How maternal exposure to aflatoxin B1 (AFB1) impacts the development of progeny intestinal immune system?

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Introduction

Exposure to toxic contaminants during early-life is associated with the development of diseases. Aflatoxins can cross placental barrier and are found in breast feeding individuals to mycotoxins exposure since early stages of life[1]. However how maternal exposure to mycotoxins influences the development and function of the offspring’s immune system remains largely unexplored. Recently, we showed that in vitro maternal exposure to micronutrients is critical for the development of the immune system, which sets long term immunity if the progeny[2]. Here we show that presence of aflatoxin B1 in diet affects females to affect development and function of the intestinal immune system.

Maternal AFB1 exposure leads to increase of intestinal innate and adaptive immune cell subsets

Flow cytometry analysis of major leukocytes in intestinal lamina propria. a. Chart graphs represent the frequency of indicated populations (Mac, macrophages; DC, dendritic cells) of all leukocytes in lamina propria. b. Frequency of distinct immune cell subsets of total lamina propria leukocytes. c. Total number of immune cells for each subset in intestinal lamina propria. Data represents 3 independent experiments. Mean and error bars: s.e.m. Vehicle n=11; AFB1 n=12; n represents biologically independent animals. Mann-Whitney test. Data represents 2 independent experiments. *P<0.05; **P<0.01; ns not significant.

Maternal AFB1 exposure leads to downregulation of immune defense-related genes in epithelium

a. Schematic representation of the self-feeding schedule to administer AFB1 in jelly-pellets to females in gestation and lactation. C57Bl6/J pregnant females (E10.5) were treated with jelly pellets containing AFB1 (400μg/Kg BW) or vehicle 3 times a week during gestation and breastfeeding period. Offspring litters were analysed at 4-5 weeks old. Litter size and body weight of the offspring are not affected by AFB1 maternal exposure (Data not shown). b. Relative expression of the immune defense-related genes in epithelium. Vehicle and AFB1 n=5 to 6. n represents litters. Each litter included at least 4 animals. Data represents 3 independent experiments. Mean and error bars: s.e.m. Vehicle (H2O); AFB1 (H2O); n=11; AFB1 n=12; Vehicle (DSS); AFB1 (DSS) n=6 to 12; n=12; n represents biologically independent animals. Mann-Whitney test. Data represents 2 independent experiments. *P<0.05; **P<0.01; ns not significant.

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Figure captions

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b. Relative expression of the immune defense-related genes in epithelium. Vehicle and AFB1 n=5 to 6. n represents litters. Each litter included at least 4 animals. Data represents 3 independent experiments. Mean and error bars: s.e.m. Vehicle (H2O); AFB1 (H2O); n=11; AFB1 n=12; Vehicle (DSS); AFB1 (DSS) n=6 to 12; n=12; n represents biologically independent animals. Mann-Whitney test. Data represents 2 independent experiments. *P<0.05; **P<0.01; ns not significant.