The association of breast milk constituents and duration of breast feeding with development of atopic disease in childhood

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• Association of breast feeding and development of atopic disease is unclear

• Breast milk contains anti-microbial and anti-inflammatory agents
• Association of breast feeding and development of atopic disease is unclear

• Breast milk contains anti-microbial and anti-inflammatory agents
  • protect the infant from infections and educate its immune system
  • immunological composition of breast milk differs between mothers
  • tolerance to certain antigens
IgA

- Main immunoglobulin in breast milk (sIgA)
- Provides passive protection against microbes and neutralizes food antigens
- Low IgA in breast milk associated with atopy among children with no heredity for atopy (Savilahti et al. Pediatric Res 2005)
**TGF-β**
(Transforming growth factor β)

- Family of cytokines that regulate proliferation, differentiation, adhesion, migration in different cell types
- Switch function: it can induce the production of IgA and inhibit IgE
The PASTURE Study

- Prospective cohort study

- (Austria), Finland, France, Germany and Switzerland
The PASTURE Study

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- Pregnancy
  - Questionnaire N=1133

- Birth
  - Month 2
  - Diary

- Age 1
  - Yearly Questionnaires

- Age 6

Breast milk samples (TGF-β1, IgA)(N=611)
Research question 1

Which factors influence levels of immunological markers in breast milk?
Univariate regression models. All socio-demographic and farming variables tested
„Determinants“ of IgA levels in breast milk (1)

Univariate regression models. All socio-demographic and farming variables tested.
„Determinants“ of IgA levels in breast milk (2)

Univariate regression models

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„Determinants“ of TGF-β levels in breast milk

Univariate regression models

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Research question 2

Are breast feeding related factors (markers, duration of breast feeding) associated with atopic disease in childhood?

All analyses among breast feeders!
Health outcome definitions

Atopic dermatitis *(DD and SCORAD)*

- Cumulative up to age 2 and age 4
Associations of duration of breast feeding and atopic dermatitis

aOR (95%CI) by logistic regression models adjusted for: Center, sex, familial history of allergies, farming, food score in the first year of life.
Associations of IgA and atopic dermatitis

aOR (95%CI) by logistic regression models adjusted for: Center, sex, familial history of allergies, farming, food score in the first year of life
Associations of IgA and atopic dermatitis

aOR (95%CI) by logistic regression models adjusted for: Center, sex, familial history of allergies, farming, food score in the first year of life.
Dose of IgA and atopic dermatitis

For each participating mother

\[
\text{IgA level in breast milk} \times \text{Duration of breast feeding} = \text{Total amount of IgA ingested by infant in first year of life}
\]
Dose of IgA and atopic dermatitis

aOR (95%CI) by logistic regression models adjusted for: Center, sex, familial history of allergies, farming, food score in the first year of life
Dose of IgA and atopic dermatitis age 2

Smoothed plot adjusted for: center, sex, familial history of allergies, farming, food score in the first year of life.
Dose of IgA/TGF-β and atopic dermatitis

aOR (95%CI) by logistic regression models adjusted for: Center, sex, familial history of allergies, farming, food score in the first year of life
Health outcome definitions

**Atopic dermatitis** *(DD and SCORAD)*
- Cumulative up to age 2 and age 4

**Atopy** *(atopic sensitization: specific IgE)*
- Age 1, 4 and 6 (cut-off: 0.35, 0.7 or 3.5 kU/l)
Dose of IgA/TGF-β and atopy

Cut-off 0.7 kU/l; aOR (95%CI) by logistic regression models adjusted for: Center, sex, familial history of allergies, farming, food score in the first year of life
Health outcome definitions

**Atopic dermatitis** (*DD and SCORAD*)
- Cumulative up to age 2 and age 4

**Atopy** (*atopic sensitization: specific IgE*)
- Age 1, 4 and 6 (cut-off: 0.35, 0.7 or 3.5 kU/l)

**Asthma** (*DD, symptoms and treatment*)
- Age 4 and 6
Dose of IgA/TGF-β and asthma

aOR (95%CI) by logistic regression models adjusted for: Center, sex, familial history of allergies, farming, food score in the first year of life
Summary

• Environmental factors associate with IgA/TGF-β levels in breast milk

• IgA levels in breast milk are inversely associated with atopic dermatitis indicative of dose-response relationship

• TGF-β1 levels have no clear association with atopic outcomes
Summary

• Environmental factors associate with IgA/TGF-β levels in breast milk

• IgA levels in breast milk are inversely associated with atopic dermatitis indicative of dose-response relationship

• TGF-β1 levels have no clear association with atopic outcomes

Conclusion

• IgA levels in breast milk might protect against atopic dermatitis in early life
Thank you for your attention

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