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Breastfeeding Strategies
for successful practice

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The Normal Newborn

Why breastmilk is not just food
Breastfeeding

- Immune system development
- Brain growth and development
- Temperature regulator
- Trust versus Mistrust (Erickson)
- Biologically and physiologically normal
- And, oh, by the way, it is food

The Normal Newborn

- Asks us to protect them as they grow out of infancy
  - Protect from disease
  - Protect from predators

Disease Protection

Development of the immune system
What if the Breast Was Really an Immune System Gland?

• The innate immune system is a rapid, generalized defense system and is run by small peptides and T-cells.

• The innate immune system is different from the acquired immune system, which is predominantly immunoglobulins and is very specific.

What if the Breast Was Really an Immune System Gland?

• In embryology, skin glands with protective infection-fighting effects are very common.

• The mammary gland evolved from a mucus-secreting skin gland, which would then help protect the skin of the newborn, even if the "newborn" was an egg.
What if the Breast Was Really an Immune System Gland?

- Mucous secretion xanthine oxidoreductase (XOR) and lysozyme. Those same protective skin mucus secretions are also found in the mammary cells.
- XOR, as well as being an important part of the innate immune system is also crucial in milk fat droplet secretion.
- Lysozyme is an anti-microbial but also evolved into alpha-lactalbumin, a nutritional whey protein special to the lactating breast.
- So both have two roles- one protective, one nutritional. For both though, their immune system function came first.

What if the Breast Was Really an Immune System Gland?

Getting the Right Bacteria

- The newborn gut is sterile
- The gut starts to be colonized from delivery
- Ideally, harmless, strictly anaerobic bacteria increase in number and compete for food and space
- These “commensal” bacteria are critical for immune system development
Enteric Bacterium Interacting with Intestinal Microvillus of the Small intestine


Gut Colonization is Essential to the Immune System

- Newborn gut needs to be colonized with good bacteria shortly after birth
- Immune response to flora leads to:
  - Colonization with commensal bacteria
  - Development of immunologic tolerance
  - Bacteria-epithelial “cross talk” organizes the spatial relationships of the B and T cells, and cells of the GALT
  - And better not lead to inflammation

Fanaro S. Acta Paediatr Suppl. 2003

Normal Innate Immune System Function

The Phagocytes in the Innate Defense
- Neutrophils
- Monocytes/Macrophages
- Cytokines
- Inflammation

Recognize “stranger” signals

Have TLRs, what we talk about later
The Leaky Gut

• Human milk simulates the strictly held balance of immune cells that are crucial for developing an immune system that recognizes what to get rid of and what to keep, what to destroy and what to leave alone.

• The delay allows for less energy and nutrients to be used for the immune system of the infant.

• That's good because, when the immune system does need to work, the processes needed increase nutritional and energy demands.

• That saved extra energy can then be used for the growth and development of the CNS and lung.

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The Leaky Gut

• This all works because of human milk. All the defenses given to the infant from human milk (antimicrobial, anti-inflammatory, and immunomodulating agents) protect from inflammation.

• Plus, it just makes sense and is really efficient that most of the antimicrobial and other defense agents in human milk are used to nurture the baby. Not fight battles.
Newborn Intestinal Immune System

Ontogeny of T Cell Function

- Human milk immune properties are priming (signaling) resting cells.
- T cells develop in GALT sent to thymus.
- Breastfed infants have a thymus twice the size of formula fed infants.

The first week of life represents a sensitive window of opportunity to program the immune system.
Specific Adaptive Immunity: Clonal Selection Theory

Precursor cell

B1 (Virgin) resting B cells

B2

B3

Antigen [anti-idiotypic Antibodies from mom in the form of sIgA]

Many B3 cells

Antibodies

sIgA Antibody

Poly Ig light

Lumen

IgA dimer

Secretory Component (SC) extracellular portion of poly Ig light

IgA Secretory Lymphoid Cell

sIgA from mom in the form of anti-idiotypic antibodies binds to B3 cells, activating them to divide and differentiate into antibody-secreting plasma cells.
Other ways to prevent inflammation: Prebiotics

- They are non-digestible food components that beneficially affect the gut by providing food for the good bacteria that (hopefully) already inhabit it.
- In human milk, the most common prebiotics are oligosaccharides, which are also the third most common component of mature human milk.
- The non-pathogenic bacteria (the good ones) can bind to the cell surface because they contain the right receptors to let them bind.
- The virulence of most pathogenic microorganisms, for example, Campylobacter jejuni, Escherichia coli, Vibrio cholerae, and Vibrio cholerae strains, often depends on their ability to adhere to the gut's epithelial surface.
- Pathological bacteria are inhibited from attaching either because a prebiotic has plugged the part of the bacteria that helps it attach or blocks the receptor site.

How Prebiotics in Human Milk Work


Newborn Brain Development
Fetal Brain Development

• The first 10-14 weeks: fetal brain growth is determined by genes
• After 14 weeks: brain growth is an active process
• Neurons migrate and make synapses because of sensations.
• More sensations = more synapses

Brain growth depends on experiences!

Fetal Brain Development

• Creating neural pathways involves creation of synapses, and pruning of non-used neurons
• This can be good or bad, depending on the experiences of the newborn

Fetal Brain Development

• Creating neural pathways involves creation of synapses, and pruning of non-used neurons
• This can be good or bad, depending on the experiences of the newborn
• Quality sensory stimulation makes the brain able to think and regulate
• Negative experiences (both absence of good and presence of bad) have long lasting effects
Newborn Development

Maintenance of critical levels of tactile input is important for normal brain maturation

What the Baby Knows

- Babies can sense the difference between a bassinet and their mother's abdomen even in the first minutes after birth.
- Mom is the best temperature regulator
- The baby needs to be on mom's chest
- All the stuff we do can wait
  - Wait on the weight, eyes and thighs

Temperature Regulation
What the Baby Knows

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The Warmer

Photo © Joan Younger Halas, MS, CPM

Trust versus Mistrust

And skin to skin
John B. Watson 1928

Treat them as though they were young adults. Dress them, bathe them with care and circumspection. Let your behavior always be objective and kindly firm. Never hug and kiss them, never let them sit on your lap. If you must, kiss them once on the forehead when they say goodnight. Shake hands with them in the morning. Give them a good pat on the head if they have made an extraordinary good job of a difficult task.

Skin to Skin

- A human baby, like any mammal, has a natural habitat: in close contact with the mother (or father).
- When a baby or any mammal is taken out of this natural habitat, it shows all the physiologic signs of being under significant stress.
- A baby not in close contact with his mother (or father) by distance (under a heat lamp or in an incubator) or swaddled in a blanket, may become too sleepy or lethargic or becomes disassociated altogether or cry and protest in despair.

Skin to Skin

- With skin to skin contact, the mother and the baby exchange sensory information that stimulates and elicits “baby” behavior: rooting and searching the breast, staying calm, breathing more naturally, staying warm, maintaining his body temperature and maintaining his blood sugar.
What the Baby Knows

- The areola of the breast contains Montgomery's glands, glands which secrete a substance, the odor of which is important to the latching behavior of newborns. The composition is similar to that of amniotic fluid and both act as "chemosignals" that help the baby figure out who mom is and how to respond to her.

What the Baby Knows

- Newborns respond to the secretions of Montgomery's glands with increased oral behaviors and changing autonomic responses.
- When babies smell the odor from the glands, they increase mouthing behaviors, like licking.
- Their respiratory rate increases, perhaps to help them breathe in the odor better.
- This signaling even works when they sleep.
What the Baby Knows

- The odor from Montgomery's gland stimulates appetite.
- It likely helps the baby find the nipple, get positioned and latch, with the odor serving as a road map to where they need to go.
- These behaviors appear to be specific to the species, as human babies don't respond to the scent of cow's milk (for example).

Early contact: physiologic norm

- The baby gets mom's bacteria establishing the gut microbome.
- Transfer for immunoglobulins via colostrum.
- Species-specific maternal and baby behaviors that include the baby's need to have mom nearby.
- Coordination of suck at a period of heightened alertness.
- Temperature, heart rate, respiratory and blood sugar regulation.
- More maternal confidence.

More and more mothers are choosing to breastfeed. But most women don't believe that the body that created that beautiful baby is capable of feeding that same child and we are supplementing more and more with infant formulas designed to be food. Why don't we trust our bodies post-partum? I don't know. But I hear over and over that the formula is because "I am just not satisfying him." Of course you are. Babies don't need to "eat" all the time- they need to be with you all the time- that's the ultimate satisfaction.

A baby at the breast is getting their immune system developed, activating their thymus, staying warm, feeling safe from predators, having normal sleep patterns and wiring their brain, and (oh by the way) getting some food in the process.
How You Can Help

• Provide mothers with encouragement
• Provide mothers with consistent information
• Provide quality, single owner, electric breast pumps

Peer Counselors

• Study after study demonstrates the importance of peer counselors in any successful breastfeeding program.

Form Relationships

• Local hospitals
• Local medical schools
• State and local breastfeeding coalitions
• Local businesses
Share Widely, Steal Liberally

- Arkansas
- Loving Support
- Newsletter
- Educational programs with hospitals
- Warmline
- Peer counselors who used text messaging on agency cell phones
- Website with downloadable content

Choose Messages that Work

- Start early: The greater the duration of exposure to WIC service increases initiation and duration of breastfeeding.
- Information and advice provided by WIC about the benefits of breastfeeding guide breastfeeding decisions
- Babies fed breastmilk are less likely to get sick
- Breastfeeding helps prevent obesity in children and reduces the risk of certain types of cancers
- Breastfeeding is convenient

Policy Advocacy

- Nursing in public: WIC participants who were more comfortable nursing in public had a longer duration of breastfeeding
- Paid maternity leave
Involve Dad and Grandmother

- May be excellent for breastfeeding support
- May also hinder support.
- Speaking with them, sharing messages of importance of breastfeeding is helpful to breastfeeding success