# Anti-inflammatory proteins in meconium

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## Introduction

Meconium is a specific type of faeces formed by the fetus and excreted in the first 48 hours after birth. It is not a homogenous material but a series of layers formed in the intestine starting from 12 weeks of gestation.

**Calprotectin (Cal)** is main cytosolic protein of neutrophils. The faecal Cal concentrations (>50µg/g) have been associated with the degree of disease activity in inflammatory bowel disease in adults and in children.

**Lactoferrin (LF)** is a component of secondary granules of mature neutrophils but is also found in: milk, tears, synovial fluid. Increased faecal LF concentrations (>7.25µg/g faeces) have been associated with intestinal inflammation in adults and older children.

**Ceruloplasmin (CP)** is produced by hepatocytes and activated monocytes and macrophages. It is copper-containing, an acute-phase protein, protects tissues from damage caused by free oxygen radicals in the foci of inflammation.

## Aim of the study

The aim of the present study was to evaluate the occurrence of the anti-inflammatory proteins in meconium. Their concentrations were measurements in all consecutive meconium portions passed by neonates. The total content of each protein in meconium portions passed by a neonate was considered to equal the amount of the protein accumulated in utero.

## Material

Homogenized portions of meconium (n=81) collected from 20 neonates.

The neonates passed from one to nine meconium portions. The weight of a single meconium portion [g]: range=0.18–18.93, mean±SD=5.52±4.02.

The weight of meconium filling the fetal intestine [g]: range=4.72–36.95, mean±SD=18.29±8.64.

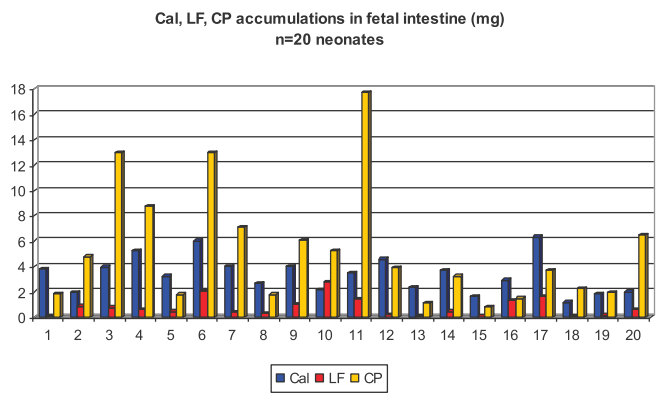
## Methods

Concentrations were measured in homogenized portions of meconium using:

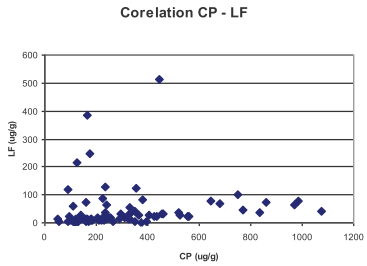
- PhiCal Calprotectin ELISA Kit
- AssayMax Human Lactoferrin ELISA Kit, Assaypro LLC
- AssayMax Human Ceruloplasmin ELISA Kit, Assaypro LLC

## Results

| Concentrations (n-81 samples) | | Proteins | Content of the fetal intestine (n=20 neonates) | |
|---|---|---|---|---|
| µg/g | | | mg | |
| range | mean±SD | | range | mean±SD |
| 33.8 – 1067.1 | 286.5 ± 214.6 | **Cal** | 1.2 – 6.3 | 3.4 ± 1.4 |
| 1.7 – 511.4 | 45.1 ± 78.5 | **LF** | 0.021 – 2.7 | 0.76 ± 0.75 |
| 52.2 – 1076.0 | 310.6 ± 228.9 | **CP** | 0.79 – 17.2 | 4.7 ± 4.34 |




A correlation was between LF-CP (r=0.46, p<0.0001).




No correlation was found between Cal-LF (r=0.3, p=0.19) and Cal-CP (r=0.16, p=0.15).

## Conclusions

- The concentrations of the three proteins measured in this study considerably varied between meconium portions from one neonate. There were also significant differences in the total meconium accumulation of the proteins between individual neonates.
- The occurrence of markers for intestinal inflammation from the start of intrauterine life, at levels above cutoffs, requires further studies.

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