



Fecal Calprotectin (FC) in babies born to mothers with or without IBD and correlation with microbiome

- results from the MECONIUM study -

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BACKGROUND AND GOALS

- Children born to IBD mothers have an increased risk of IBD.
- We previously showed that babies born to IBD mothers had evidence of gut microbiota dysbiosis at birth that persisted up to 3 months of life.
- We investigated Fecal Calprotectin (FC) concentrations as a biomarker of gut inflammation in babies born to mothers with or without IBD during their first year of life who were participating in the MECONIUM (Exploring MECHANisms Of disease traNsmission In Utero through the Microbiome) study.

METHODS

- 243 infant stool samples obtained at 2 weeks (2w), 2 months (2m) and 1 year (1y) from 122 babies (33 born to mothers with IBD) were analyzed using a quantitative enzyme immunoassay (CalproLab™ Calprotectin ELISA, Norway).
- We included 97 mother-baby pairs at 2w, 96 at 2m and 28 at 1y.
- FC concentrations were compared by maternal status at the third trimester (control or IBD [remission or active disease according to physician global assessment]), and correlated with the infant microbiome composition at 2w and 2m.

RESULTS

- FC levels in babies were higher than the levels observed in healthy adults and decreased with age (median FC 497µg/g [IQR: 253-766] at 2w versus 170µg/g [IQR: 45-327] at 1y; **p<0.0001**).
- No significant difference in FC levels was detected in babies born to mothers with IBD compared to those with no IBD at any time point (p=0.19 at 2w, p=0.68 at 2m, p=0.07 at 1y).
- However, babies born to mothers with active disease at the third trimester sustained higher FC levels at 1y (**median FC=502µg/g**) as compared to those born to mothers in remission (median FC=141µg/g; p=0.17), or with no IBD (**median FC=124µg/g; p=0.016**, Figure 1). Babies' characteristics at 1y are described table 1.
- FC levels across all time points correlated with relative abundance of *Gammaproteobacteria* (**r=0.39; p=0.0002**) (Figure 2.)

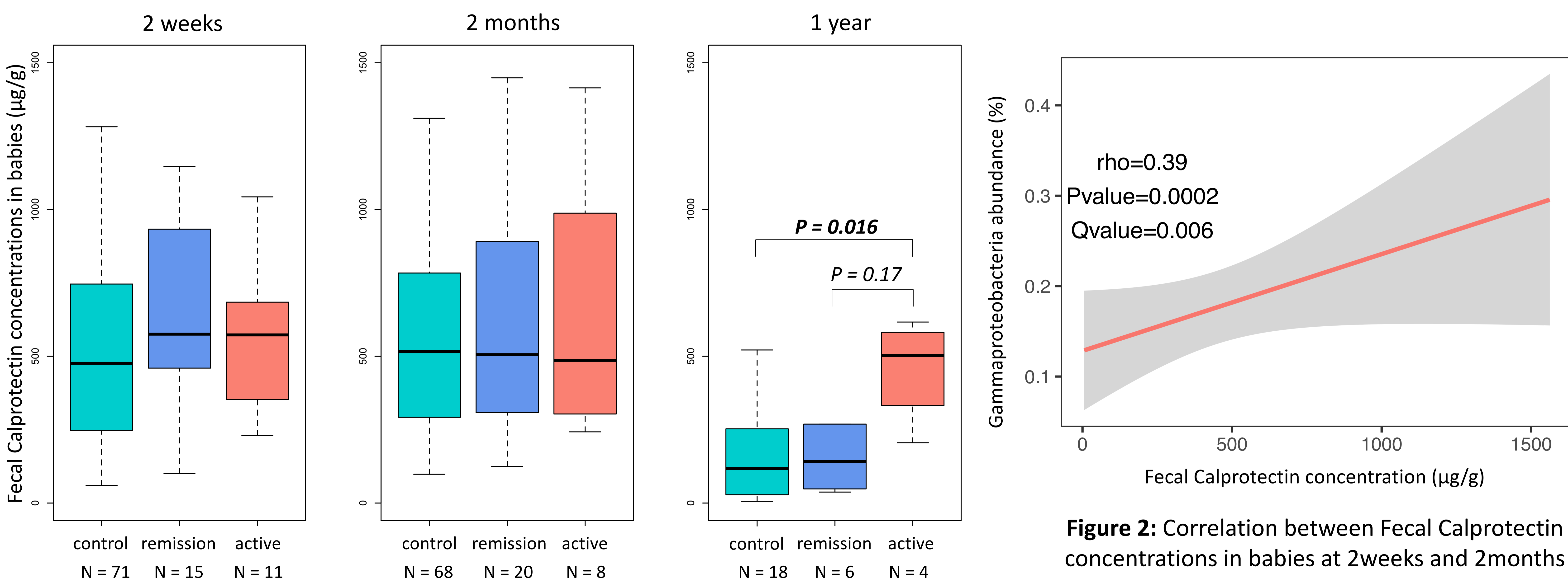


Figure 1: Fecal Calprotectin concentrations in babies at 2weeks, 2months and 1year according to maternal status (control, remission or active)

Figure 2: Correlation between Fecal Calprotectin concentrations in babies at 2weeks and 2months and *Gammaproteobacteria*

Characteristics at 1 year	Babies born to control mothers (N = 18)	Babies born to mothers with remission IBD (N = 6)	Babies born to mothers with active IBD (N = 4)
C-section delivery	5 (27,8%)	5 (83,3%)	2 (50%)
Mean gestational age at delivery (weeks)	39.5 ± 1.8	39.4 ± 0.9	39.6 ± 1.2
Mean birthweight (Kg)	3.6 ± 0.6	3.3 ± 0.5	3.4 ± 0.3
Neonatal intensive care unit stay	1 (5,5%)	0%	0%
Exposure to antibiotics	3 (16,7%)	1 (16,7%)	0%
Exposure to probiotics	1 (5,6%)	1 (16,7%)	2 (50%)
Last rotavirus vaccine at 1 year	1 (5,6%)	0%	0%
Eczema and/or allergy	2 (11,1%)	2 (33,3%)	0%

Table 1: Characteristics of the babies at 1 year of life according to mother's status

CONCLUSIONS

- Newborns had high levels of FC that decreased with age.
- Babies born to mothers with active IBD during pregnancy displayed higher FC levels at 1 year of life compared to babies not exposed to IBD in utero. FC levels also correlated with more pro-inflammatory bacterial profiles in early life.
- If confirmed in a large sample size, these results may suggest evidence of early subclinical inflammation of which duration and consequences need to be further investigated.