

Antistoffen zijn meestal IgG die gevonden worden in serum. Bij een gevaccineerde moeder zullen de antistoffen de placenta passeren (Shahid NS, Steinhoff MC, Chirico G, et al: Placental and breast transfer of antibodies after maternal immunization with polysaccharide meningococcal vaccine; a randomized, controlled evaluation. Vaccine 20:2404-2409, 2002). Als er een Secretoir component aan vast hangt, zullen de antistoffen ook in de moedermelk overgaan.

Als de immuniteit gebaseerd is op beschermende T-cellen dan gaat de immuniteit niet over van moeder naar foetus. T-lymfocyten reageren rechtstreeks met het antigeen=celgebonden afweer en zitten niet in de lichaamsvloeistoffen.

B-lymfocyten wel:

B-cel geactiveerd > plasmacel > maakt antilichamen > in circulatie; bloed
Tranen
Slijmvocht
Melk

Na eerste contact met antigeen > geheugence

Passieve immunisatie via IgG's verdwijnt gedurende de eerste maanden (Mor G, Abrahams VM: Potential role of macrophages as immunoregulators of pregnancy. Reprod Biol Endocrinol 1:119, 2003).

grafiek

Het is dus noodzakelijk een actieve immunisatie op te wekken dmv vaccineren. Als er zich nog passief doorgegeven antistoffen in het bloed van het kind zitten, kan de reactie op de vaccinatie gehinderd worden.

Quote Hanson, Immunobiology of human milk, How breastfeeding protects babies;

“other vaccine studies have not confirmed the enhancing effect of breastfeeding, especially not for live virus vaccines against influenza, rotavirus and poliovirus. This finding may be due to the fact that these viruses are common in many societies and one would expect to find antibodies against them in the serum and milk. These antibodies may have inhibited the vaccine responses. Sabin, who made the first live oral vaccine against poliomyelitis, noted that breastfeeding close to the time of giving oral poliovirus vaccine neutralizes the vaccine virus and prevents the planned effect of the vaccination. This effect has been confirmed in a recent study by WHO.

It may not be safe to breastfeed within a half hour before or after giving a dose of oral poliovirus vaccine. This problem is avoided by using inactivated, killed poliovirus vaccines but they are more expensive.”

SIgA's

Colostrum 12 gr/liter = kleine hoeveelheid melk per dag
Mature melk 1 gr/liter = grote hoeveelheid melk per dag ongeveer gelijke hoeveelheden...

Volledig borstgevoed;

1^e maand; 125 mg/kg/dag
4^e maand; 75 “ “ “

Daily Ingestion of Immunologic Components in Human Milk during the First Four Months of Life
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<http://www3.interscience.wiley.com/journal/119279316/abstract?CRETRY=1&SRETRY=0>

Niet lacterende volwassene produceert 40 mg/kg/dag!

De reden waarom er minder SIgA's in de melk voorkomen, is dat de moedermelk aanvullend is op het eigen immuunsysteem van het kind. Het immuunsysteem van het kind groeit dus de noodzaak om melk met SIgA's te krijgen wordt minder.

Trouwens klopt het niet wat die man tegen je zei; SIgA's die in melk voorkomen, zitten in alle secreten... traanvocht, speeksel en dus ook moedermelk

[Ann N Y Acad Sci](#). 2003 Apr;987:199-206.

The transfer of immunity from mother to child.

[Hanson LA](#), [Korotkova M](#), [Lundin S](#), [Håversen L](#), [Silfverdal SA](#), [Mattby-Baltzer I](#), [Strandvik B](#), [Telemo E](#).

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The newborn's immune system grows fast from a small size at birth by exposure primarily to the intestinal microflora normally obtained from the mother at and after birth. While building up its immune system, the infant is supported by the transplacental IgG antibodies, which also contain anti-idiotypic antibodies, possibly also actively priming the offspring. The second mode of transfer of immunity occurs via the milk. Numerous major protective components, including secretory IgA (SIgA) antibodies and lactoferrin, are present. The breastfed infant is better protected against numerous common infections than the non-breastfed. Breastfeeding also seems to actively stimulate the infant's immune system by anti-idiotypes, uptake of milk lymphocytes, cytokines, etc. Therefore, the breastfed child continues to be better protected against various infections for some years. Vaccine responses are also often enhanced in breastfed infants. Long-lasting protection against certain immunological diseases such as allergies and celiac disease is also noted.

<http://www.ncbi.nlm.nih.gov/pubmed/12727640?dopt=Abstract>

Immunologic factors in human milk during the first year of lactation

The Journal of Pediatrics, Volume 100, Issue 4, Pages 563-567

A. Goldman, C. Garza, B. Nichols, R. Goldblum

The effects of the duration of lactation upon lactoferrin, lysozyme, total IgA, SIgA, SIgA antibodies to *Escherichia coli* somatic antigens and leukocytes in human milk were investigated. Longitudinal and cross-sectional studies were performed with milk collected from women 20 to 35 years of age during the first year of lactation. Collection and storage conditions and immunologic analyses were controlled to minimize confounding variables. The concentrations of lactoferrin, total IgA, and leukocytes and the uptake of 3H-thymidine by phytohemagglutinin-stimulated lymphocytes fell during the first several weeks of lactation; afterward, the levels of lactoferrin and IgA stabilized. Approximately 90% of total IgA in human milk during the year was SIgA. Secretory IgA antibody titers to *E. coli* increased in some individuals studied longitudinally suggesting that the enteromammary gland pathway of SIgA antibody production was active after several weeks of lactation. Moreover, the concentrations of lysozyme, after falling to a nadir of 20 to 30 µg/ml at 2 to 4 weeks, rose to 200 to 300 µg/ml by six months and remained elevated. The immunologic system in human milk undergoes remarkable changes which may represent adaptations for the recipient infant.

<http://linkinghub.elsevier.com/retrieve/pii/S0022347682807531>

<http://www.kellymom.com/nutrition/milk/immunefactors.html> Some of the immune factors in breastmilk have been shown to increase in concentration as the baby gets older and nurses less, so older babies still receive lots of immune factors. So as a baby starts to nurse less (weaning) and milk supply decreases, the concentration of immunities increases. This isn't age-dependent, but depends on the amount of milk that baby is removing from the breast.

[source: Goldman AS et al. "Immunologic components in human milk during weaning." Acta Paediatr Scand. 1983 Jan;72(1):133-4.]

Concentration of Immunologic Components in Human Milk						
Average Concentration, mg/ml						
(I'm leaving out the uncertainty factors to make this more readable)						
	2-3 days	1 mo	6 mo	12 mo	13-15 mo	16-24 mo
Lactoferrin	5.3	1.9	1.4	1.0	1.1	1.2
Secretory IgA	2	1	0.5	0.8	1.1	1.1
Lysozyme	0.09	0.02	0.25	0.196	0.244	0.187

Sources:

Table 6-5 "Concentration of Immunologic Factors in Human Milk During Several Phases of Lactation" from: [Nutrition During Lactation](#), Institute of Medicine, 1991, p. 134.

Table 5-2 "Concentration of immunologic components in human milk collected during second year of lactation" from: Lawrence R and Lawrence R. Breastfeeding: A Guide for the Medical Profession, 5th ed. St. Louis: Mosby, 1999, p. 169 .

Immune factors found in human milk	
alpha-Lactalbumin (variant)	Lewis antigens
alpha-lactoglobulin	Lipids
alpha2-macroglobulin (like)	Lysozyme
β-defensin-1	Milk cells (macrophages, neutrophils, B & T lymphocytes)
Bifidobacterium bifidum	Mucin (muc-1; milk fat globulin membrane)
Carbohydrate	Nonimmunoglobulin macromolecules (milk fat, proteins)
Casein	Oligosaccharides
CCL28 (CC-chemokine)	Phosphatidylethanolamine
Chondroitin sulphate (-like)	(Tri to penta) phosphorylated beta-casein
Complement C1-C9	Prostaglandins E1, E2, F2 alpha
Folate	RANTES (CC-chemokine)
Free secretory component	Ribonuclease
Fucosylated oligosaccharides	Secretory IgA
Gangliosides GM1-3, GD1a, GT1b, GQ1b	Secretory leukocyte protease inhibitor
Glycolipid Gb3, Gb	(antileukocyte protease; SLPI)
Glycopeptides	
Glycoproteins (mannosylated)	
Glycoproteins (receptor-like)	

Glycoproteins (sialic acid-containing or terminal galactose)	Sialic acid-glycoproteins
Haemagglutinin inhibitors	sialylated oligosaccharides
Heparin	Sialyllactose
IgG	Sialyloligosaccharides on sIgA(Fc)
IgM	Soluble bacterial pattern recognition receptor
IgD	CD14
kappa-Casein	Soluble intracellular adhesion molecule 1 (ICAM-1)
Lactadherin (mucin-associated glycoprotein)	Soluble vascular cell adhesion molecule 1 (VCAM-1)
lactoferrin	Sulphatide (sulphogalactosylceramide)
Lactoperoxidase	Trypsin inhibitor
	Vitamin A
	vitamin B12
	Xanthine oxidase (with added hypoxanthine)
	Zinc
	Unidentified factors

Source:

[Human milk - Tables of the antimicrobial factors and microbiological contaminants relevant to human milk banking \(with continued updating\)](#) by Dr. John T. May, PhD

Mss interessant;

Mechanisms by which maternal antibodies influence infant vaccine responses: review of hypotheses and definition of main determinants

Siegrist CA

Vaccine 21:3406-3412, 2003