



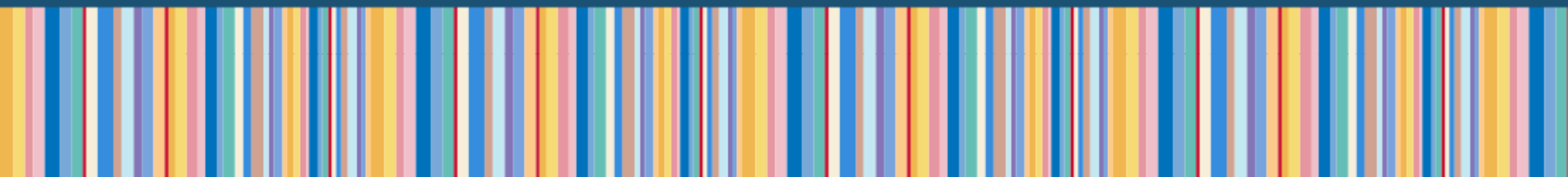
Skin Care in Neonates and Infants: An Overview

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Agenda

The Skin's
Vital Role

Infant vs Adult
Skin

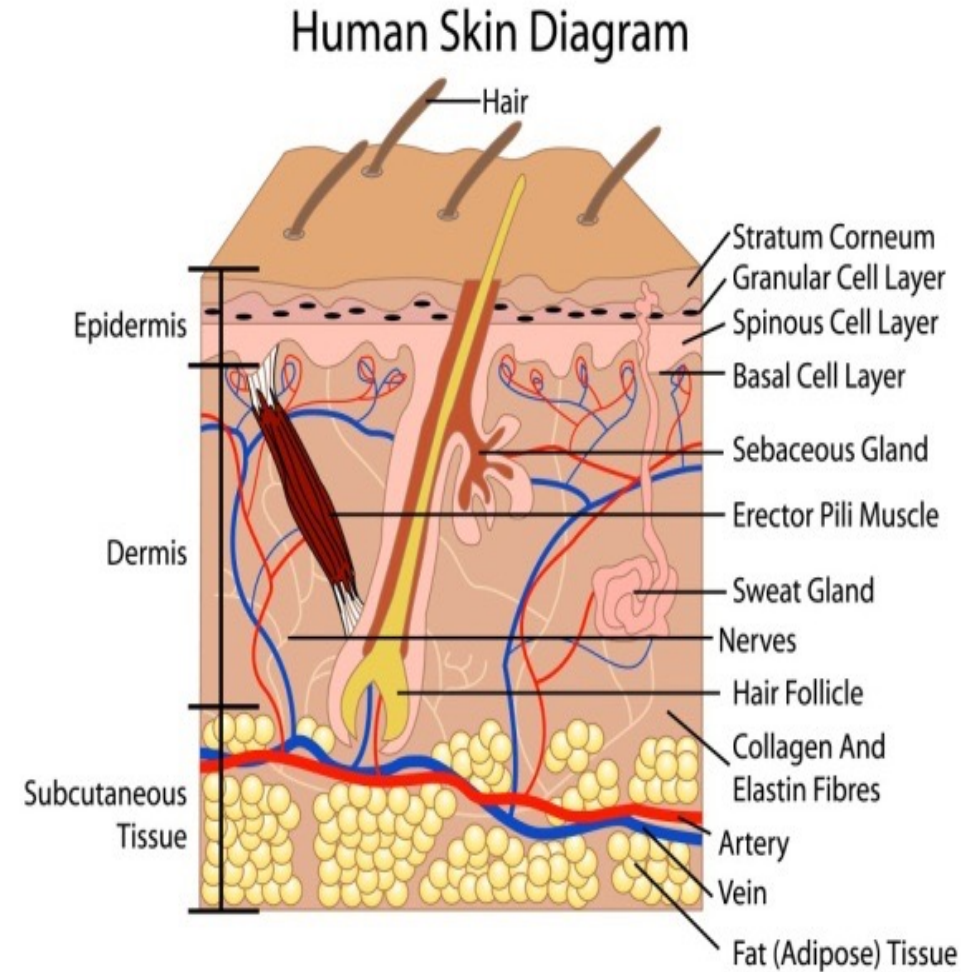
The Human
Skin
Microbiome

Skincare
Practices

Educating
Parents

Skin Function – A Vital Role

- Natural **protective barrier** from
 - Physical injury
 - Pathogenic microbes
 - Chemical agents
 - Extreme temperatures
- Starts process for making **Vitamin D** to help body absorb calcium and maintain phosphorous for healthy bones
- **Sensory perception:** temperature, pressure, touch, pain
- **Temperature regulation** of the body
- Helps to **restrict fluid** and water loss



Maintaining Skin Barrier Integrity is Essential

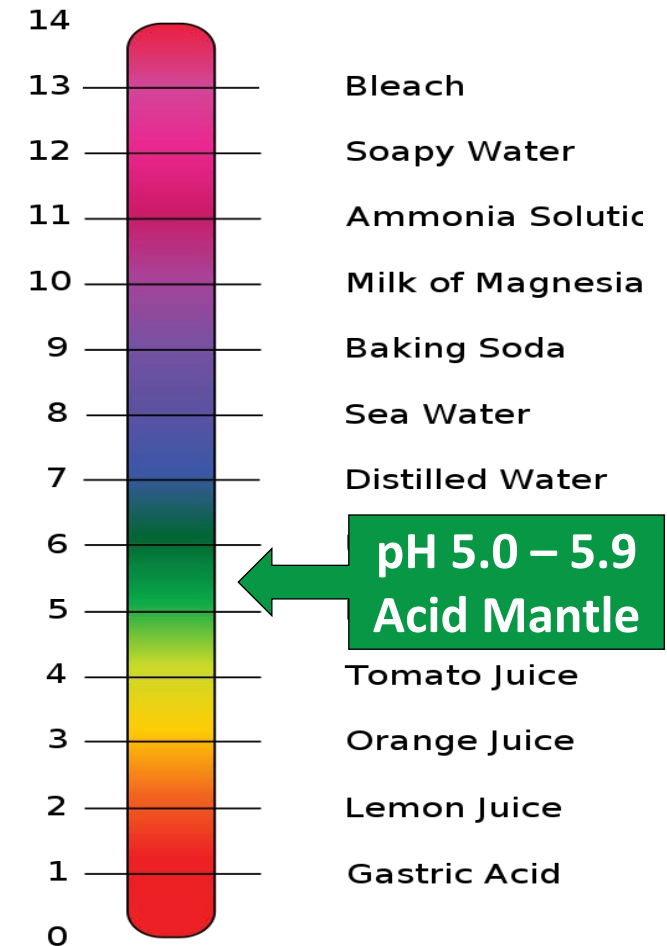
- Can be ***measured by skin's ability to hold onto water*** - TEWL*
- ***Skin hydration*** of the stratum corneum (SCH) ***also important*** (assessed with electrical measures)
- Is ***influenced by skin pH***
- Immaturity (*i.e., still developing*), alterations in skin pH, injury or disease can result in impaired skin barrier function

* TEWL, transepidermal water loss

Skin pH (or *Acid Mantle*)

Important for Maintaining Skin Barrier Integrity

- Protective, mildly acidic, skin “film”
 - Helps protect overall health of the skin
 - Allows resident skin flora to flourish
 - Inhibits growth of transient flora, such as, gram negative bacteria (*E. coli*, *Pseudomonas*); gram positive bacteria (*Staphylococcus*); fungal (*C. albicans*)
- What can happen if skin becomes more alkaline (less acidic)?
 - Interferes with protective barrier
 - Cell separation results in more water loss → dry skin, flaking, irritation, roughness
 - Skin vulnerable to bacterial invasion → infection



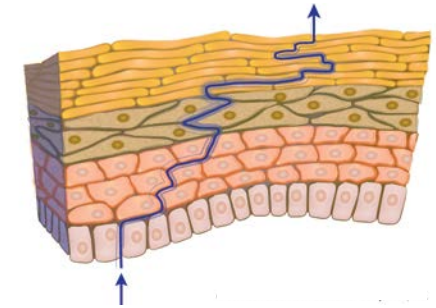
Infant Skin is Different vs. Adult Skin Develops Over Time



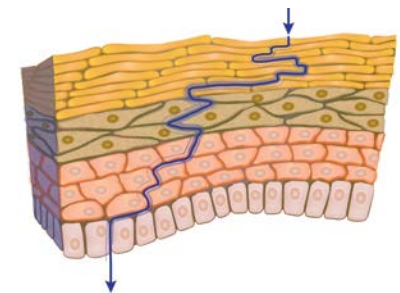
Infant Skin is Different vs. Adult Skin in Structure and Composition

- Stratum corneum 30% thinner¹
- Absorbs and desorbs water at a faster rate¹
- Cells are smaller than adult skin cells¹
- Has fewer moisturizing factors and fewer lipids
- Body surface to weight ratio is greater
- Skin (and immune system) still developing

Differences have implications for infant skin function, and hence it's care



Although more hydrated than adult skin it can lose water up to 2X as fast



Smaller cells and thinner skin results in shorter pathway from outside to inside

The Skin Microbiome is Important
and Infant Skin Microbiome Also
Develops Over Time



The Skin Microbiome Offers a First Line of Defense

- The skin microbiome works alongside the skin barrier to provide a first line of defense
- Despite being constantly exposed to large numbers of microorganisms, the skin can discriminate between beneficial and pathogenic

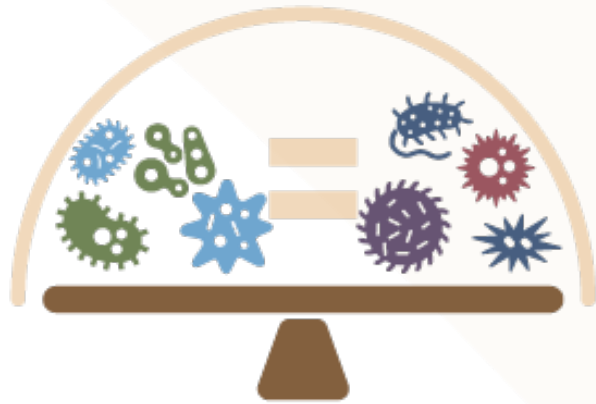
Healthy skin is inhabited by harmless microbes, which also help to keep harmful ones away

The Human Skin Microbiome

1

**BILLION
BACTERIA**

inhabit a typical square
centimeter of skin²



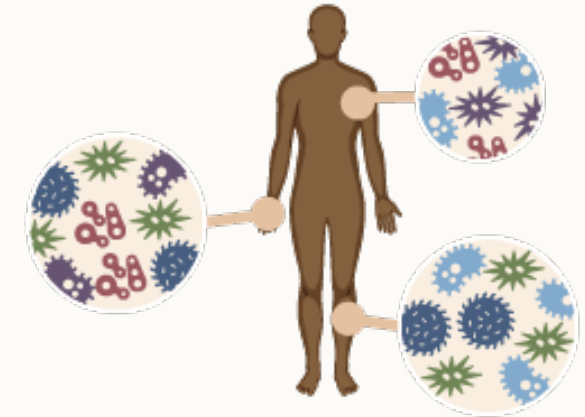
A Balanced Microbiome

The skin 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 differs by body zone

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

1. Grice EA, Segre JA. The skin microbiome. Nature reviews Microbiology. 2011;9(4):244-253.

2. Grice EA, Kong HH, Renaud G, Young AC, Bouffard GG, Blakesley RW, et al. A diversity profile of the human skin microbiota. Genome Res 2008

Infant Microbiome Development – 1st Year of Life



- First major exposure to microbes is at birth
 - First “seeding” at rupture of membranes¹
- Bacteria on skin varies by delivery mode:
 - Vaginal: initial microbiome like mother’s vaginal microbiota¹
 - C-section: more like adult skin bacteria suggesting environmental (hospital) and mother¹

Longitudinal Study of Skin Microbiota and their Biological Mothers during the First Year of Life

Skin microbes demonstrate concordance and bi-directional transmission between the mother-infant dyad



Factors That May Affect the Infant Skin Microbiome

- Method of birth¹
- Bathing and skin care routines/products¹
- Maternal microbiome; family & household contacts¹
- Environmental factors (temperature, humidity)¹
- Many others¹

Baby skin microbiome community is dynamic and becomes more diverse as the baby grows²

Skin contacts between mother and child (breast-feeding, kangaroo care, wash, massage, etc.) is an opportunity for exchange of microbiome²

Differences in Infant Skin and its Microbiome Inform Skincare Routines and Practice



Water Alone Cleansing May Not Be Best

Soap May Be Drying

- Soap can be an effective cleanser, but it also causes skin dryness and irritation
- These negative effects are likely to be because of soap affecting skin lipids (fats) and **high pH (alkaline)** – **this can negatively impact** the integrity of the skin barrier and **may also disturb the natural acid mantle**
- Loss of lipids **from outer skin layers** after washing with soap **may be greater than with other more appropriate cleansers. Mild appropriately formulated cleansers designed for babies may be better choice for cleansing of baby's still developing skin**



Clinical Study – Wash Only vs. Wash + Lotion

In a clinical study, adding a specific tested lotion for babies, after a bath with a specific tested cleanser for babies, was shown to accelerate microbial richness.

Key Learnings

1. Infant skin is different from adult skin in structure and composition and *continues to develop* over the first years of life
2. These differences lead to functional differences in skin barrier properties with implications for care and protection
3. The skin and its microbiome continue to mature and develop long after birth, playing an important role as a first line of defense
4. These unique differences have implications for skin care routines and product choices for infants

Educating Parents



Educating Parents About Skin Care Routines

- Avoid soaps and adult skin products; use mild gentle formulations
 - Compatible with baby's naturally-developing skin microbiome
 - Support baby's natural skin pH (5.5)
- Products should be designed and tested for babies

***Key Take-Away** - Baby skincare routines should strive to support baby's developing skin and microbiome*

Educating Parents

- Infancy is an opportunity to continue to support microbiome development
 - Early and exclusive breastfeeding
 - Regular skin-to-skin contact
 - Routines which encourage TOUCH and “sharing” of skin microbiome between parents and baby

Criteria for Product Selection

- Criteria for product selection should include
 - Ingredients that are safe and appropriate for baby, including fragrance if scented
 - Products with mildly acidic or neutral pH, to support baby's normal skin pH
 - Products designed to support baby's skin microbiome
 - Products designed and tested for baby, including assessment for skin irritation and sensitization

Why is Understanding Infant Skin and its Microbiome Important to Midwives?

- You are uniquely positioned to provide education and support for Skin-to-Skin Care starting at birth and for care routines after birth
 - Close skin contact, breast feeding, routines that encourage touch
- You can provide knowledge on the importance of supporting infant's still developing skin and its microbiome
 - Mild products, formulated and tested for infants

The choices you can help parents make on how they care for their baby's skin – based on evidence - is essential!



Thank You!