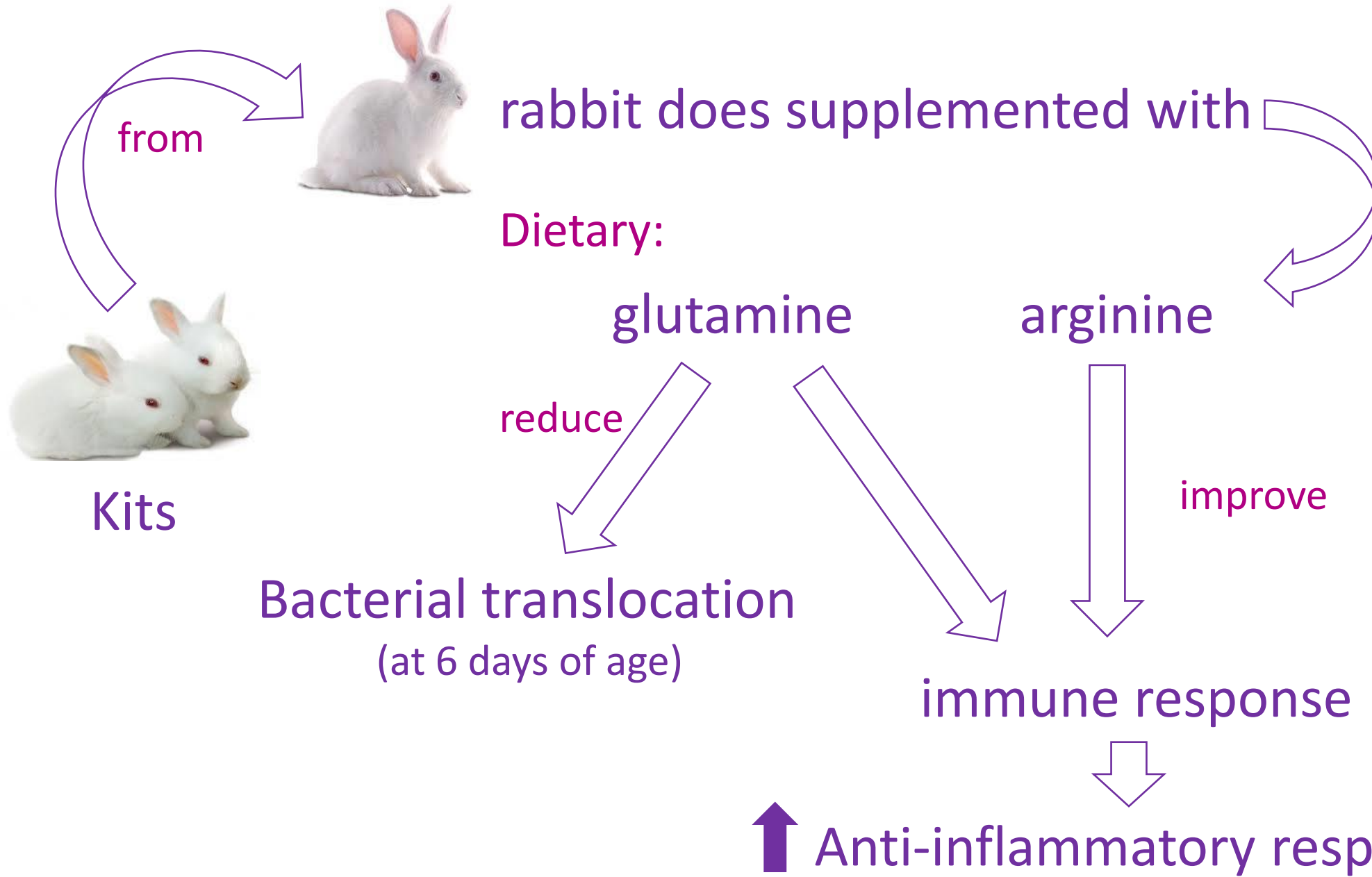
## ✓ Interaction Cytokines age × diet





✓ Interaction Cytokines age × diet





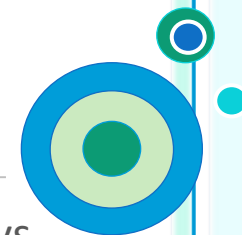
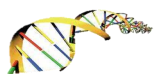
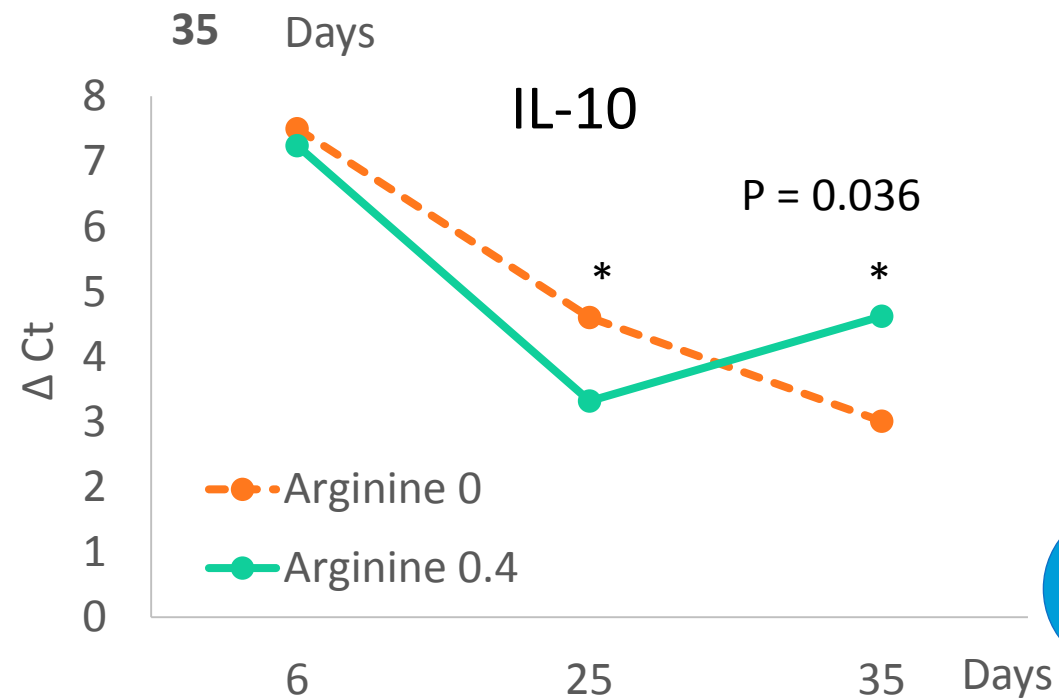
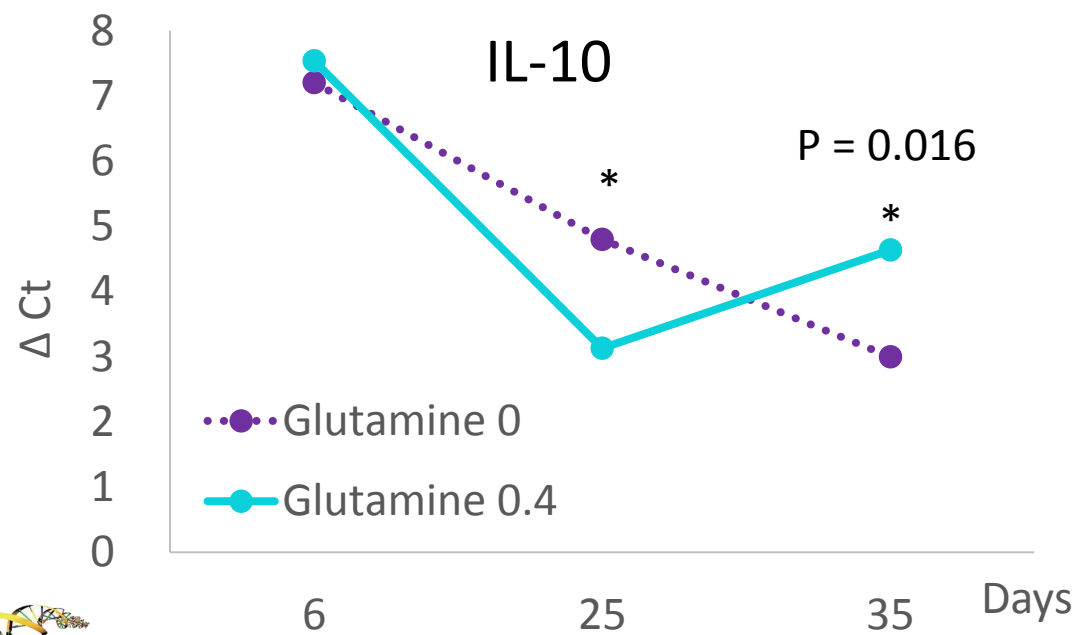
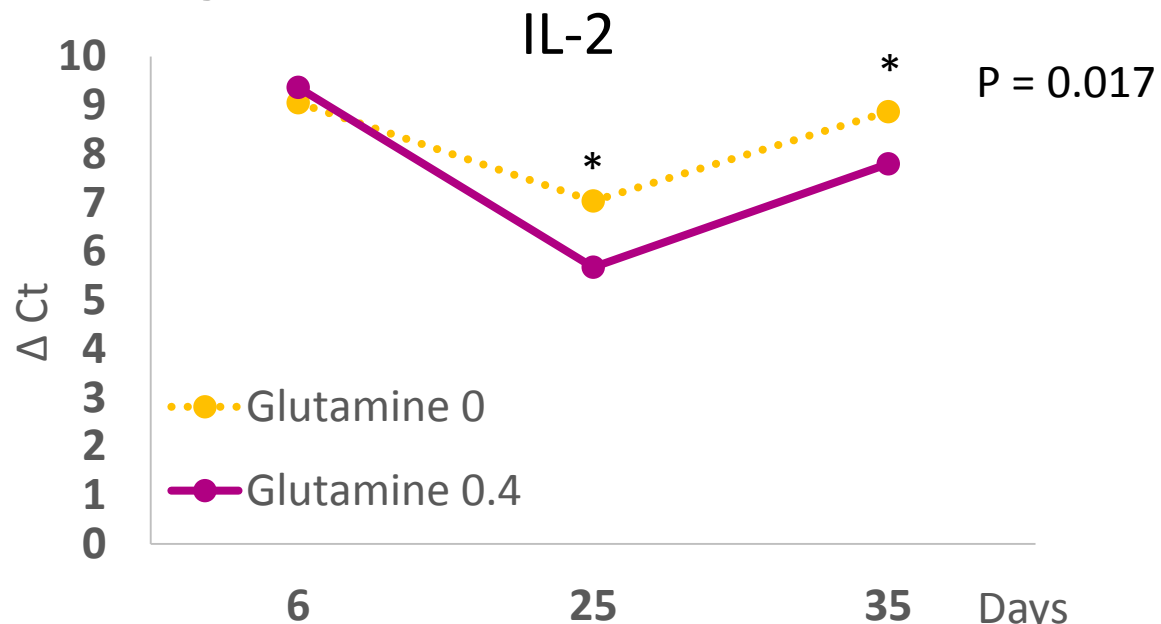


# Effect of Arginine and Glutamine supplementation of rabbit does on translocation and immune response of their litters

**THANKS FOR YOUR  
ATTENTION**



## ✓ Interaction Cytokines age × diet



6, 25 and 35 days after parturition

One kit per litter (6 litters/diet)

