Analysis of indoleamine 2,3-dioxygenase 1 (IDO1) expression of cultured cord blood adherent mononuclear cells as an indicator of atopic risk

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**Background**
Maternal atopy is a known risk factor for allergy development in children. This link can be studied to find potential indicators of atopic risk by examining umbilical cord blood. *Indoleamine 2,3-dioxygenase 1 (IDO1)*, the initiator of the IDO pathway, plays a regulatory role in the immune response and may differ in expression in the adherent mononuclear cells (AMNC)

![Figure 1](image_url)  
*Figure 1* IDO1 gene expression fold changes relative to plain media control. IDO1 expression levels were normalized to HPRT1 expression. The error bars represent the standard error of the mean. Numbers per stimulation group are as indicated beneath the graph. Cultures of atopic and non-atopic AMNCs were plated at $7.5 \times 10^6$ cells per condition. Following 5.5 hours incubation with either plain media, 1 μg/ml IFN-γ, or 1 μg/ml IFN-γ and 10 ng/ml CSE, cells were lysed for RNA extraction. RNA was reverse transcribed and cDNA levels were analyzed.

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of atopic and non-atopic individuals. Supernatants of these AMNC cultures may also exhibit different cytokine profiles.

**Methods**

Cord blood samples were collected from consenting women undergoing elective Caesarian-sections and atopic status was self-reported. Mononuclear cells were isolated and cryopreserved. Once thawed, AMNCs were cultured and stimulated with interferon-gamma (IFN-γ 1 µg/ml or 1 ng/ml) with or without control standard endotoxin (CSE 10 ng/ml). In each condition, 7.5x10⁶ cells were seeded for gene analysis and 5x10⁶ cells were seeded for cytokine analysis. Cells were lysed for RNA isolation, reverse transcribed and cDNA levels were analyzed using qPCR. Supernatant cytokine levels were analyzed using the Luminex® xMAP™ Technology.

**Results**

*IDO1* expression was significantly increased in all stimulated conditions (P<0.05) except for the CSE only condition. The high atopic risk group displayed trend towards decreased *IDO1* expression, however, high and low atopic risk groups did not show significant differences (Figure 1). Supernatant cytokine analysis show heightened levels of Th2 cytokines IL-4, IL-5, IL-13 (Figure 2). Similarly, heightened levels of TNF-α and IL-6 were observed, while levels of IL-10 were decreased in the high atopic risk samples in all stimulated conditions (Figure 3).

**Conclusions**

Preliminary differences detected suggest that further research could elucidate a suitable biomarker to predict atopic risk. Due to the lack of significant differences between high and low atopic risk groups for *IDO1* expression and cytokine expression, a reliable biomarker was not determined in this study.

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