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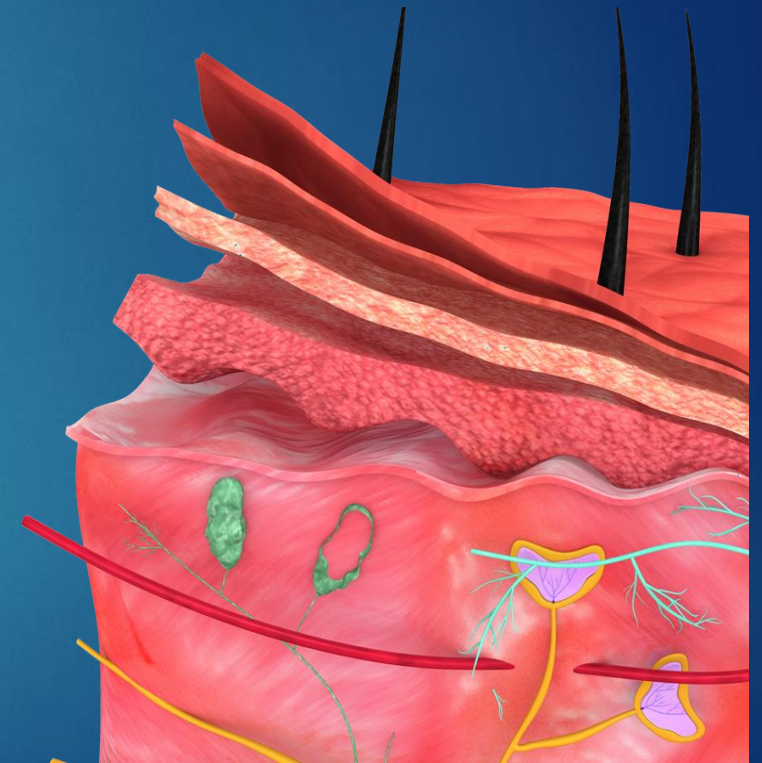
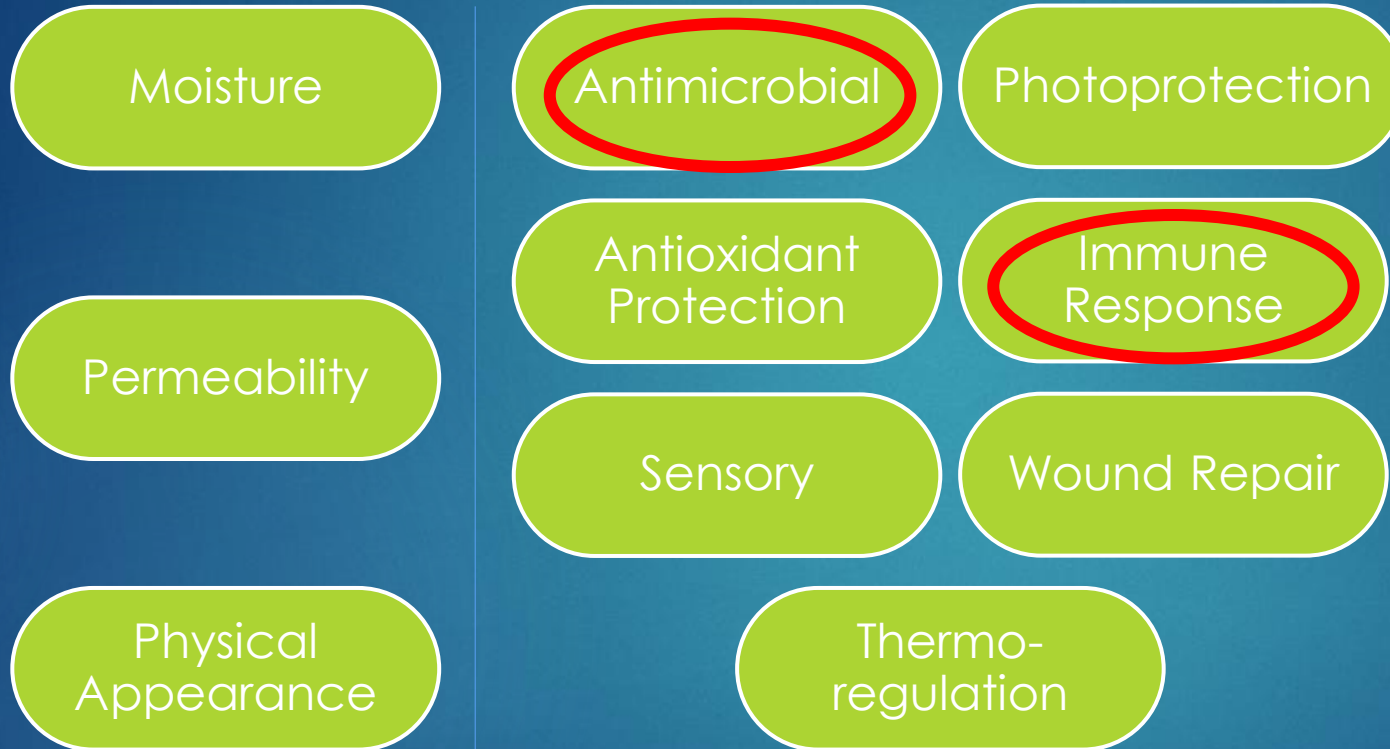
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I have received funding either as an investigator, consultant, or a speaker from the following pharmaceutical companies:

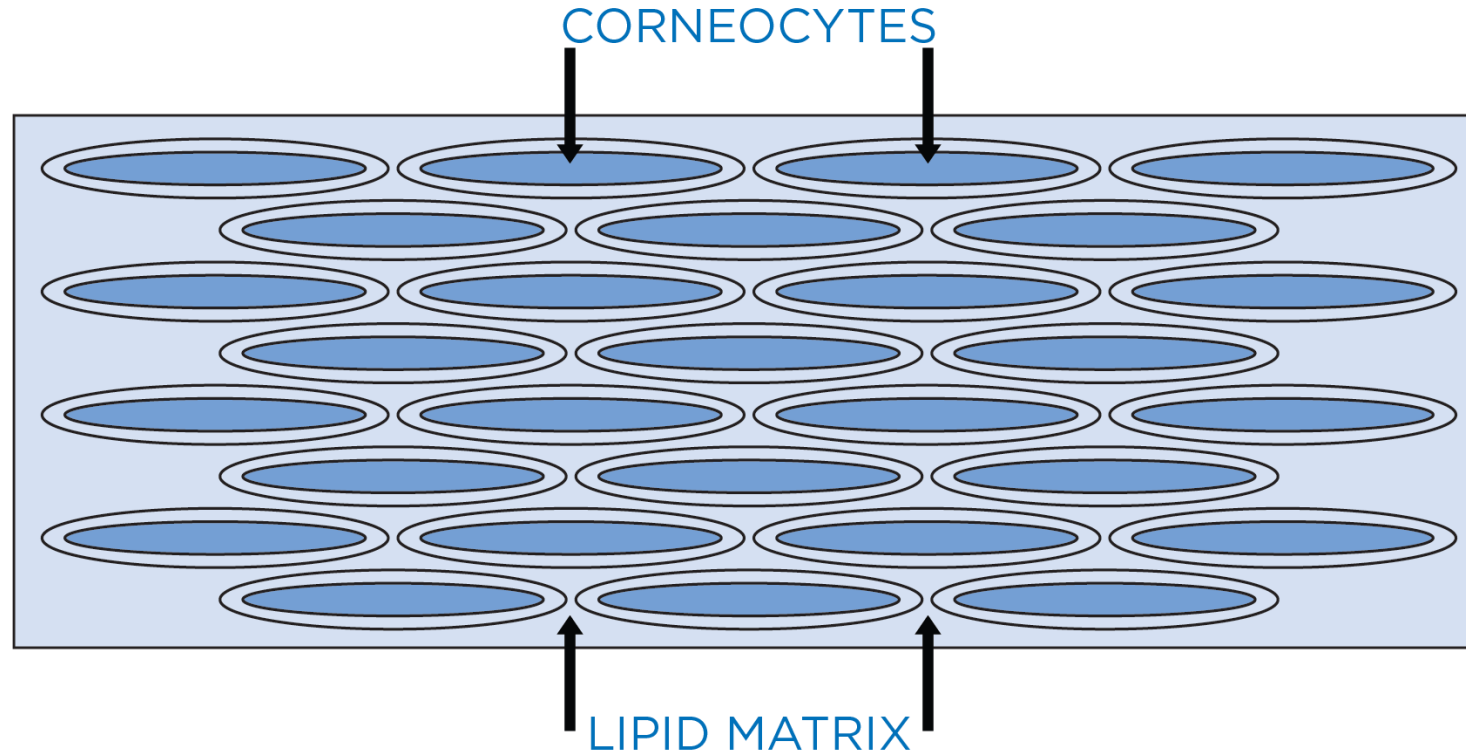
- Abbott
- Acambis
- Aclaris
- Allergan
- Almirall
- Amgen
- Anacor
- Astellas
- Asubio
- Berlex
- Biogen-Idec
- Biolife
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- Breckenridge Pharma
- Cellceutix
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- Colbar
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- Combinatrix
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- Coria
- Dermavant
- Dermik
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- Dusa Pharmaceuticals
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- EOS
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- Intendis
- Innovail
- Isdin
- Johnson & Johnson
- 3M
- Leo
- L'Oreal
- Maruho
- Medicis
- Merck
- Merz
- NanoBio
- Novartis
- Novan
- Nucryst
- Obagi
- Onset Therapeutics
- OrthoNeutrogena
- PediaPharma
- Pfizer
- PharmaDerm
- Promius
- Puracap
- QLT
- Quatrix
- Quinnova
- Serono
- SkinMedica
- Stiefel
- Sun Pharma
- Taro
- TolerRx
- Triax Pharmaceuticals
- UCB
- Valeant
- Warner & Chilcott
- Xenoport
- ZAGE

**BARRIER REPAIR IS A
MUST AS ADJUNCTIVE
THERAPY**

Key Functions of the Dynamic Skin Barrier



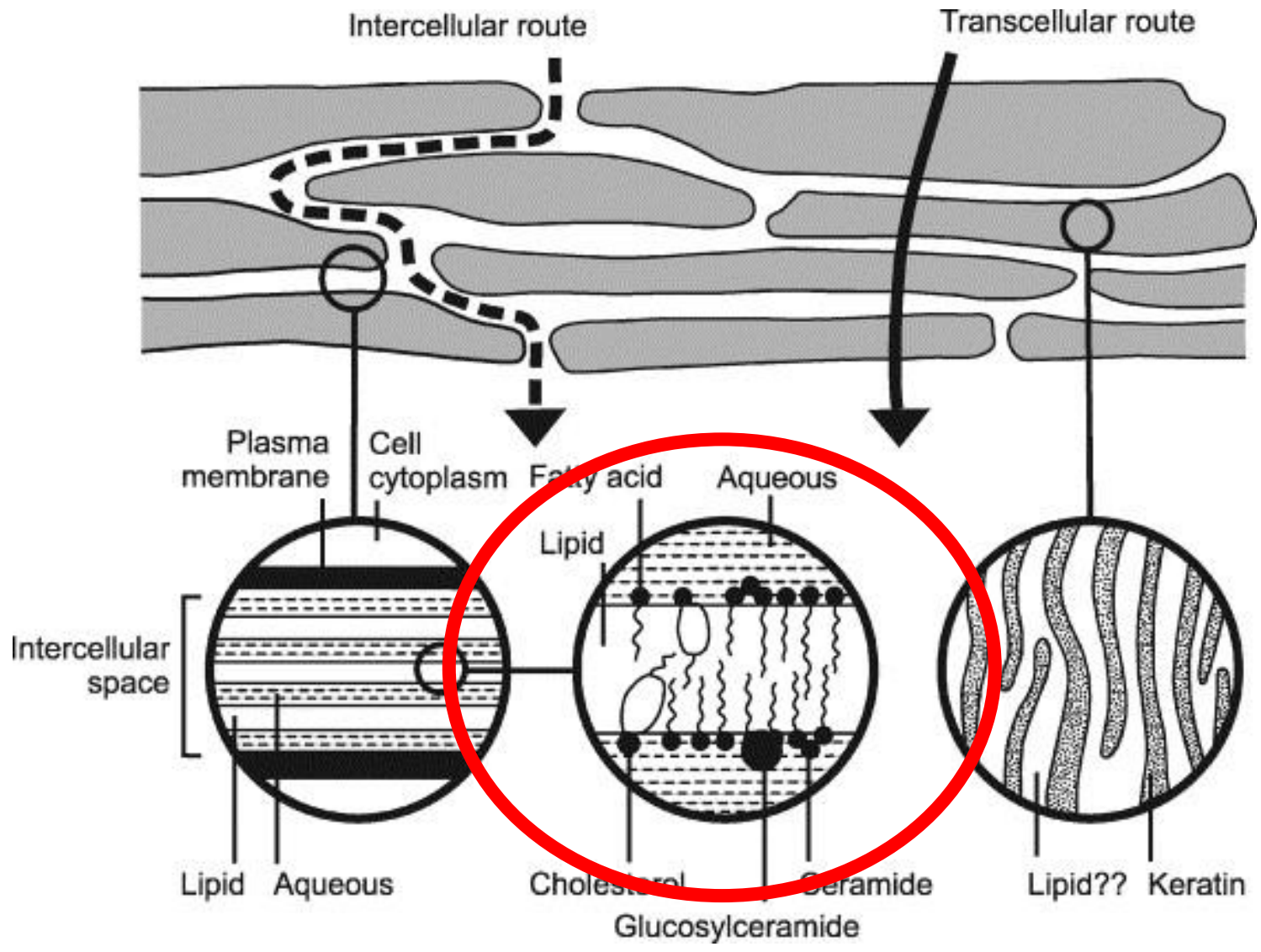
Stratum Corneum (SC): Brick and Mortar Model



McMullen RL et al. *Cosmetic Chemist*. Available at:
http://www.thecosmeticchemist.com/education/skin_science/epidermis.html.
Accessed September 10, 2017.

Corneodesmosomes

- Desmoglein
- Desmocollin
- Corneodesmosin



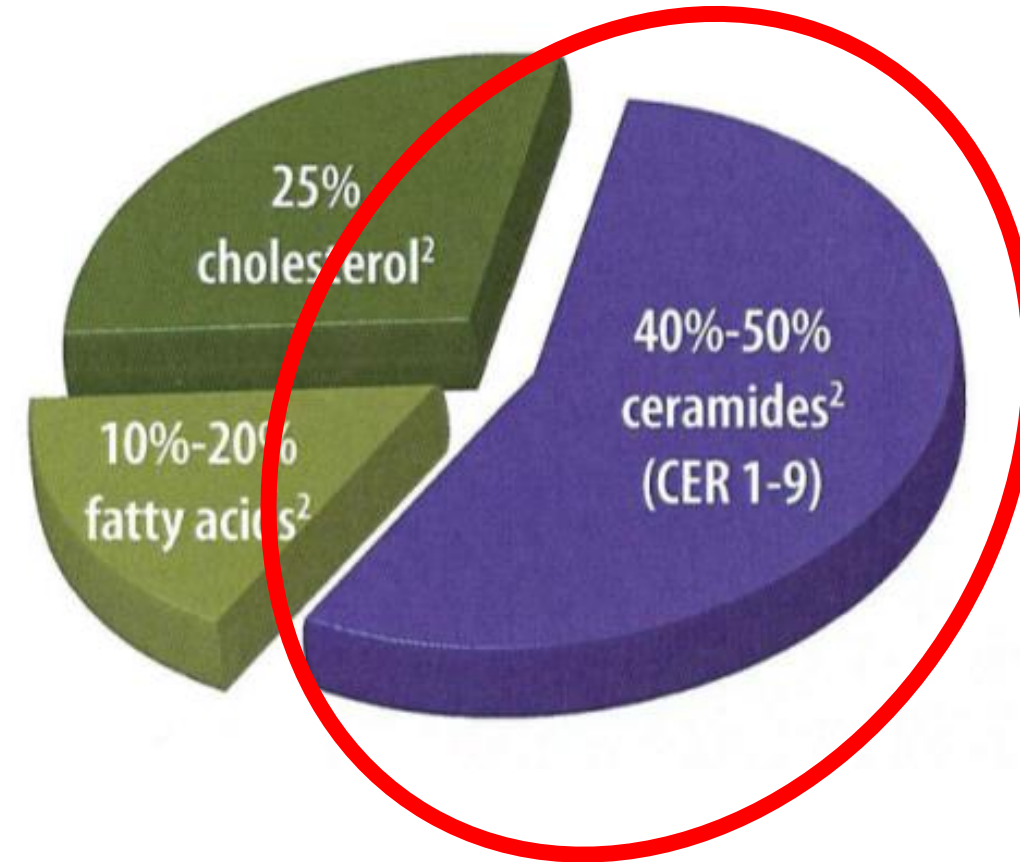
Certain Ceramides are covalently bonded to the outside of corneocytes to form a lipid monolayer over the surface of each cell. The lipophilic coating may act as a template to organize new lipids into lamellar bilayers and prevents loss of NMF from corneocytes.

Ceramides Play an Important Role

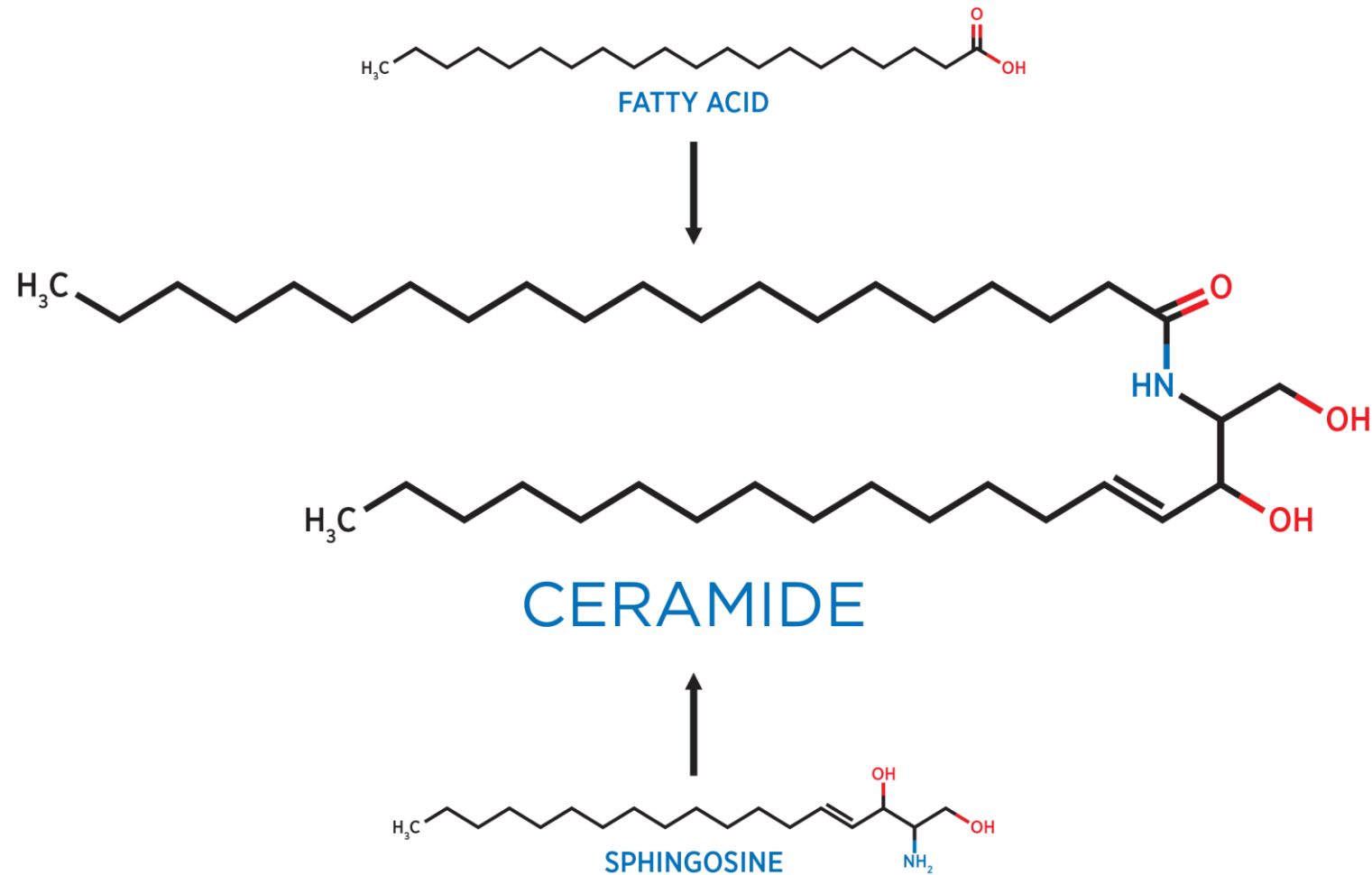
Ceramides play a crucial role in:

- Stratum corneum structure
- Regulation of skin barrier homeostasis

Major lipids in the stratum corneum



Ceramide Structure



Moore JM et al. *Int J Cosmetic Sci.* doi:10.1111/ics.12399. Meckfessel MH et al. *J Am Acad Dermatol.* 2014;71:177-184.

Lipid Levels in SC Regulated By:

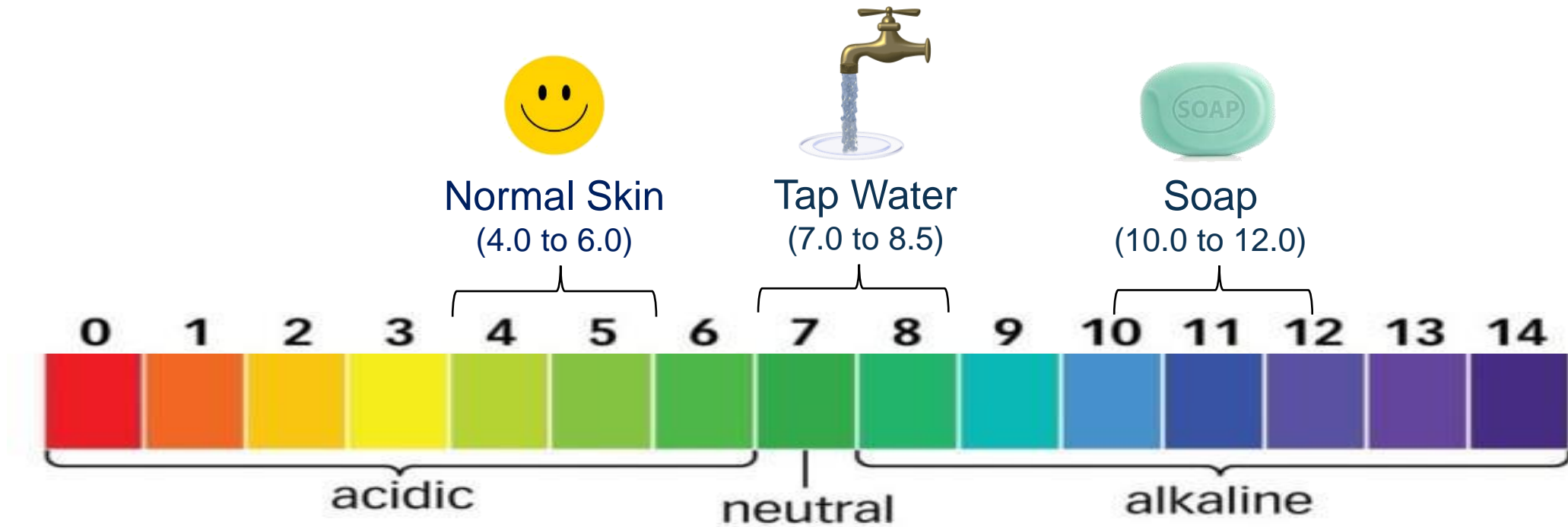
Precursor Lipid	Enzymes	Final Lipid
Glucosylceramide	Beta Glucosylcerebrosidase	Ceramide
Phospholipid	Phospholipase	Fatty Acid
Cholesterol Sulfate	Steroid Sulfatase	Cholesterol

The role of pH in skin barrier function



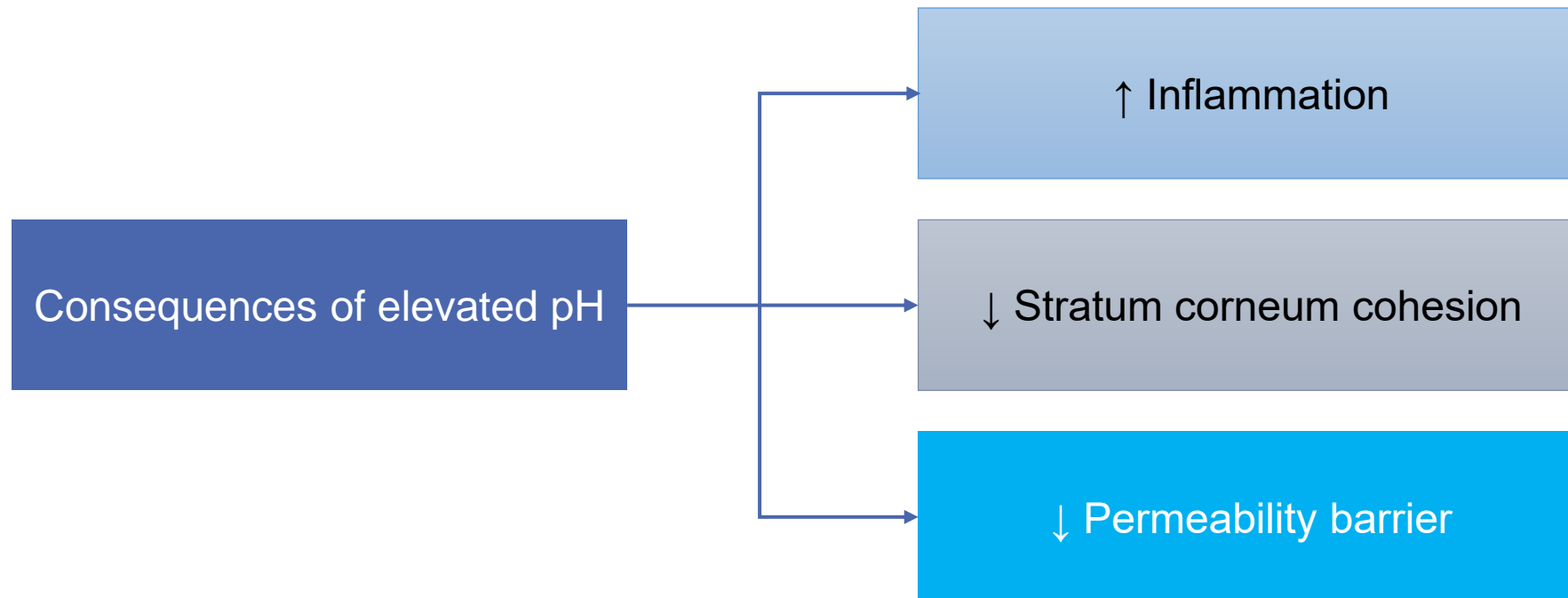
The Types of Skin Care We Use Influence Skin pH

The measure of concentration of hydrogen atoms in a solution is expressed as pH



Potential hydrogen (pH) or Power of hydrogen (pH)

What happens when pH increases



Skin cannot retain sufficient water which leads to dry skin and the itch, scratch and damaged skin and inflammation cycle.

Cleansers: U.S. Centers for Disease Control paper

- Dr. Elaine Larson of Columbia University notes:
- “Some soaps can be associated with long-standing changes in skin pH leading to a reduction in fatty acids, and subsequent changes in resident flora”—
- i.e., changes to the microbiome and a decreased antimicrobial capacity

COVID-19 ERA



Effect of soap and harsh detergents on pH buffering capacity



The Role of pH in Acne Vulgaris



Is skin pH different in patients with acne?

SKIN SURFACE pH IN ACNE VULGARIS: Insights from an Observational Study and Review of the Literature

by CHAITRA PRAKASH, MD; PUNEET BHARGAVA, MD; SIDDHI TIWARI, MD; BANASHREE MAJUMDAR, MD; and RISHI KUMAR BHARGAVA, MD

Drs. Prakash, P. Bhargava, Tiwari, and Majumdar are with the Department of Dermatology, Venereology and Leprosy, Sawai Man Singh Medical College and Attached Hospitals, Jaipur, Rajasthan, India. Dr. R.K. Bhargava is with Girdhar Hospital and Research Centre, Jaipur, Rajasthan, India.

J Clin Aesthet Dermatol. 2017;10(7):33–39

N = 400

Case Group:

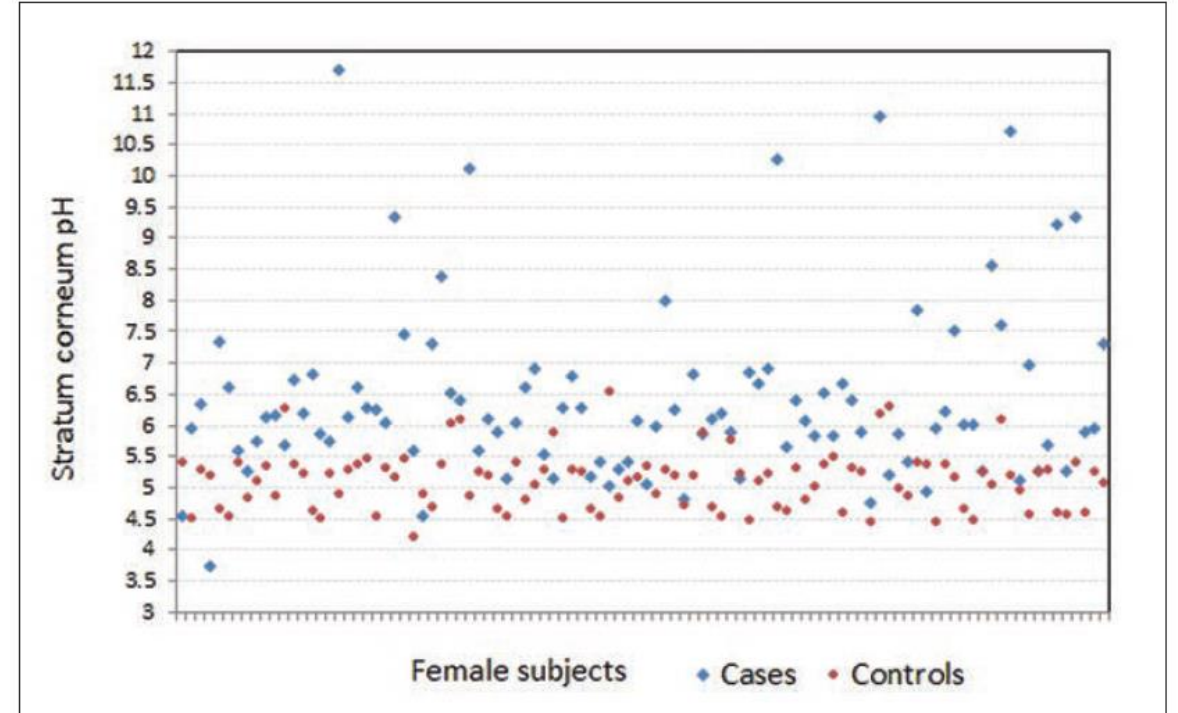
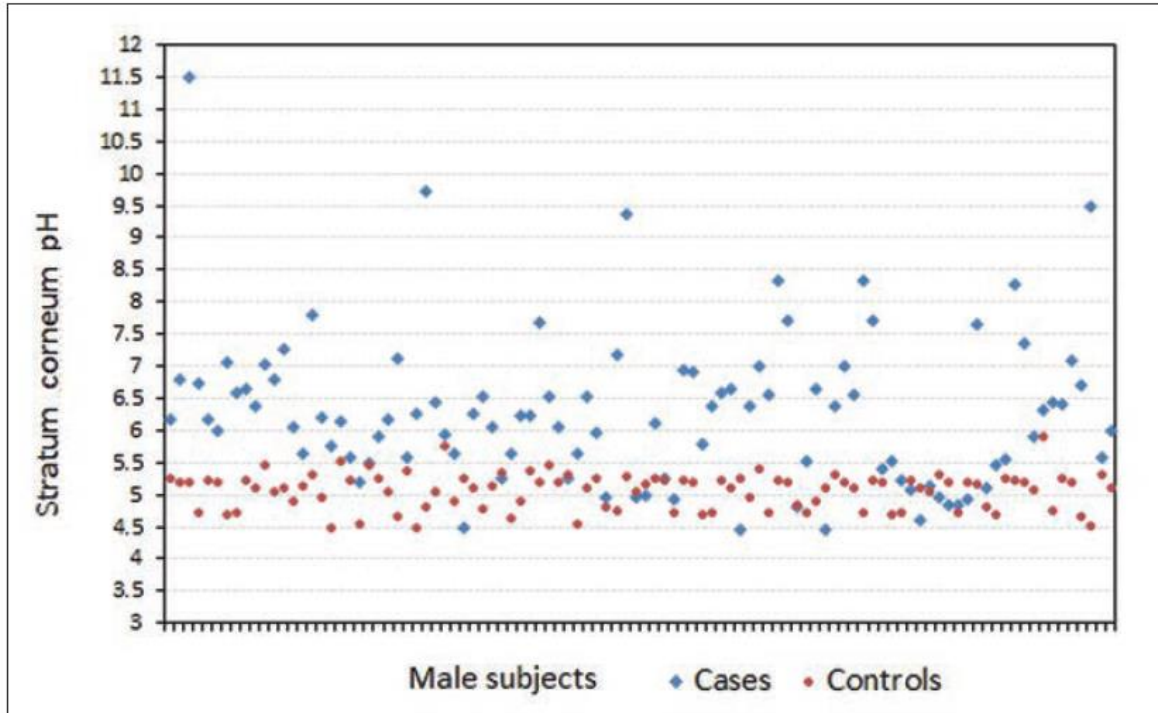
- 200 patients with mild to moderate acne
 - 100 male + 100 female
- Not taken any oral acne medication for 3 months prior

Control Group:

200 age and sex matched controls without acne

Both case and control groups instructed not use cleansers and topical applications to the face for 24h prior to the pH test

Higher pH in acne patients, both genders



Mean pH 5.09 ± 0.39 controls versus 6.35 ± 1.30 acne cases ($p < 0.001$)

Clinical Insights About the Role of Skin pH in Inflammatory Dermatological Conditions

Introduction

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Clinical Insights About the Role of Skin pH in Inflammatory Dermatological Conditions

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Clinical Insights About the Role of Skin pH in Inflammatory Dermatological Conditions

Consensus on the role of pH in Acne

1. Acne is a common inflammatory skin disorder, which is multifactorial.

Factors involved in acne pathogenesis:

1. Inflammation
2. Sebum hyperexcretion
3. Follicular hyperkeratinization
4. *C. acnes*
5. Androgenic hormones
6. Skin barrier defect

3. There is a paucity of research on the pathogenic role of pH in acne but there is an association with higher skin surface pH in patients with acne.

4. Many skin care products and acne therapies disrupt skin barrier function, which potentially impact patient adherence and therapeutic outcomes.

5. Cleansers and moisturizers with a near-physiologic skin surface pH (4.0–6.0) improve skin barrier function, treatment tolerability, and should be part of the acne treatment regimen.

6. Education of patients with acne on appropriate cleansing and moisturizing can improve skin barrier function, treatment adherence, and results.

Cleansers and their pH

TYPE OF CLEANSER	PH	EXAMPLE
Soap: Contains fat and alkali-treated salts of fatty acids.	pH 9.0–12	Home-made/"Natural" soap, Ivory Soap
Combar: Contains equal parts of soap-based detergent mixed with synthetic detergent.	pH: 10–12	Irish Spring
Liquid cleanser: Contains synthetic detergents, can be ionic or non-anionic in lotion, cream, oil or gel form.	pH: 6.0–7.0	Body wash, liquid hand cleanser
Syndet bar: Contains synthetic surfactants and may contain small amounts of soap-based detergents (up to 10%).	pH: 5.0–7.0	Dove Beauty Bar Cetaphil Cleansing Bar CeraVe Hydrating Cleanser Bar
Gentle lipid-free cleansers and or ceramides-containing cleansers: Do not contain soap – just synthetic surfactants.	pH: 5.0–7.0	CeraVe Hydrating Cleanser Cetaphil Gentle Skin Cleanser

pH of Cleansers

Brand Name	pH	Composition	
Avecyde	3.61	Syndet	Acidic pH
CeraVe Hydrating Cleanser Bar*	5	Syndet	
CeraVe SA Cleanser*	5	Syndet	
Dove [liquid]	5.16	Syndet	Normal skin pH
CeraVe Hydrating Cleanser*	5.7	Syndet	
CeraVe Foaming Facial Cleanser*	5.8	Syndet	
Aderm	6.44	Syndet	
Avène	6.94	Syndet	Neutral pH
Dove baby	7	Syndet	
Dove Bar pink	7.23	Syndet	
Dove Bar white	7.53	Syndet	
Cetaphil	7.72	Syndet	
Zest citrus sport	9.75	Soap	Alkaline pH
Zest neutral	9.85	Soap	
Zest aqua	9.89	Soap	
Zest herbal	9.97	Soap	
Palmolive botanicals/chamomile	10.13	Soap	
Palmolive green	10.18	Soap	
Palmolive [white]	10.23	Soap	
Camay soft	10.26	Soap	
Camay gala	10.36	Soap	
Palmolive botanicals	10.38	Soap	
Camay classic	10.38	Soap	
Johnson's baby	11.9	Soap	
Nivea bath care	12.21	Syndet	
Nivea bath c. Almond	12.22	Syndet	
Nivea bath c. Oat	12.3	Syndet	
Johnson's baby oat	12.35	Soap	
Nivea baby creamy	12.35	Syndet	

12-Week Open-label Adjunct Acne Study

Efficacy and Safety of a Ceramide Containing Moisturizer Followed by Fixed-dose Clindamycin Phosphate 1.2%/Benzoyl Peroxide 2.5% Gel in the Morning in Combination With a Ceramide Containing Moisturizer Followed by Tretinoin 0.05% Gel in the Evening for the Treatment of Facial Acne Vulgaris

Joshua A. Zeichner MD, Rita V. Patel MD, Madelaine Haddican MD, and Vicky Wong BS

Mount Sinai School of Medicine, New York, NY

JOURNAL OF DRUGS IN DERMATOLOGY
JUNE 2012 • VOLUME 11 • ISSUE 6

High Treatment Success Rate (60%) with Minimal Adverse Events

25

- ▶ Participants were considered a treatment success based on Physician Global Assessment scores
- ▶ Ceramide-containing cleanser and moisturizing lotion improved acne regimen tolerability
- ▶ CeraVe[®] moisturizer may restore ceramide levels and improve skin barrier function in acne

Ceramide Moisturizers as Adjunctive Therapy for Acne – Canadian Consensus Paper

Moisturizers and Ceramide-containing Moisturizers May Offer Concomitant Therapy with Benefits

CW LYNDE, A ANDRIESSEN, B BARANKIN, G DE GANNES, W GULLIVER, R HABER, C MCCUAIG, P RAJAN, SP SKOTNICKI, R THOMAS, J TOOLE, R VENDER

- A literature review was conducted using the Medline, Embase, and Cochrane data bases.
- Keywords: topical acne treatment, adherence, concordance, efficacy, safety, tolerability, dry skin, skin irritation, moisturizers and acne, ceramide-containing moisturizers and acne, depletion of ceramides and acne, adjunctive treatment with ceramide-containing moisturizers.

Ceramide Moisturizers as Adjunctive Therapy for Acne – Canadian Consensus Paper

- A very important reason for non adherence to acne treatment is dry skin and irritation
- Skin barrier dysfunction may contribute to acne
- Dry skin and irritation commonly results from topical and systemic retinoid acne treatment
- Moisturizers can improve dryness and irritation resulting from acne treatment
- Ceramide-containing moisturizers may enhance adherence and complement existing acne therapies
- Adjunctive therapy with moisturizers should be considered in acne-treated patients

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