Unique Differences of Infant Skin, its Microbiome, and How to Support Normal Skin Maturation

The Skin Is Our Natural Protective Barrier

- **Protects** from injury, external environment, pathogens.
- **Regulates** temperature.
- **Helps manage** water loss.
- **Provides sensory perception.**

Maintaining Skin Barrier Integrity is Essential

Measured by:
- Skin’s ability to hold onto water - TEWL (transepidermal water loss)
- Skin Hydration
- Skin pH (acid mantle) — protective, mildly acidic, supports resident flora & inhibits pathogens

Infant’s Skin is Uniquely Different and Develops Over First Years

**Structure and composition** differences lead to **functional** differences

- Infant skin can lose water 2x as fast.
- Smaller cells and thinner skin - shorter pathway outside to inside.

Infant skin pH 6.0 at birth, quickly becomes mildly acidic.


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**The Skin Microbiome**

Skin is an *ecosystem*; microbiome works with skin barrier.

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**A Balanced Microbiome**

The skin microbiome is a habitat of billions of beneficial and harmful bacteria. An imbalance of these bacteria can lead to a variety of skin conditions including acne, eczema, rosacea and aging.¹

**pH Balance**

The skin microbiome prefers a relatively acidic environment (pH around 5.0) which also inhibits growth of pathogens.¹

**Bacterial Diversity**

Differences in skin temperature, texture, thickness, humidity and chemistry help determine which kinds of microbes live where on the skin.¹

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**Skin-Microbe Relationships Are Important**

*Balanced microbiome supports healthy skin and imbalance between harmful & beneficial microbes may be associated with skin conditions*

- **Goal:** *Enhance beneficial* microbes and *protect from harmful microbes.*
- **Balance** is key. Both *richness* and *diversity* are important.
  - Richness - Total # of bacterial species
  - Diversity - # & abundance of individual types of organisms
- Healthy microbiome *prefers acidic environment* (about pH 5.0) which also inhibits pathogens.

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Infant Skin Microbiome Establishes at Birth, Different vs. Adult, Develops Over Time

1. MG Dominguez-Bello, EK Costello, M Contreras, M Nargris, G Hidalgo, N Fierer, R Knight, PNAS 107(26), 11971-5, 2010

*Shown in a clinical study

Applying Lotion After Bath Accelerates Increase in Skin Microbial Richness*

Clinical Study Results – adding application of lotion after bath, using mild products specifically formulated for baby’s skin

1. In utero skin is in a sterile environment
2. The skin of vaginally-born babies is colonized by microbes from the mother’s vagina
3. The skin of C-section babies is colonized by microbes from the mother’s skin
4. Baby skin microbiome community is dynamic and becomes more diverse as the baby grows
5. Skin contacts between mother and child (breast-feeding, kangaroo care, wash, massage, etc.) is an opportunity for exchange of microbiome

Wash Only * *

Wash + Lotion *

Baseline Week 2 Week 4

Baseline Week 2 Week 4

* P<0.05 from Baseline
** P<0.05 Between treatments
Key Takeaways

1. The skin and its microbiome continue to mature and develop long after birth, playing an important role as a first line of defense

2. Skin care routines should strive to maintain the integrity of the skin barrier and support the skin microbiome

3. In a clinical study, adding an application of lotion after bath, using mild products specifically formulated for baby’s skin, was shown to accelerate increase in skin microbial richness