Zusammenfassung der Master-Thesis von
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Influence of specific farming activities of pregnant mothers on Gene-Expression of CD14 and Toll-like receptors of the newborn. Indicators for pre-natal priming of the immune system: a cohort study

BACKGROUND: In recent years, studies have shown a protective effect of being raised on a farm for the development of hay fever and atopic sensitization. Prenatal exposure to a farming environment through the mother might also play a role and alters the immunological status of the newborn.

OBJECTIVES: We sought to investigate the role of maternal exposures to environments rich in microbial compounds for alterations in the innate immune system of the offspring.

METHODS: Prenatal environment of the children of the PASTURE-study (Protection against allergy: study in rural environment) was assessed by standardized questionnaire (n=1133) and in a subgroup RNA-Expressions of CD14 and TLR1-9 receptors in cord blood (n=938) were measured.

RESULTS: Farming status of the mother influenced the expression of TLR7 and 8 of the newborn positively. Contact to cows of the pregnant mother was inversely associated with RNA-expression of TLR1 (adjusted MR: 0.87, CI: 0.76-1), TLR2 (MR: 0.91, CI: 0.83-1), TLR7 (MR:.82, CI: 0.70-0.96), TLR8 (MR: 0.85, CI: 0.74-0.98), and TLR9 (MR: 0.90, CI: 0.8-1.02), contact to sheep or goat was positively associated with TLR4 (MR: 1.23, CI: 1.07-1.41), TLR5 (MR: 1.12, CI: 0.99-1.26), and TLR9 (MR: 1.16, CI: 1.02-1.32). Contact to compost was positively associated with TLR4 (MR: 1.21, CI: .99-1.47), TLR5 (MR: 1.18, CI: 1-1.39), TLR6 (MR: 1.19, CI: 1.01-1.49), TLR7 (MR: 1.22, CI: 0.99-1.50), and TLR9 (MR: 1.20, CI: 0.99-1.44).

CONCLUSION: Maternal exposure to an environment rich in microbial compound alter the regulation of receptors of the immune system in the newborn and may lead to different outcomes for childhood asthma and allergy. The underlying mechanisms potentially operating through the intrauterine milieu await further elucidation.

CLINICAL IMPLICATIONS: When assessing factors influencing the child´s immune system, attention must also be paid to environmental exposures affecting the mother.