Skin Barrier Research in Atopic Dermatitis in the Era of Biologics

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Disclosure of conflicts of interest

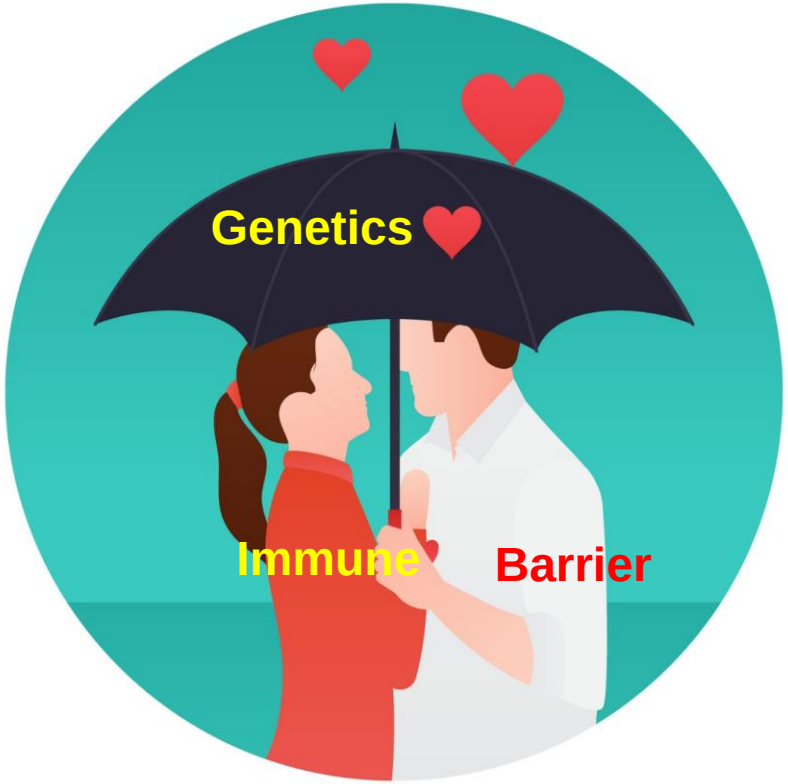
CMS LAB
SKINMED
MIRANGEL
SANOFI
LEO Pharma

* I have provided consulting services for several companies in Korea, but it is not directly related to the current presentation.

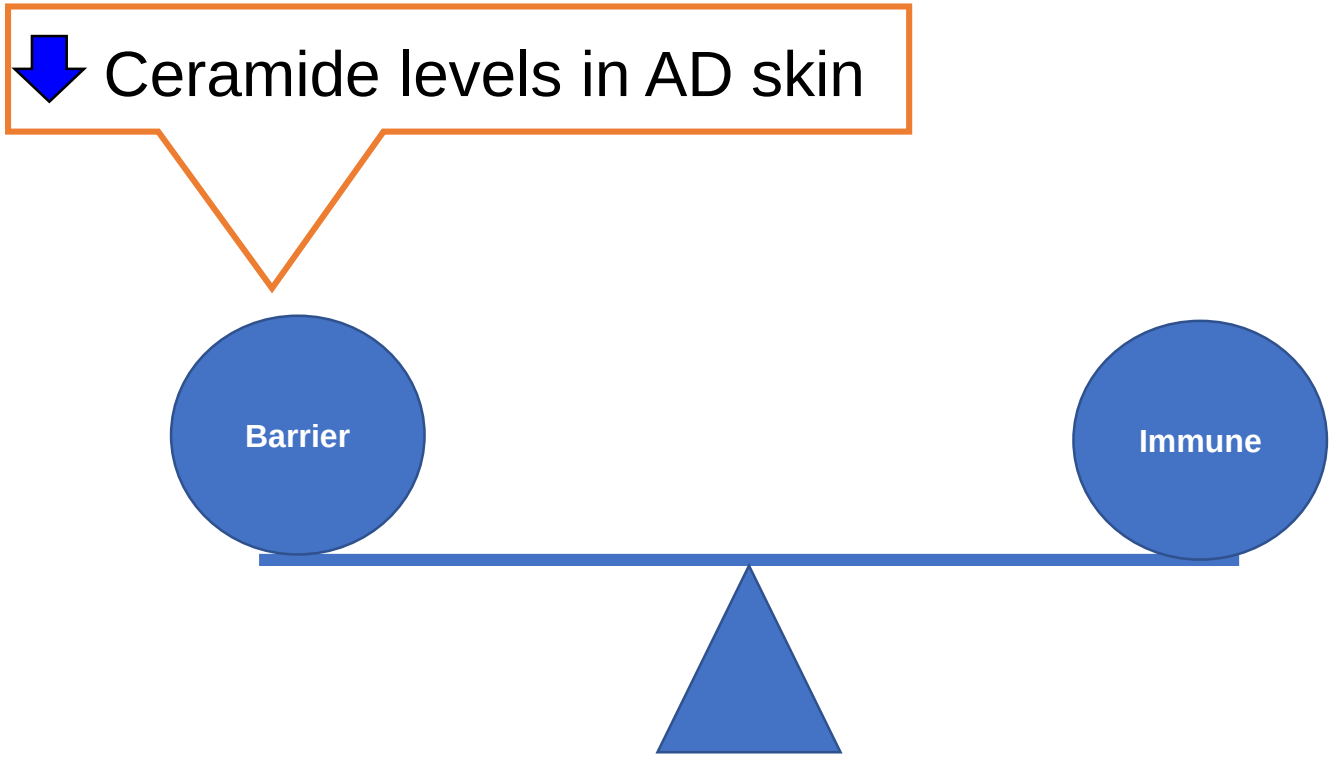
Contents

AD arises from a complex interplay of 3 major factors.

1. Genetic variation
2. Skin barrier dysfunction
3. Abnormal immune response



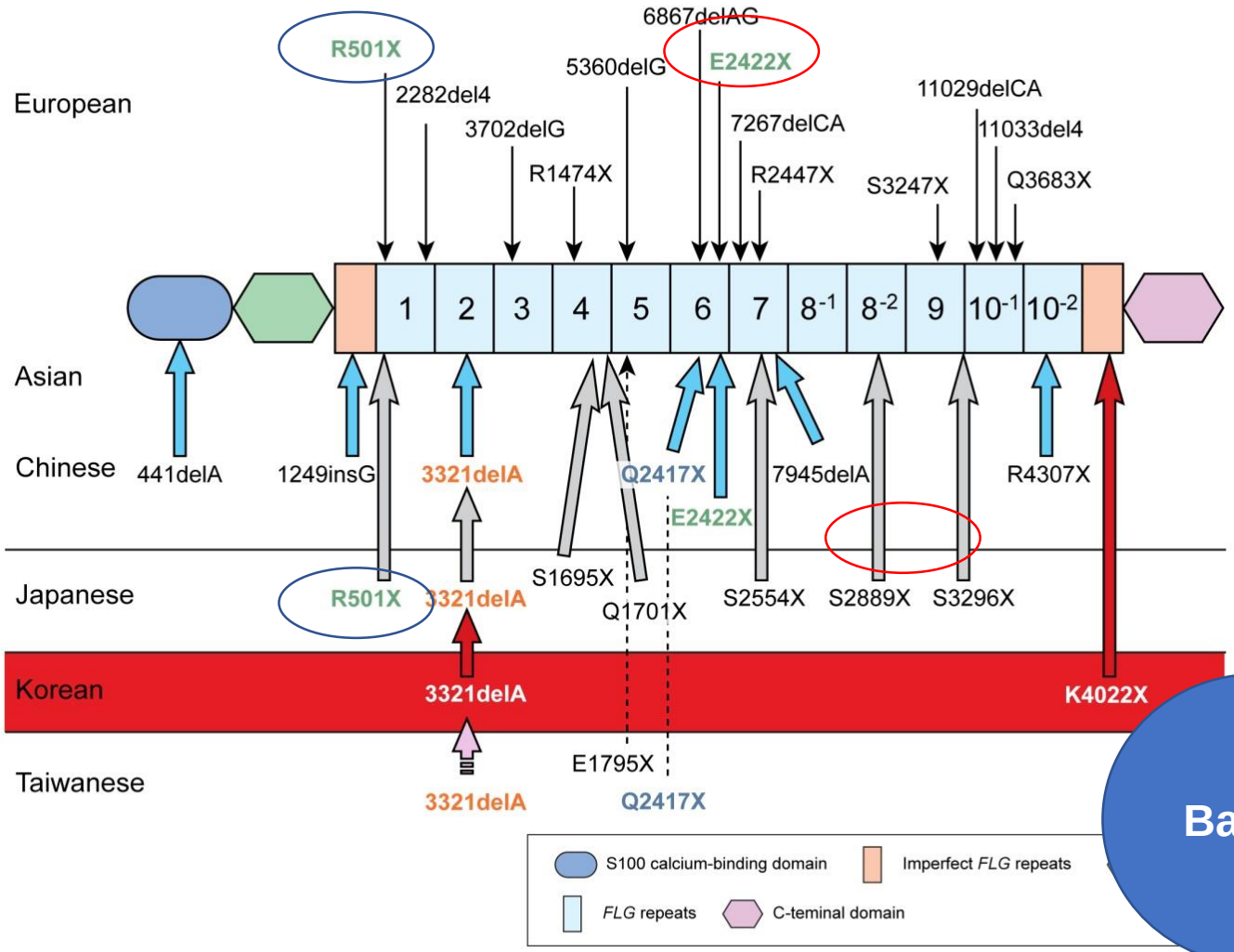
AD skin presents decreased ceramide levels.



First indication that the barrier defect is central to the pathogenesis of AD

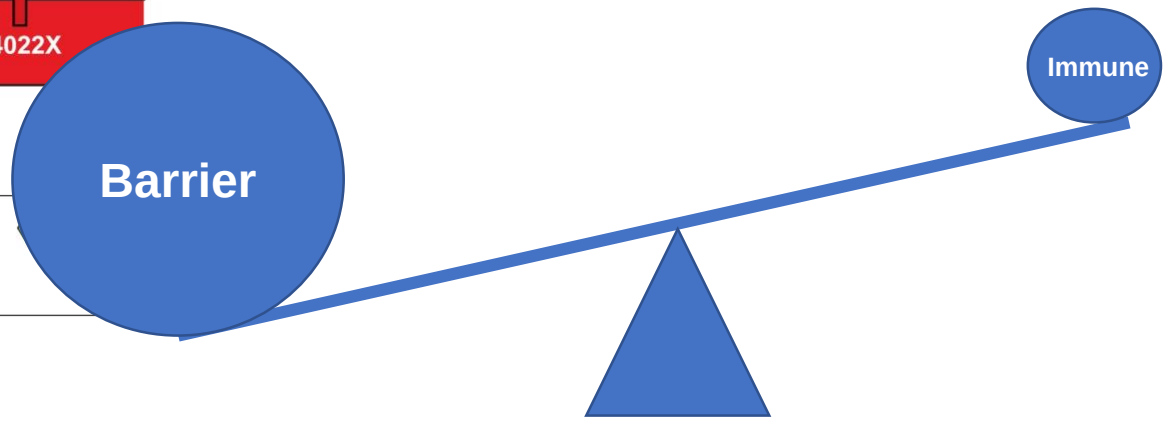
(Imokawa G et al. JID 1991)

Loss of function mutation of *FLG* are frequently observed in AD.

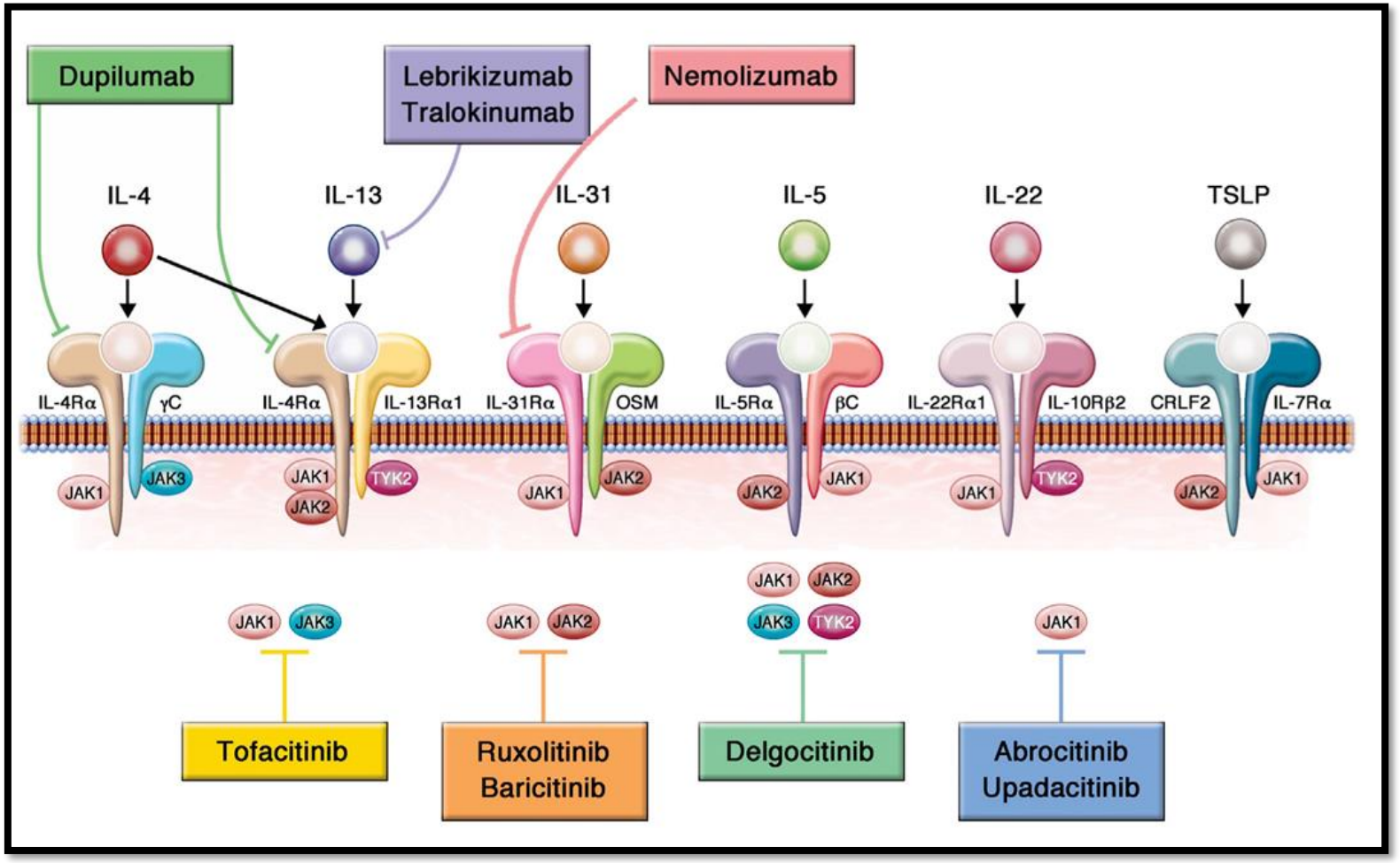


FLG mutation AD patients

- Early onset
- Severe symptoms
- Persistent into adult AD
- Atopic march



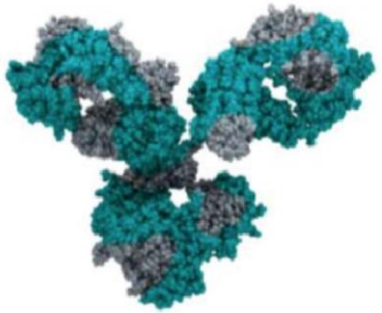
Biologics and JAKi has fundamentally changed the treatment paradigm for severe AD.

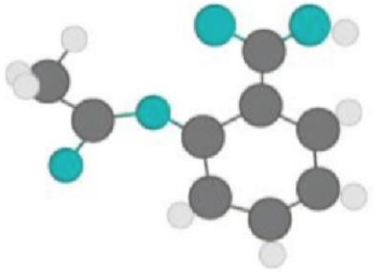


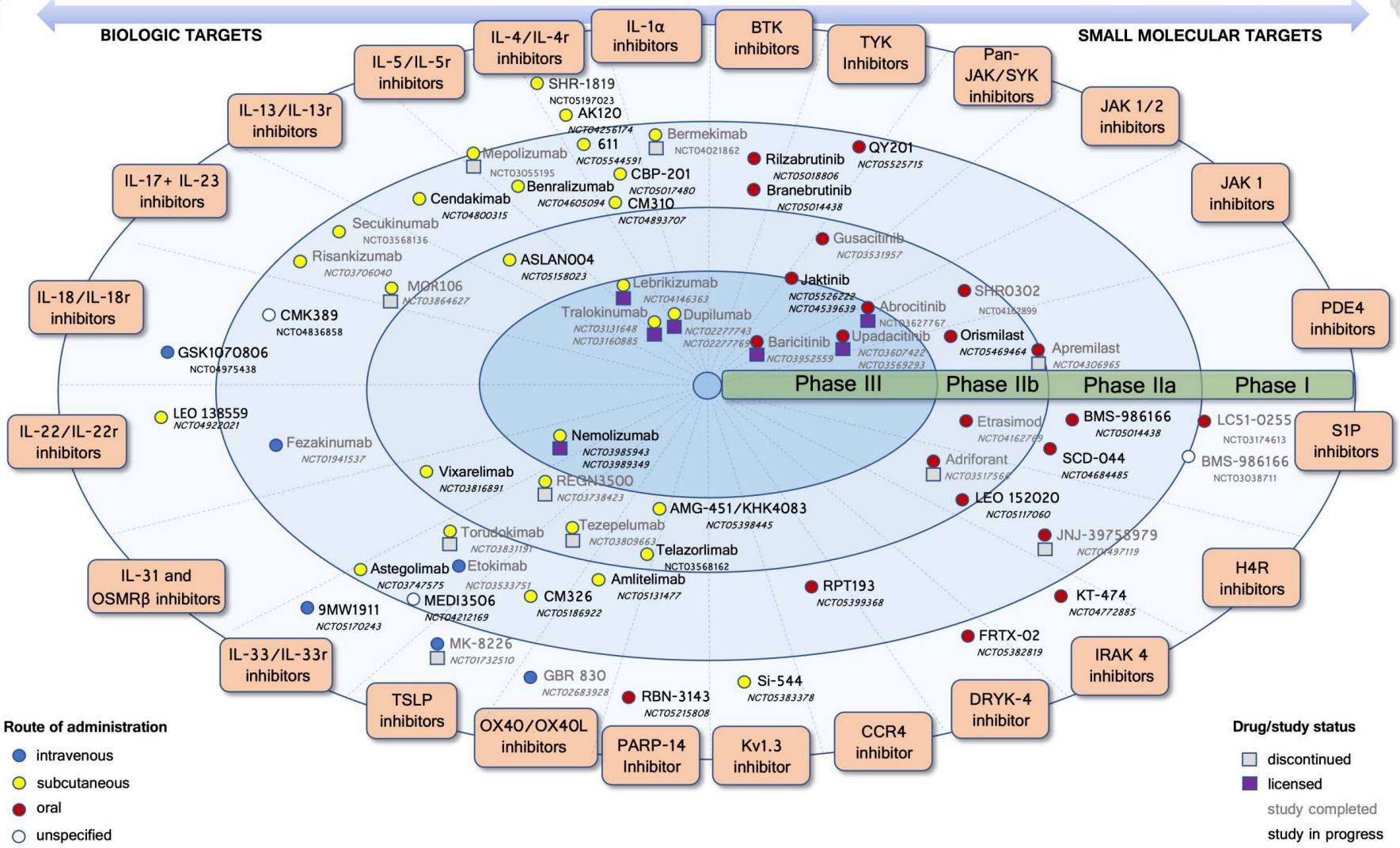
"All of them have been the result of research into immunological mechanisms."

(Butala S et al. JACI Pract 2023)

Therapeutic pipeline of the systemic treatment for AD



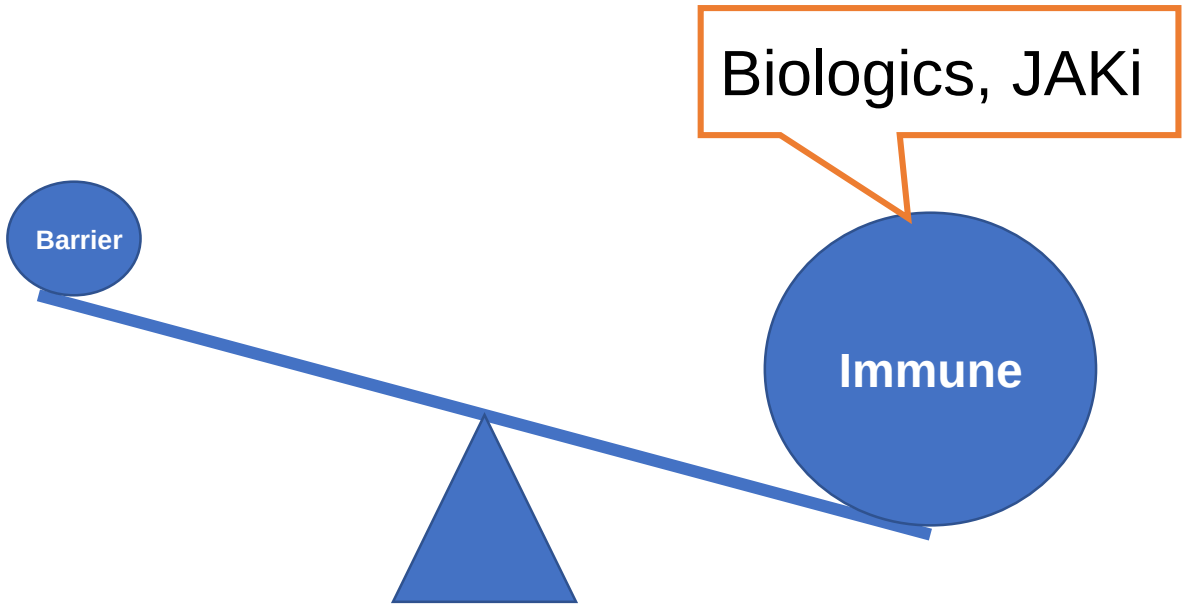




(Paolino A, et al. Clin Exp Allergy. 2023)

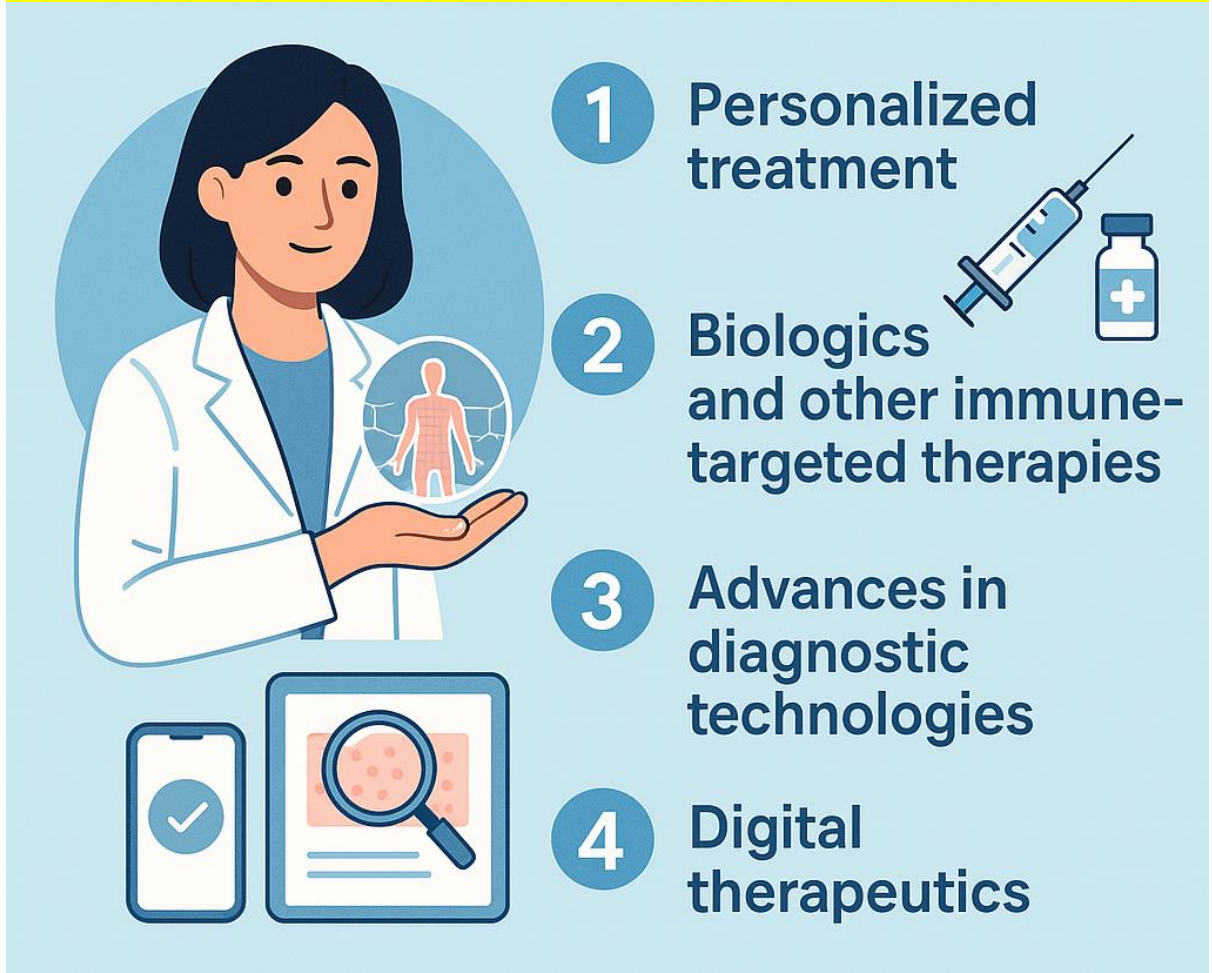
Biologics and JAKi are reshaping the perception of AD.

1. No longer refractory
2. The only remaining challenge in its treatment is cost.
3. A full spectrum of treatment modalities from A to Z



We asked researchers in the field of AD what directions future research might take.

Their expectations were ranked in the following order



Where should skin barrier research be positioned today?

Contents

Skin barrier issues in AD

1) Prediction of the onset of AD through research on the skin barrier

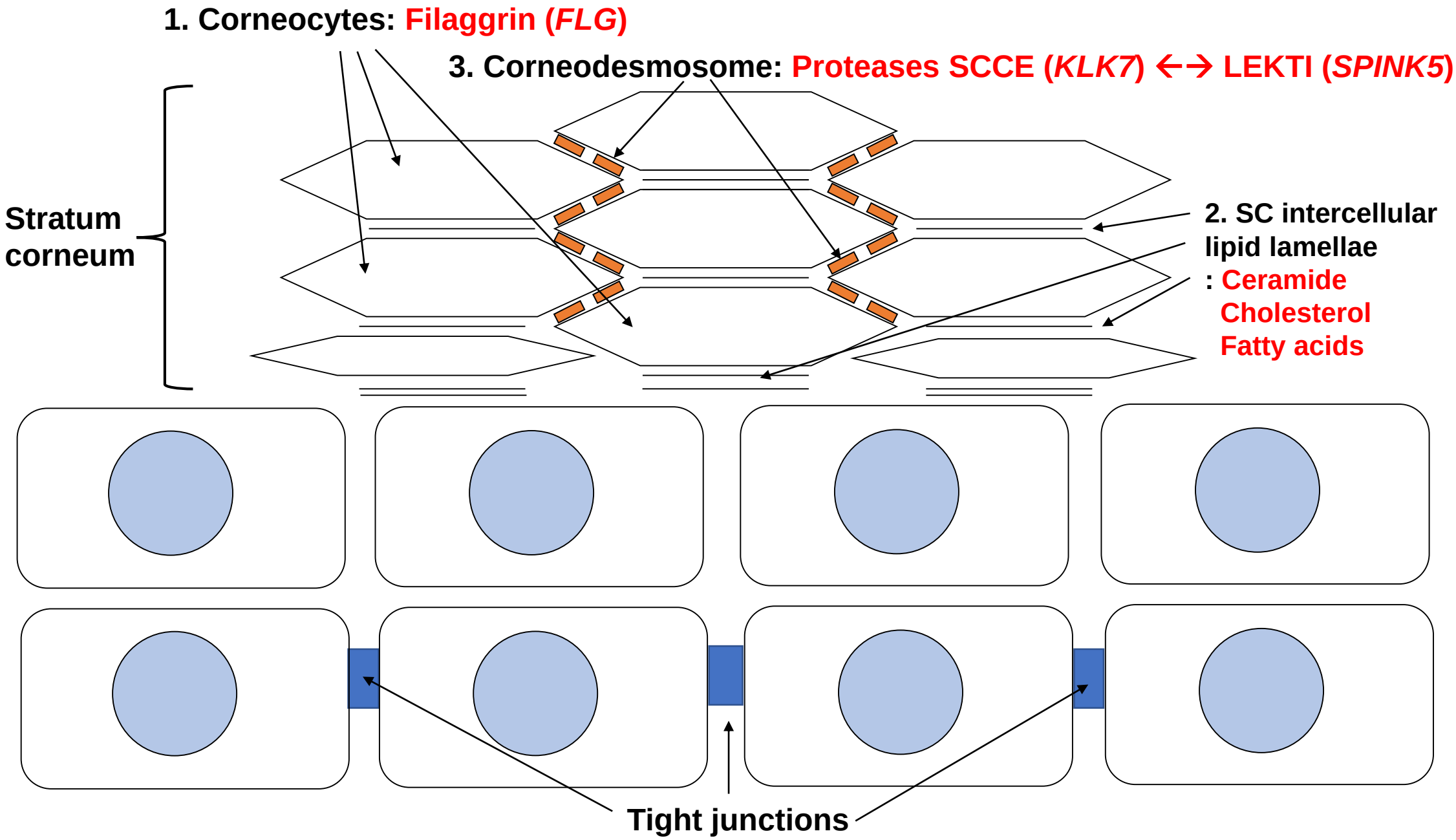
2) The critical factors in the skin barrier dysfunction in patients with AD

: Deficiency of SC ceramides or an increase in SC pH

3) Prevention of the progression of the atopic march

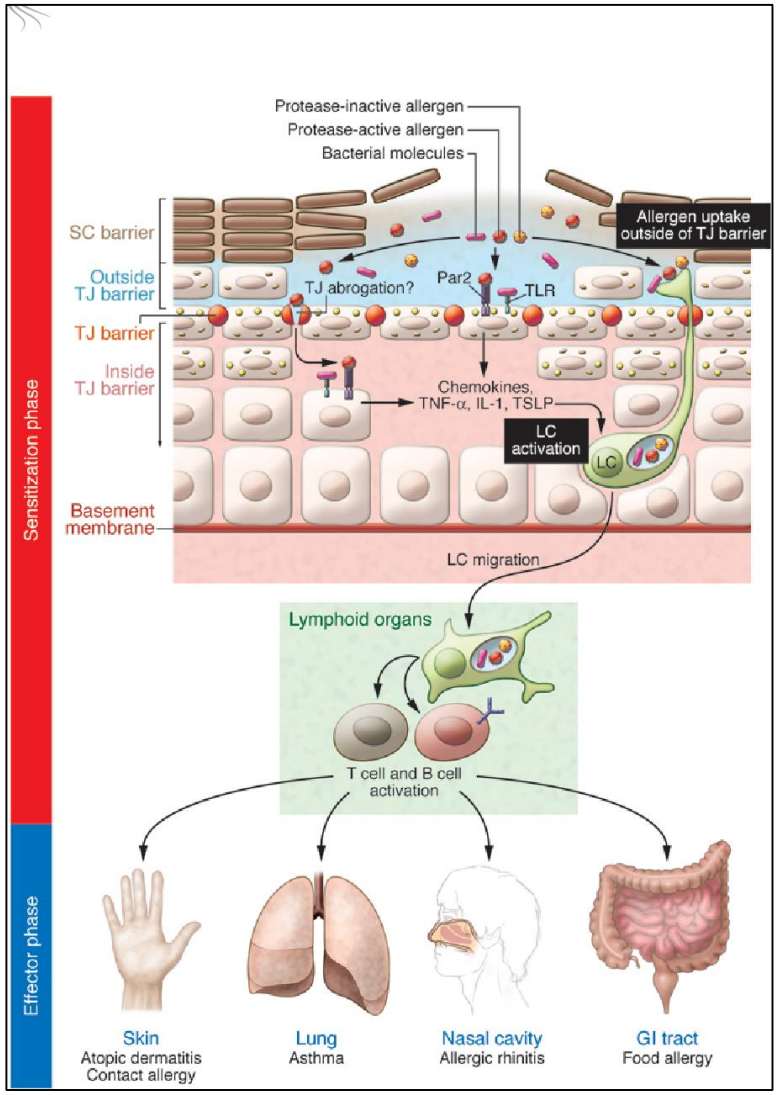
4) Prevention of AD onset by maintaining skin barrier function through the use of moisturizer

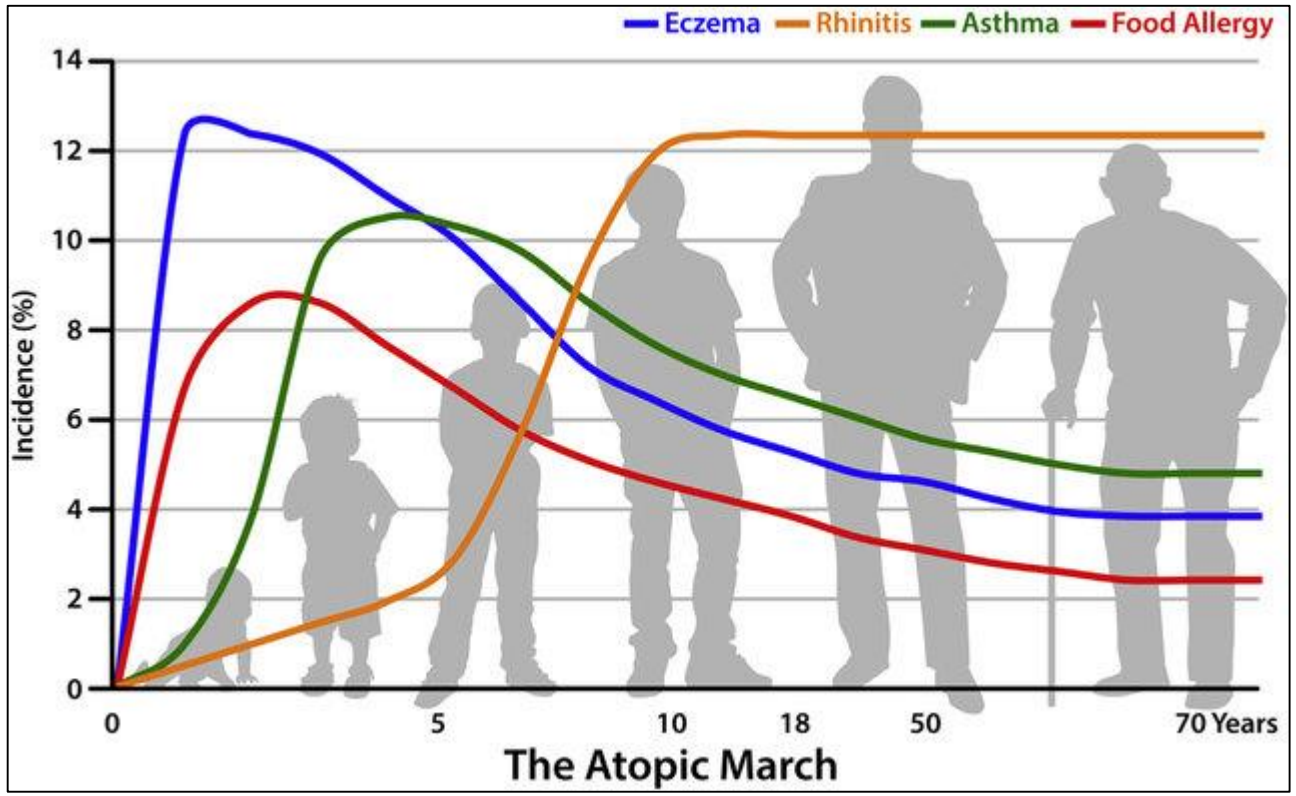
Skin barrier is composed of SC and TJ.



Skin barrier impairment → Atopic dermatitis → Asthma, AR

"Starting point of atopic march is the impaired skin barrier."





(Kubo A et al. J Clin Invest 2012; Davidson WF et al. JACI 2019)

NMF can act as a predictive biomarker for development of AD.

Natural Moisturizing Factor in neonate's skin

In vivo Raman spectroscopy discriminates between *FLG* loss-of-function carriers vs wild-type in day 1-4 neonates

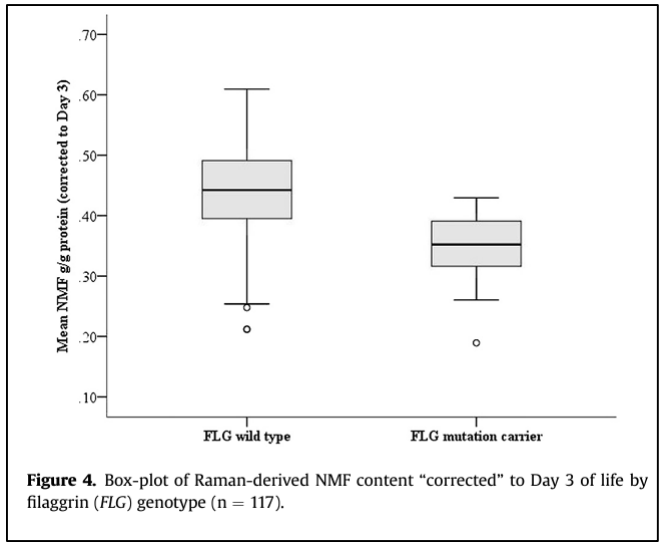
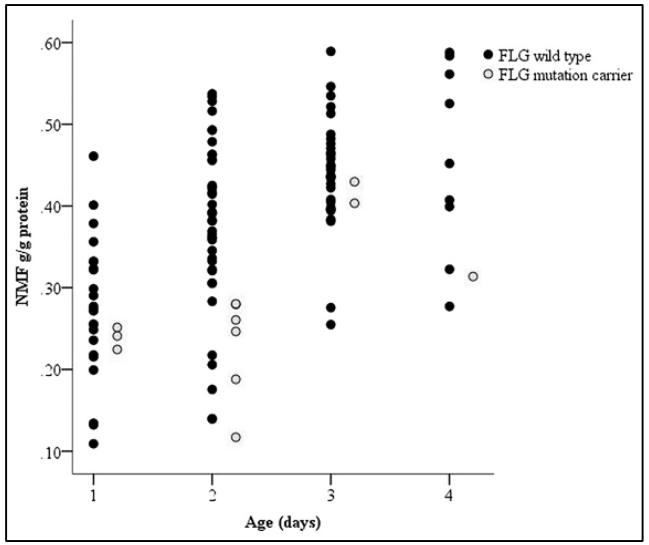
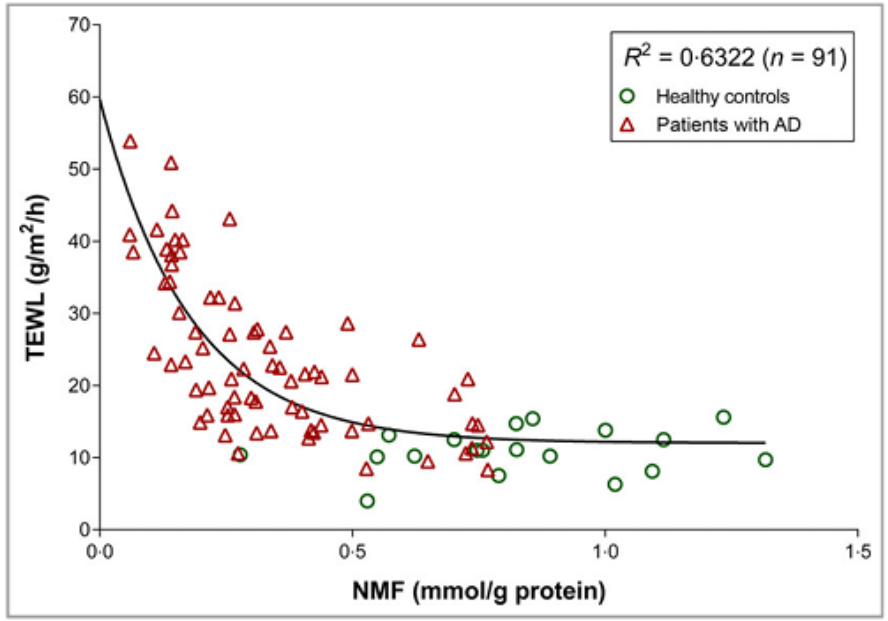


Figure 4. Box-plot of Raman-derived NMF content "corrected" to Day 3 of life by filaggrin (*FLG*) genotype (n = 117).





Raman spectroscopy help assess filaggrin gene mutations.

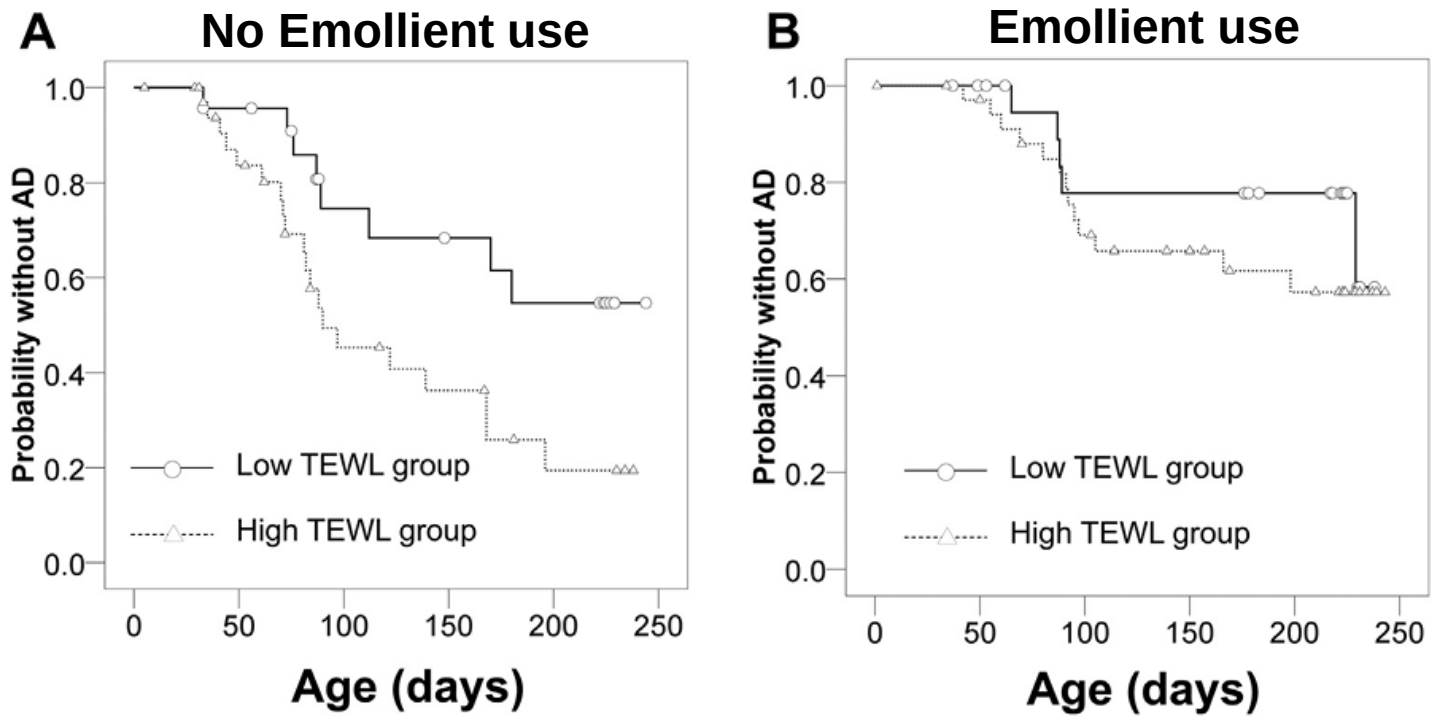
NMF is inversely proportional to TEWL.

(Ni Chaoimh C et al. AAAI 2020)

(McAleer MA et al. BJD 2019)

TEWL during infancy predicts the development of AD.

Transepidermal water loss in neonate's skin



Significant decrease of the probability without AD in high TEWL group

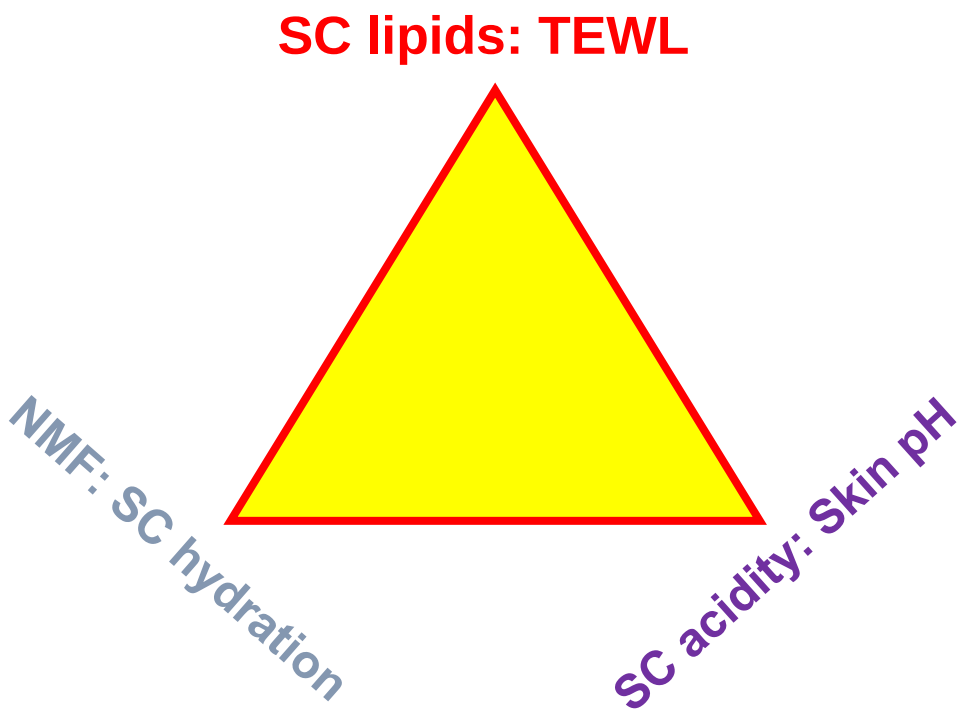
Use of emollient increases the probability without AD in high TEWL group

(Horimukai K et al. Allergol Int 2016)

Skin barrier issues in atopic dermatitis

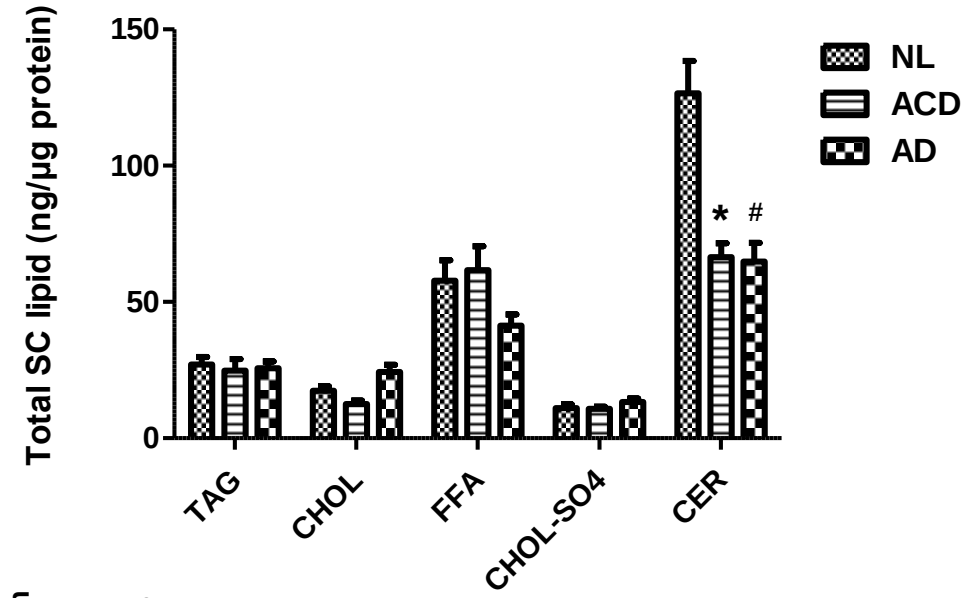
1. Prediction of the onset of AD through research on the skin barrier
2. **The critical factors underlying skin barrier dysfunction in patients with AD : A deficiency of SC ceramides or an increase in SC pH**
3. Prevention of the progression of the atopic march
4. Prevention of AD onset by maintaining skin barrier function through the use of moisturizer

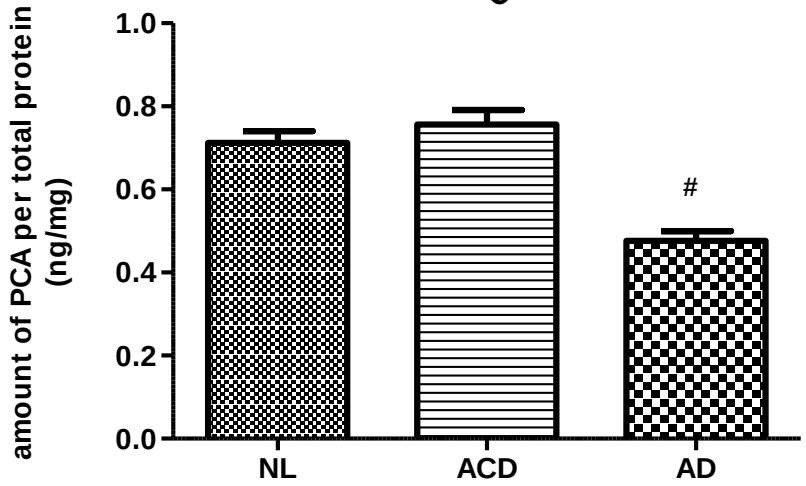
Three components for a healthy skin barrier function



(Choi EH & Kang H. Ann Dermatol 2023)

Non-lesional skin in AD & ACD: barrier function and ceramides



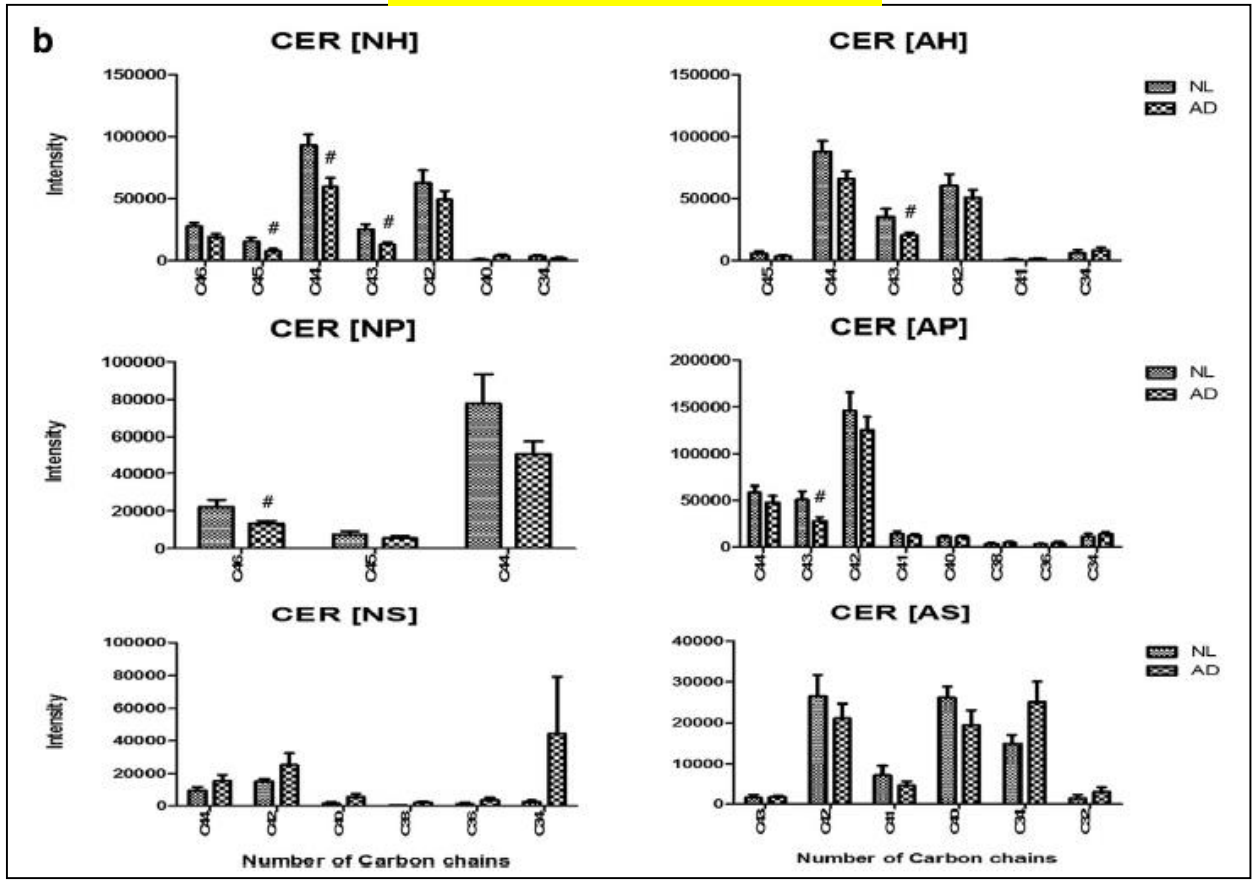


Pyrrolidone carboxylic acid (PCA): a breakdown product of filaggrin protein and a moisturizing factor

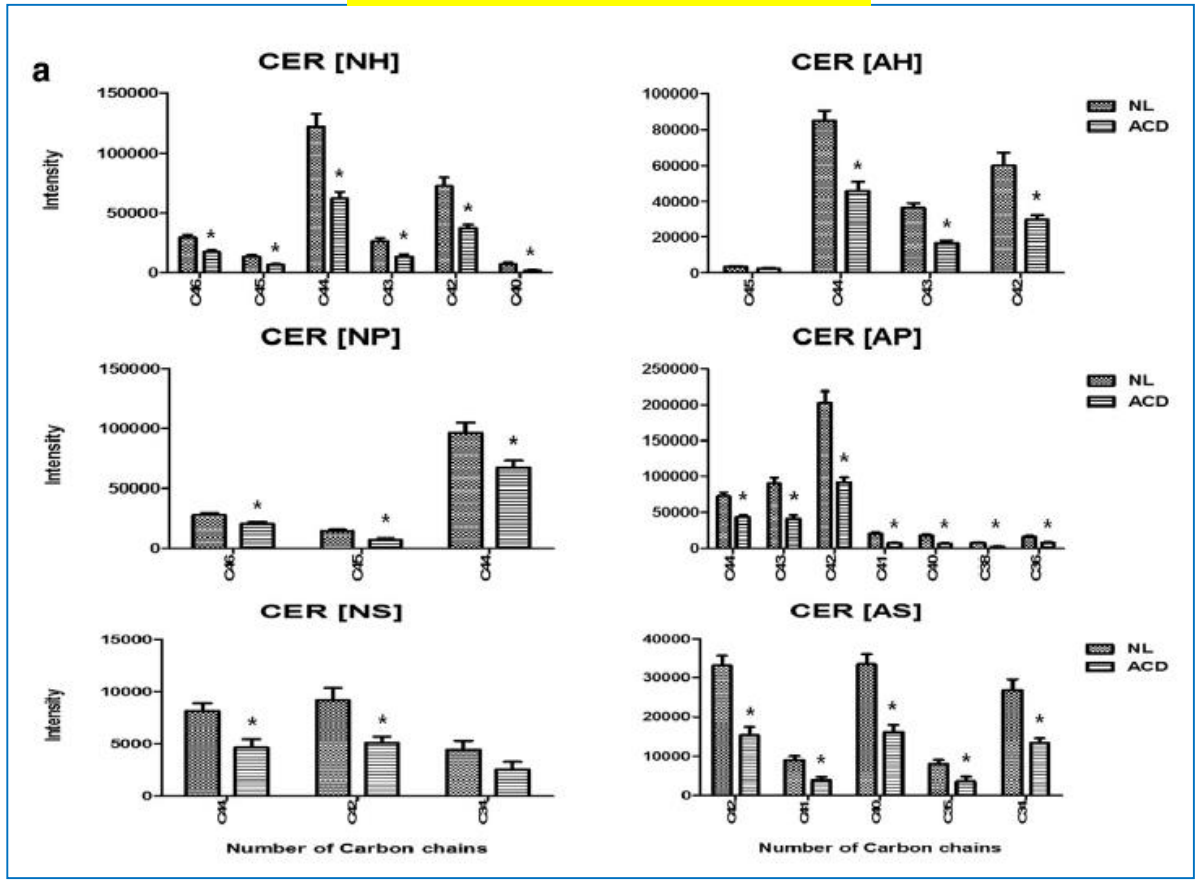
(Kim D et al. JID 2017)

L-C ceramides tended to decrease but S-C ceramides increase in AD patients.

NL vs AD non-lesion



NL vs ACD non-lesion

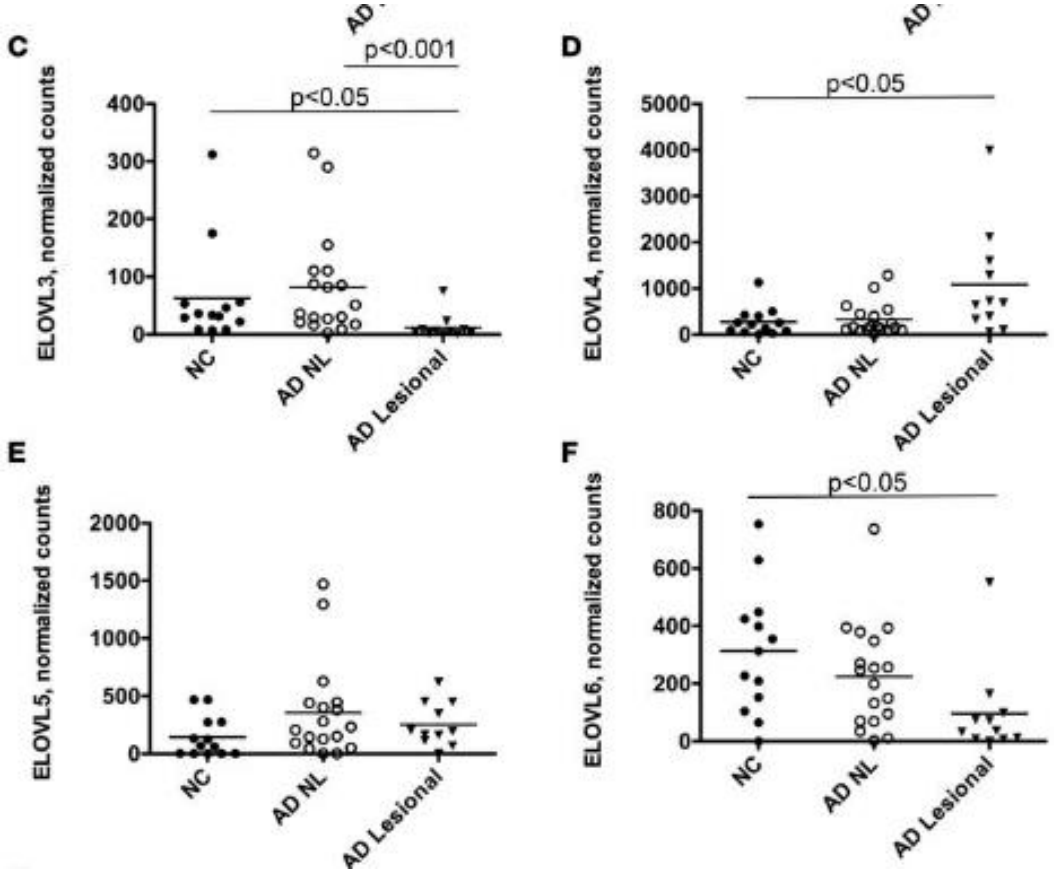


"In the SC lipids of non-lesional skin, ACD patients showed a significant overall decrease in ceramide chain length, whereas AD patients exhibited a tendency toward reduced long-chain ceramides and increased short-chain ceramides."

(Kim D et al. JID 2017)

Lipid abnormalities in atopic skin are driven by type 2 cytokines.

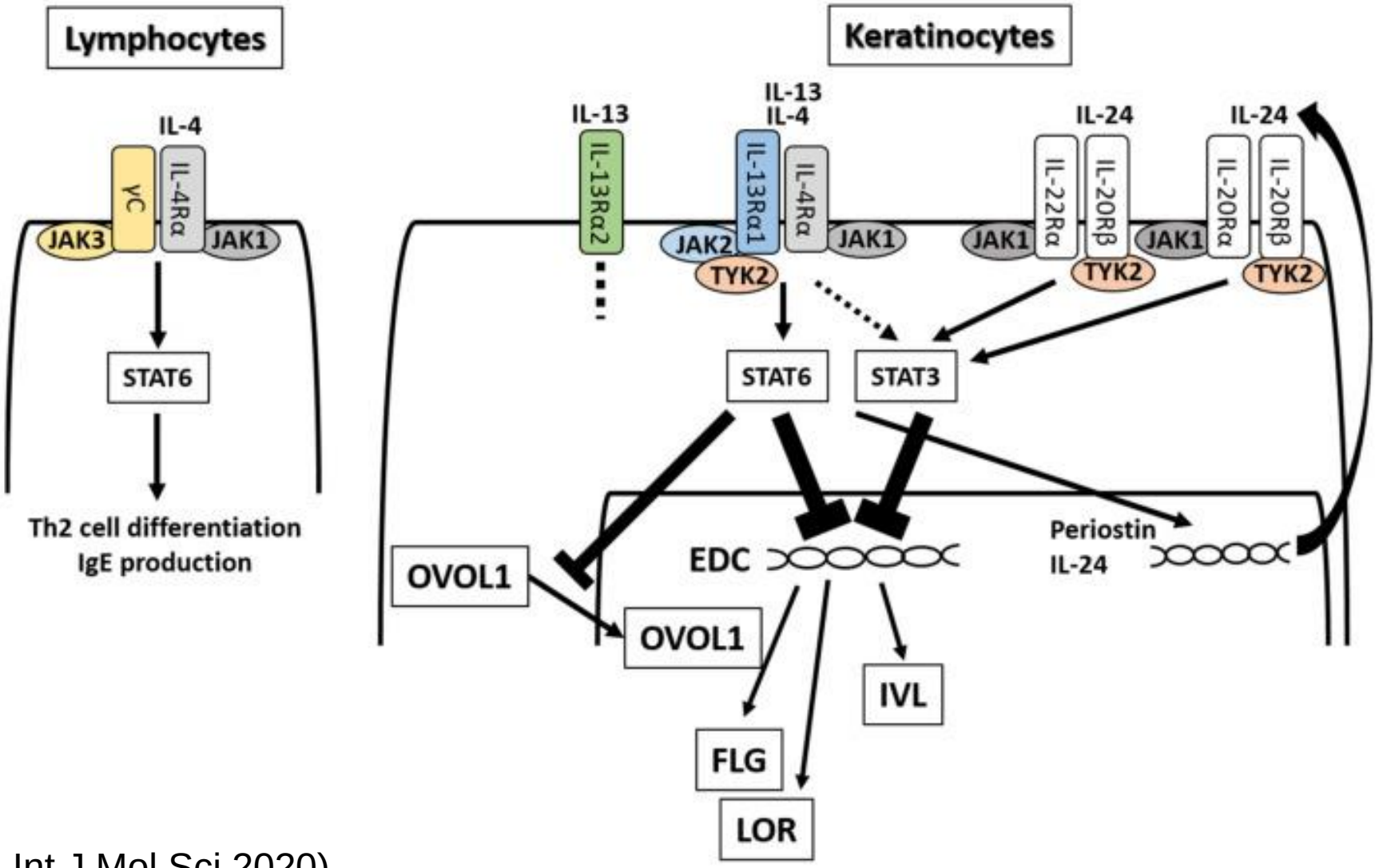
Expression of elongation of long-chain fatty acids family member 3 and 6 (ELOVL3 and ELOVL6) enzymes is decreased in atopic skin.



(Berdyshev E et al, JCI insight 2018)

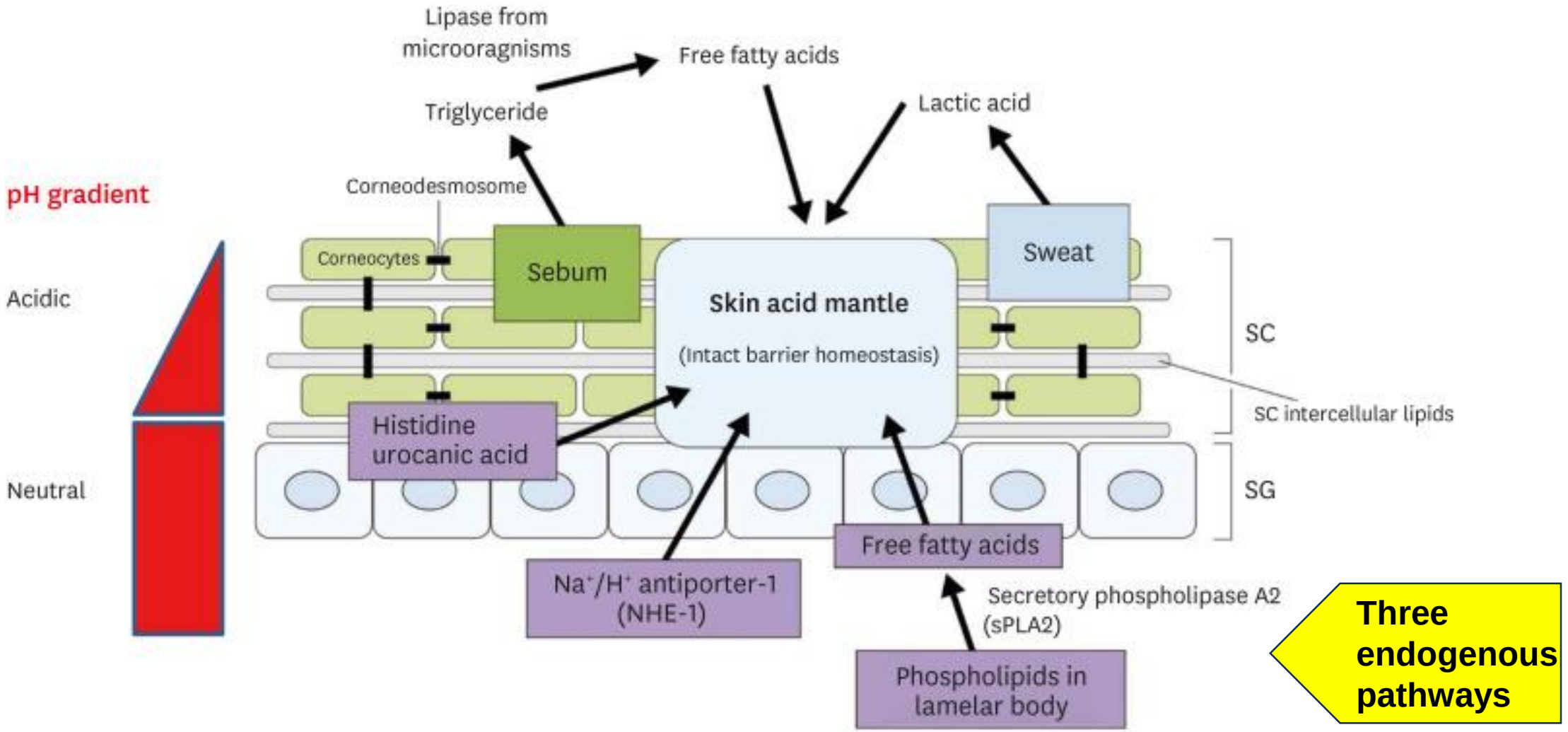
"In AD, there is a notable change in SC lipids characterized by an increase in short-chain ceramides, sphingomyelins, and lysophosphatidylcholines, coupled with a reduction in long-chain counterparts."

Th2 cytokines influence epidermal differentiation as well as SC lipids.



(Furue M, Int J Mol Sci 2020)

Acidic pH in the SC is important for establishing a healthy skin barrier.

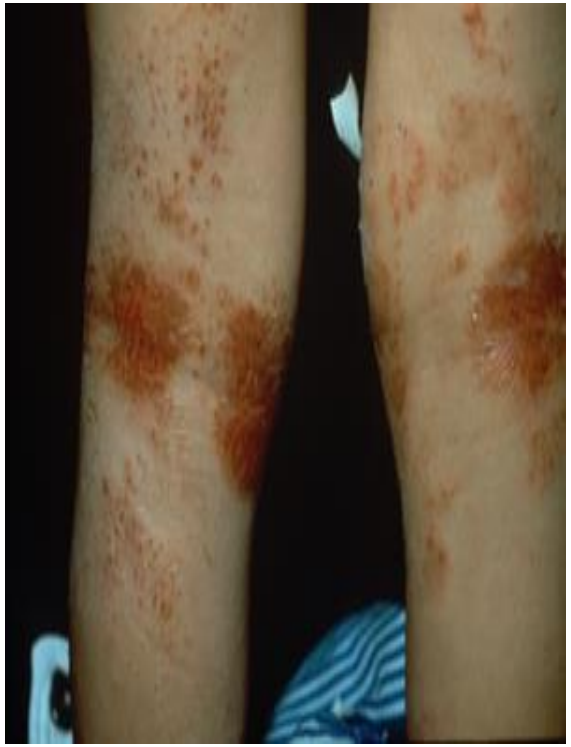


(Choi EH & Kang H. Ann Dermatol 2023)

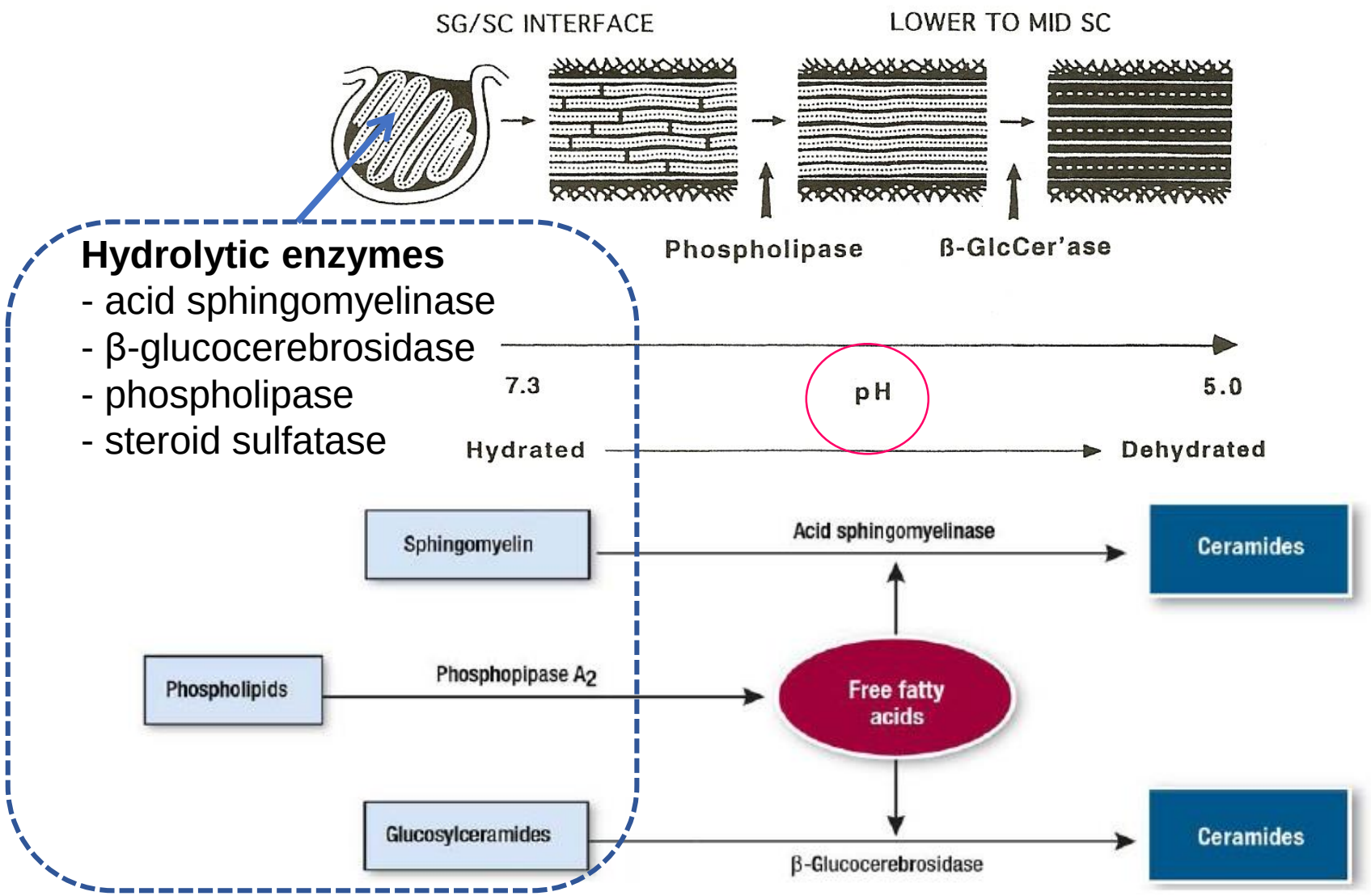
The pH of the SC increases in AD lesion.

Contributing factors

- Filaggrin degradation products↓
  : PCA, UCA ↓
- Sweating ↓ : Lactic acid ↓
- Lamellar body secretion ↓
  : Fatty acids ↓

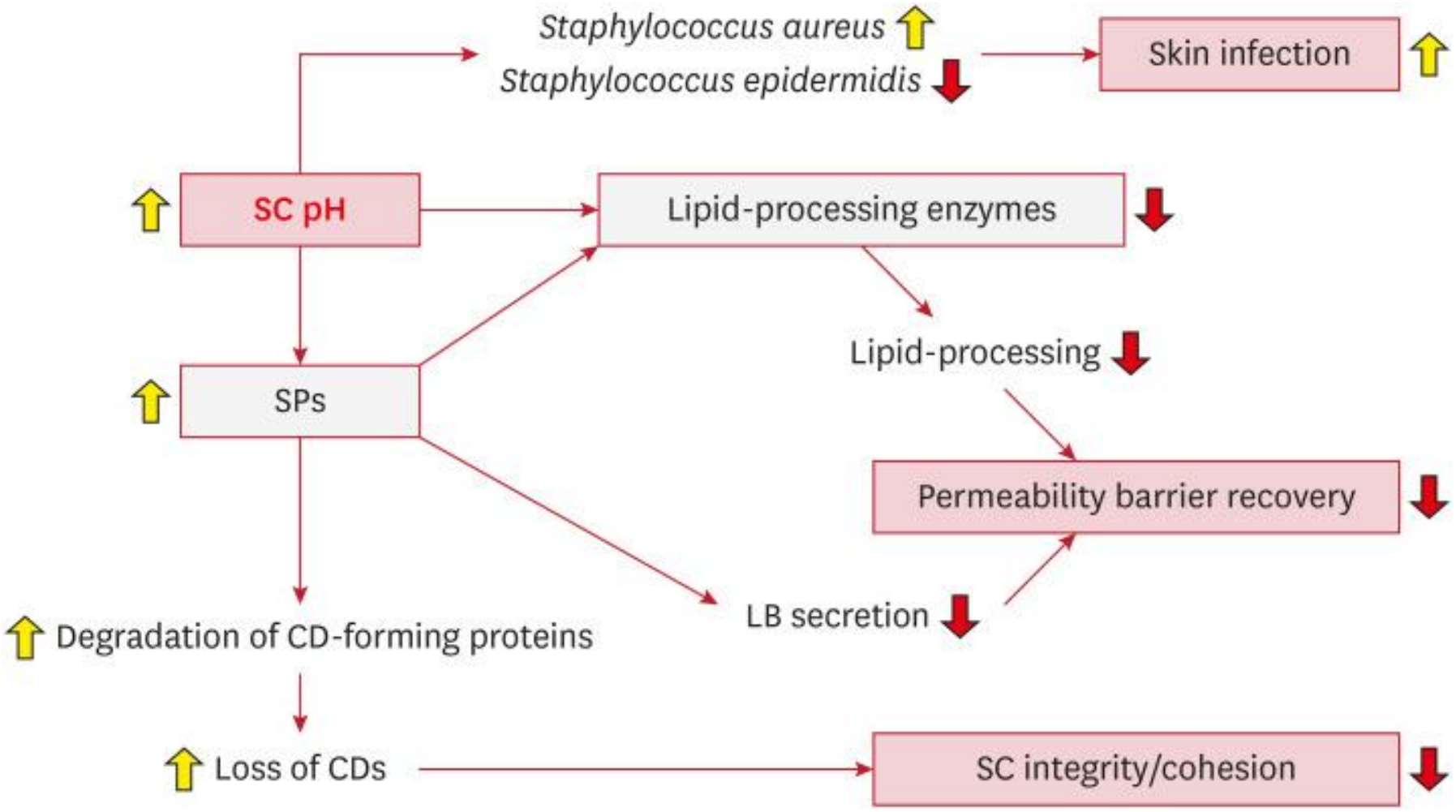


Under acidic conditions of SC, ceramide generating enzymes are activated.



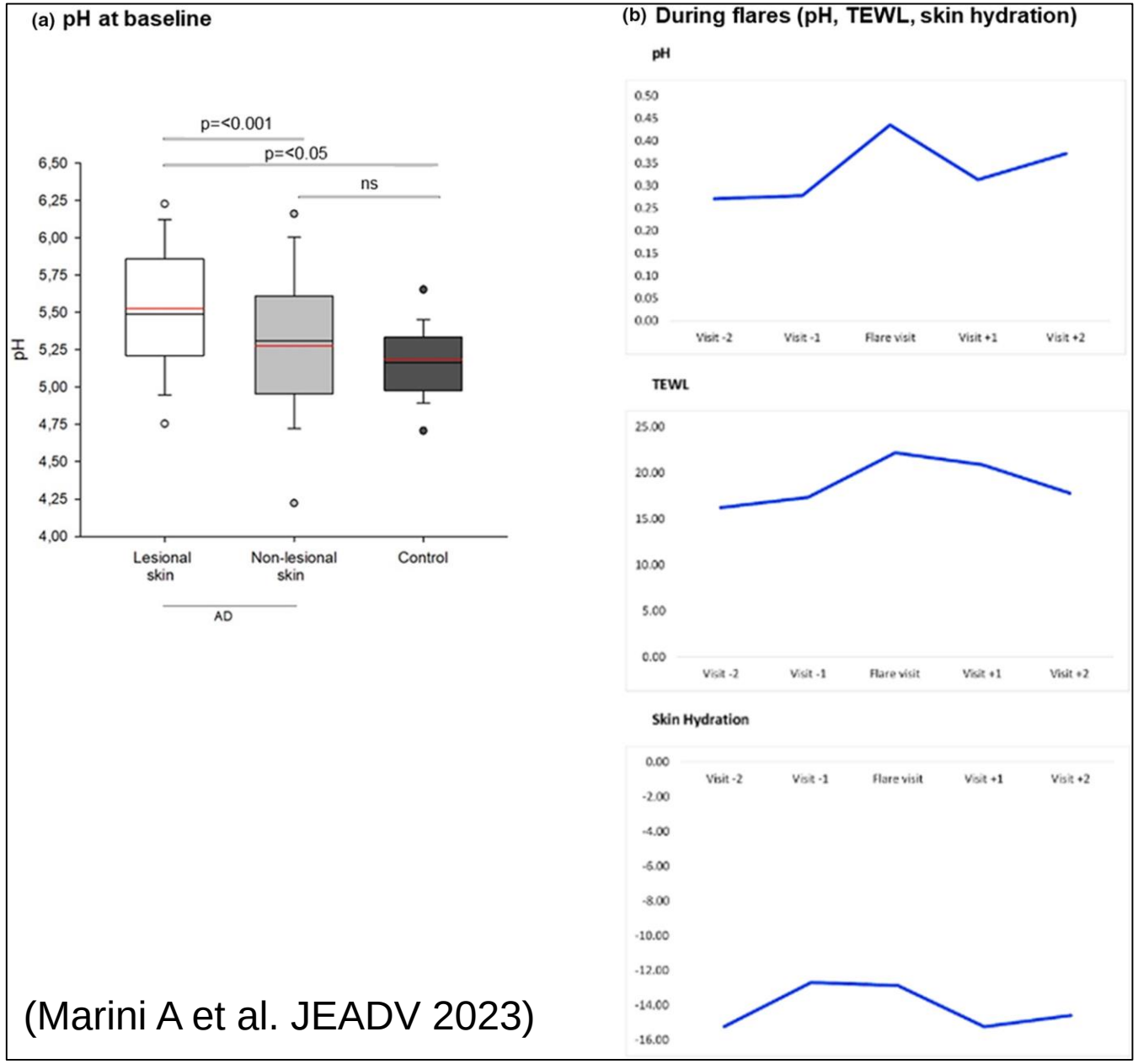
(Holleran WM et al. J Lipid Res 1992; Jensen JM et al. J Clin Invest 1999)

Functional consequences of an elevated pH of the SC in AD skin



(Choi EH & Kang H. Ann Dermatol 2023)

Increased skin pH & TEWL serve as predictor for AD flares.



(Marini A et al. JEADV 2023)

- Increase in pH and TEWL occurs *before* the onset of AD flares
- Targeted emollients for balancing skin pH and reducing TEWL may have potential in prevention of AD flares.

Acidic water bathing is an effective treatment for severe AD.

We assessed the impact of bathing in artificial acid water on patients with AD.

Bathing in acidic water

Bath-tub, warm water (40℃), pH 3 with citric acid

1. Bathing for 40 min twice a day for 2 days

2. After bathing, application of enough moisturizer

VS

Wet wrap dressing

A well-established and effective therapy for severe AD

"No clinical differences or differences in skin barrier function were observed between two group."

(Lee NR et al. Ann Dermatol 2016)

pH-modified moisturizer is better for AD.

A randomized half-body, double blind, controlled trial on the effects of a pH-modified moisturizer vs. standard moisturizer in mild to moderate atopic dermatitis.

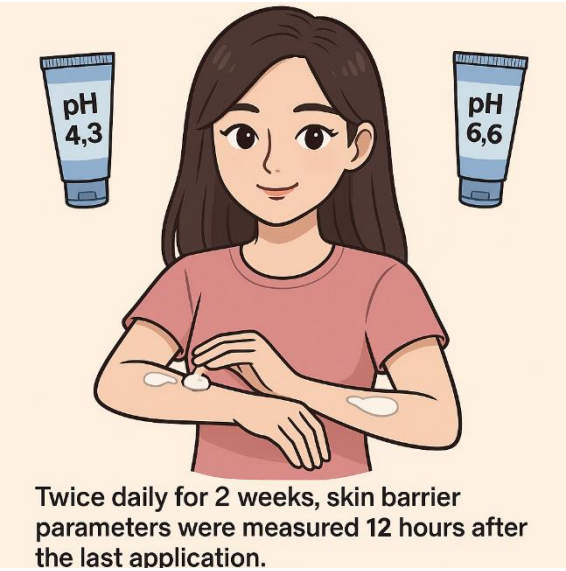
F : M = 30 : 6

pH 4.5 vs **pH 7.32**

- A pH-modified moisturizer and a standard moisturizer were applied to half body for 6 weeks.
- Reduction in pH was observed with both moisturizers, while TEWL significantly improved with the pH-modified moisturizer.
- pH-modified moisturizer resulted in greater pH, TEWL and SCORAD improvements however the differences were not significant from standard moisturizer.
- Moisturization is beneficial for AD; use of physiologically compatible pH moisturizer is promising.

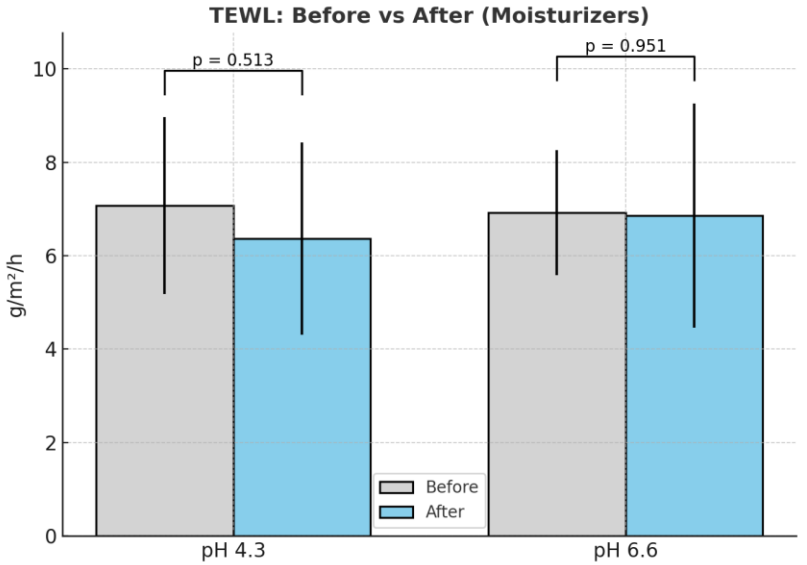
(Goh SW et al. An Bras Dermatol 2020)

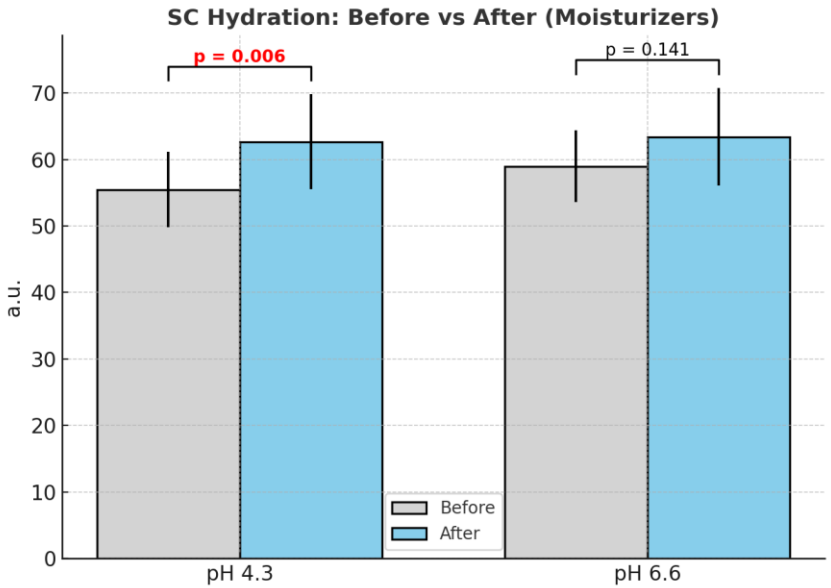
Acidic Moisturizers: Superior in Maintaining Skin Barrier Parameters

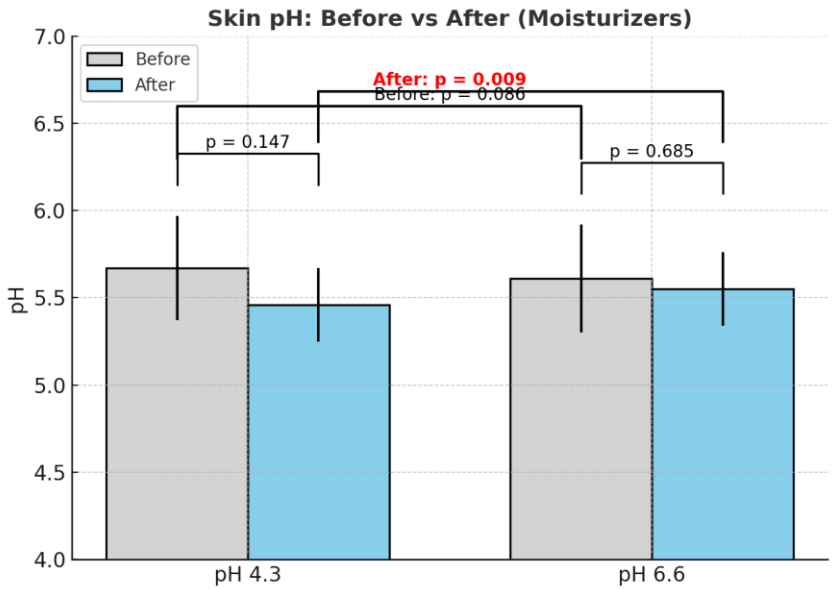


Participants
F:M = 9:1
Ages: 27 ~ 42 year old

Showered on the morning of the assessment day.







(Unpublished)

Skin barrier issues in atopic dermatitis

1. Prediction of the onset of AD through research on the skin barrier
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3. **Prevention of the progression of the atopic march**
4. Prevention of AD onset by maintaining skin barrier function through the use of moisturizer

Acidic environment on the SC inhibits atopic march

Ox-AD mice
NC/Nga mice
Flaky tail mice

Atopic march models

Prolonged Skin barrier damage

pH↑

TSLP↑
PAR-2 ↑

AD Skin
Th2 cytokines↑, IgE↑
Tissue eosinophils↑
Filaggrin, Involucrin, Loricrin↓

HDM allergen

Skin & Respiratory tissue

Eosinophil↑
TSLP↑
PAR-2 ↑

Respiratory allergy (Asthma)

Maintenance of acidic skin environment

Prolonged Skin barrier damage

pH↓

TSLP ↓
PAR-2 ↓

AD Skin ↓
Th2 cytokines ↓, IgE ↓
Tissue eosinophils ↓
Filaggrin, Involucrin, Loricrin ↓

HDM allergen

Skin & Respiratory tissue

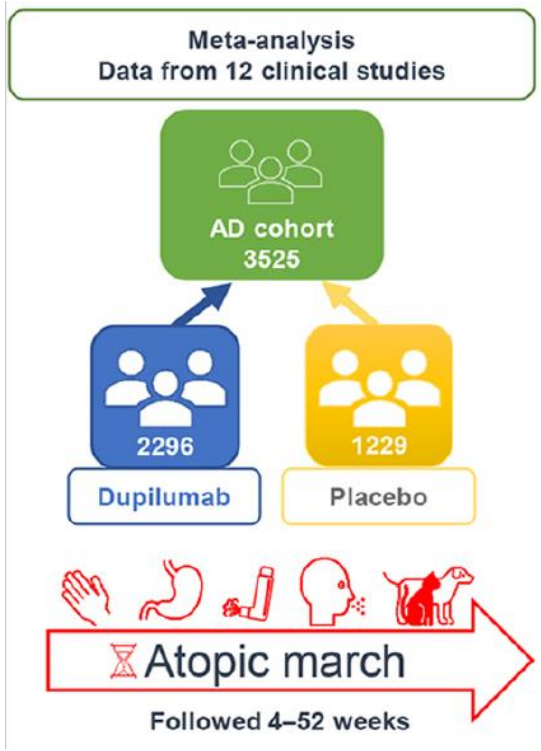
Eosinophil ↓
TSLP ↓
PAR-2 ↓

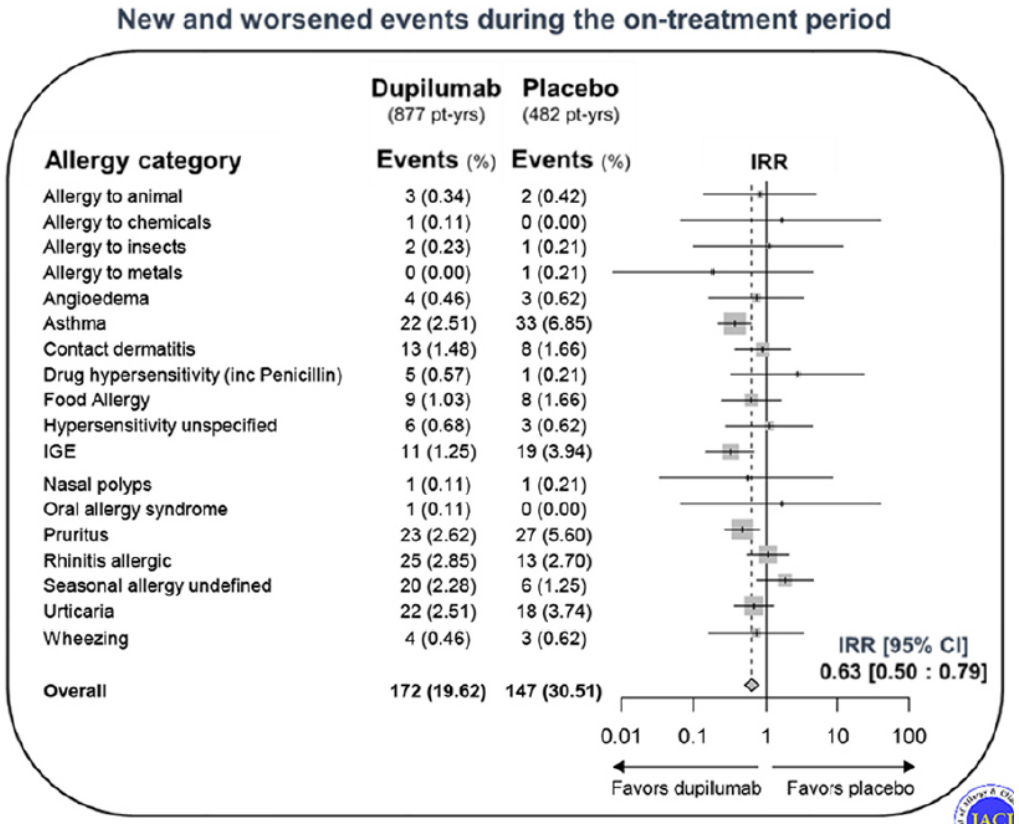
Respiratory allergy (Asthma) ↓

(Lee HJ et al. Exp Dermatol 2014, 2017, J Invest Dermatol 2015)

Meta-analysis showed that dupilumab attenuates atopic march

- Dupilumab reduced the **risk of new/worsening allergies by 34%** (IRR 0.66; 95% CI, 0.52–0.84), and **new allergies by 37%** (IRR 0.63; 95% CI, 0.48–0.83) versus placebo.
- Including IgE category shift, the incidence rate ratio (IRR) for **combined new/worsening allergies was reduced by 54%** (IRR 0.46; 95% CI, 0.36–0.57).





(Geba et al. JACI 2022)

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Daily emollient during infancy did not prevent AD in high-risk children.

Daily emollient during infancy for prevention of eczema: the BEEP randomised controlled trial

Background: Skin barrier dysfunction precedes eczema development. We tested whether daily use of emollient in the first year could prevent eczema in high-risk children.

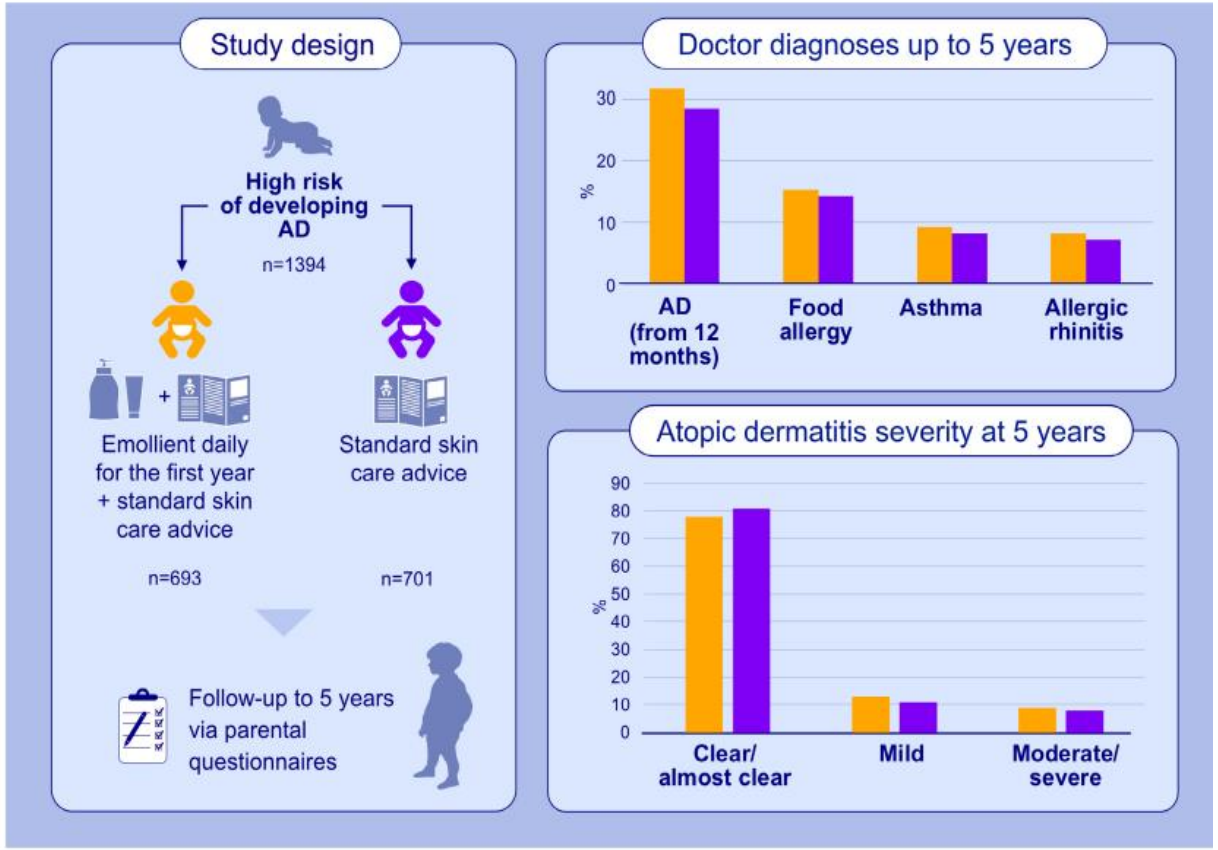
Methods: We did a multicentre, pragmatic, parallel-group, randomised controlled trial in 12 hospitals and four primary care sites across the UK. Families were approached via antenatal or postnatal services for recruitment of term infants (at least 37 weeks' gestation) at high risk of developing eczema (ie, at least one first-degree relative with parent-reported eczema, allergic rhinitis, or asthma, diagnosed by a doctor). Term newborns with a family history of atopic disease were randomly assigned (1:1) to application of emollient daily (either Diprobase cream or DoubleBase gel) for the first year plus standard skin-care advice (emollient group) or standard skin-care advice only (control group). The randomisation schedule was created using computer-generated code (stratified by recruiting centre and number of first-degree relatives with atopic disease) and participants were assigned to groups using an internet-based randomisation system. The primary outcome was eczema at age 2 years (defined by UK working party criteria) with analysis as randomised regardless of adherence to allocation for participants with outcome data collected, and adjusting for stratification variables. This trial is registered with ISRCTN, ISRCTN21528841. Data collection for long-term follow-up is ongoing, but the trial is closed to recruitment.

Findings: 1394 newborns were randomly assigned to study groups between Nov 19, 2014, and Nov 18, 2016; 693 were assigned to the emollient group and 701 to the control group. Adherence in the emollient group was 88% (466 of 532) at 3 months, 82% (427 of 519) at 6 months, and 74% (375 of 506) at 12 months in those with complete questionnaire data. At age 2 years, eczema was present in 139 (23%) of 598 infants with outcome data collected in the emollient group and 150 (25%) of 612 infants in the control group (adjusted relative risk 0·95 [95% CI 0·78 to 1·16], p=0·61; adjusted risk difference -1·2% [-5·9 to 3·6]). Other eczema definitions supported the results of the primary analysis. Mean number of skin infections per child in year 1 was 0·23 (SD 0·68) in the emollient group versus 0·15 (0·46) in the control group; adjusted incidence rate ratio 1·55 (95% CI 1·15 to 2·09).

Interpretation: We found no evidence that daily emollient during the first year of life prevents eczema in high-risk children and some evidence to suggest an increased risk of skin infections. Our study shows that families with eczema, asthma, or allergic rhinitis should not use daily emollients to try and prevent eczema in their newborn.

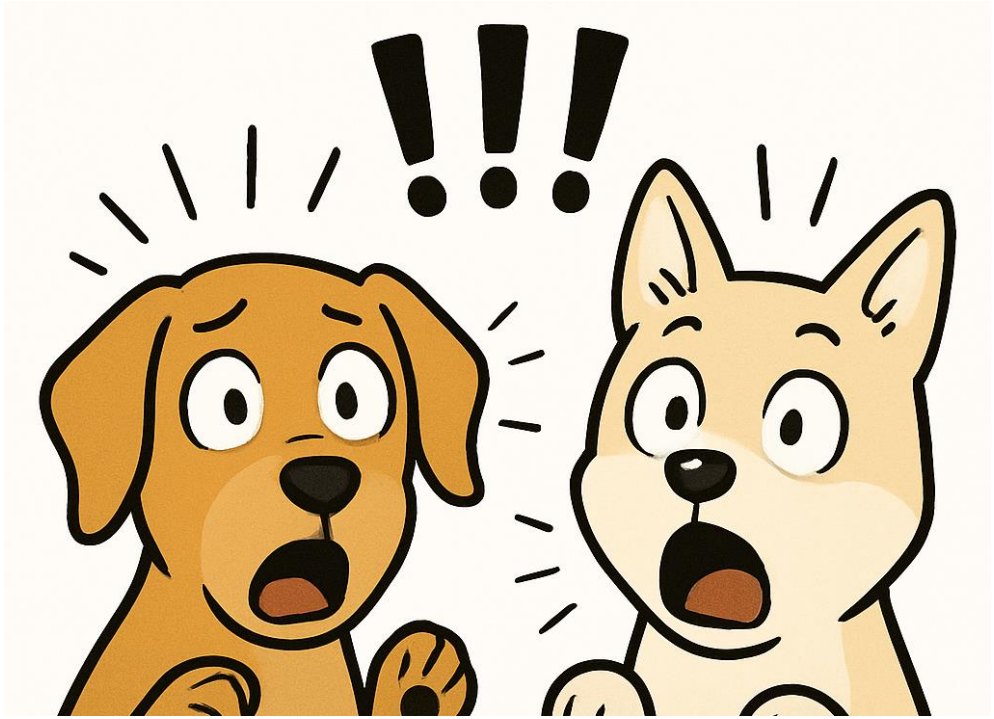
(Chalmers JR et al. Lancet 2020)

Emollients for prevention of atopic dermatitis: 5-year findings from the BEEP randomized trial



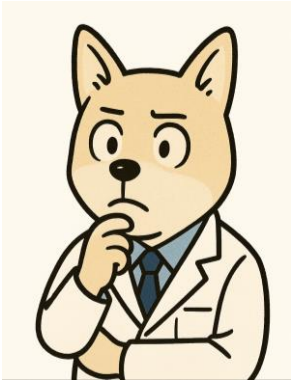
Daily emollient application during the first year of life **does not prevent** atopic dermatitis, food allergy, asthma or hay fever

(Bradshaw LE et al. Allergy 2023)



“For several years, I have been advising patients in my clinic and speaking to expectant mothers in public lectures to diligently apply moisturizers from infancy as a preventive measure against the development of AD.”

Possible reasons behind this result ?



The emollients provided in this study were two types.

Diprobase cream (%w/w)
White soft paraffin 15%
Liquid paraffin 6%
Macrogol cetostearyl ether
Chlorocresol
Cetostearyl alcohol
Phosphoric acid
Sodium dihydrogen phosphate
Sodium hydroxide
Purified water

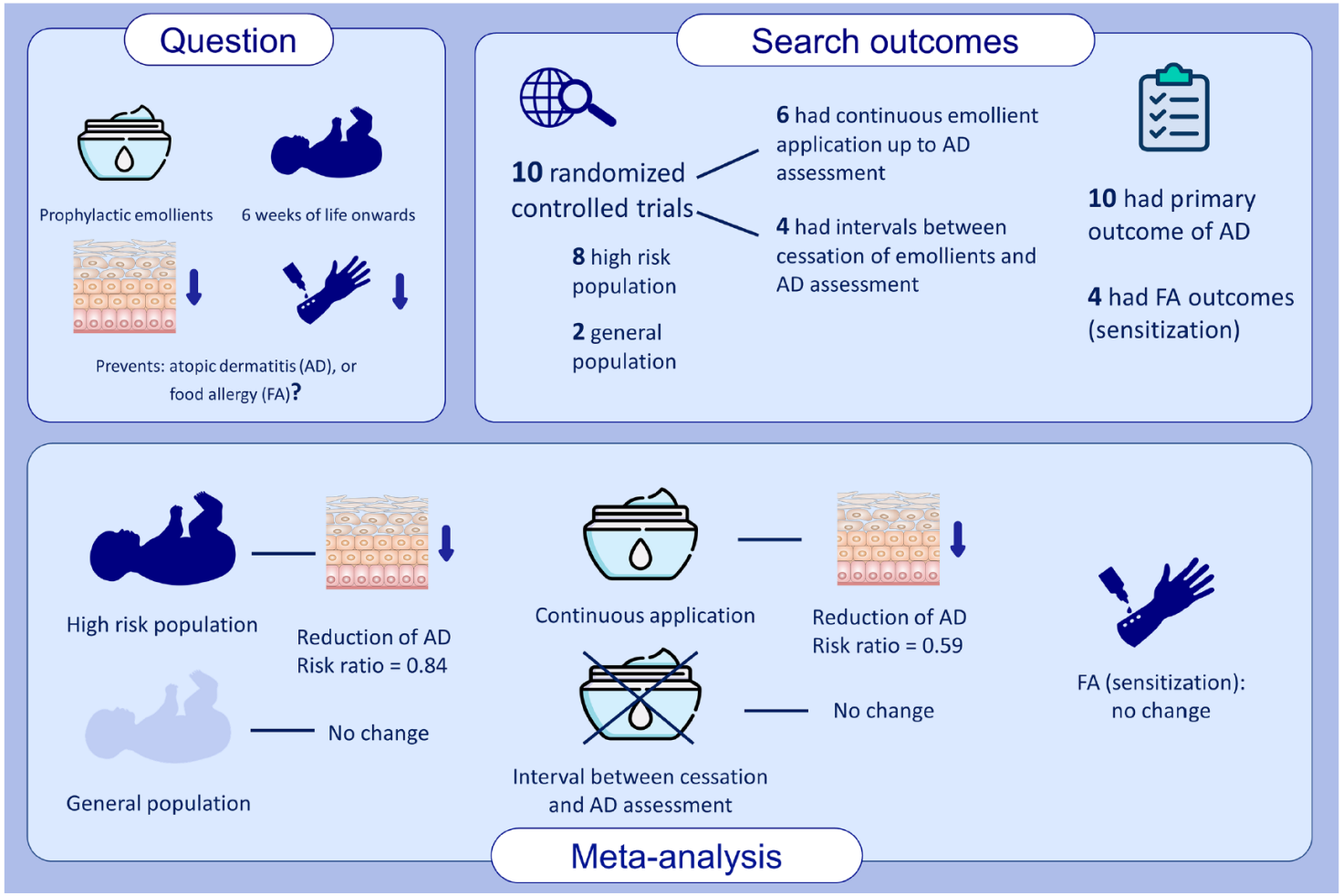
pH 4.92

Doublebase gel (%w/w)
Isopropyl myristate 15%
Liquid paraffin 15%
Glycerol
Carbomer
Sorbitan laurate
Triethanoloamine
Phenoxyethanol
Purified water

pH 7.13

Neither of them contains ceramides.

A meta-analysis: Emollients in infancy prevents AD



Patient or population: prevention of atopic dermatitis in infants
Intervention: prophylactic emollients
Comparison: standard skin care

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)
Development of atopic dermatitis (AD)	3505 (10 RCTs)	⊕⊕◯◯ LOW[a,b]	**RR 0.84** (0.64 to 1.10)
Development of atopic dermatitis in high risk subjects (AD high risk)	2059 (8 RCTs)	⊕⊕⊕◯ MODERATE[a]	**RR 0.75** (0.62 to 0.91)
Development of food sensitisation (Sensitisation)	1455 (5 RCTs)	⊕⊕⊕◯ MODERATE[a]	**RR 0.85** (0.65 to 1.11)

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations
a. There was low adherence in intervention groups, and a significant rate of contamination (where control groups used emollients in a way that mirrored the intervention group) in many of the studies
b. 2 studies out of 10 showed possible increase in atopic dermatitis in intervention groups

“Use of emollients in high-risk infants can prevent the occurrence of AD.”

(Zhong Y et al. Allergy 2022)

Classification of moisturizers based on their pH

pH & Buffer Capacity of Topical Formulations

Suitable pH : 3.5 ~ 5.5

Suitable to a limited extend : 5.6 ~ 6.5

Unsuitable pH : over 6.6

Grey circles = Buffer capacity
(Large diameter = Higher buffer capacity)

(Wohlrab J & Gebert A, 2018)

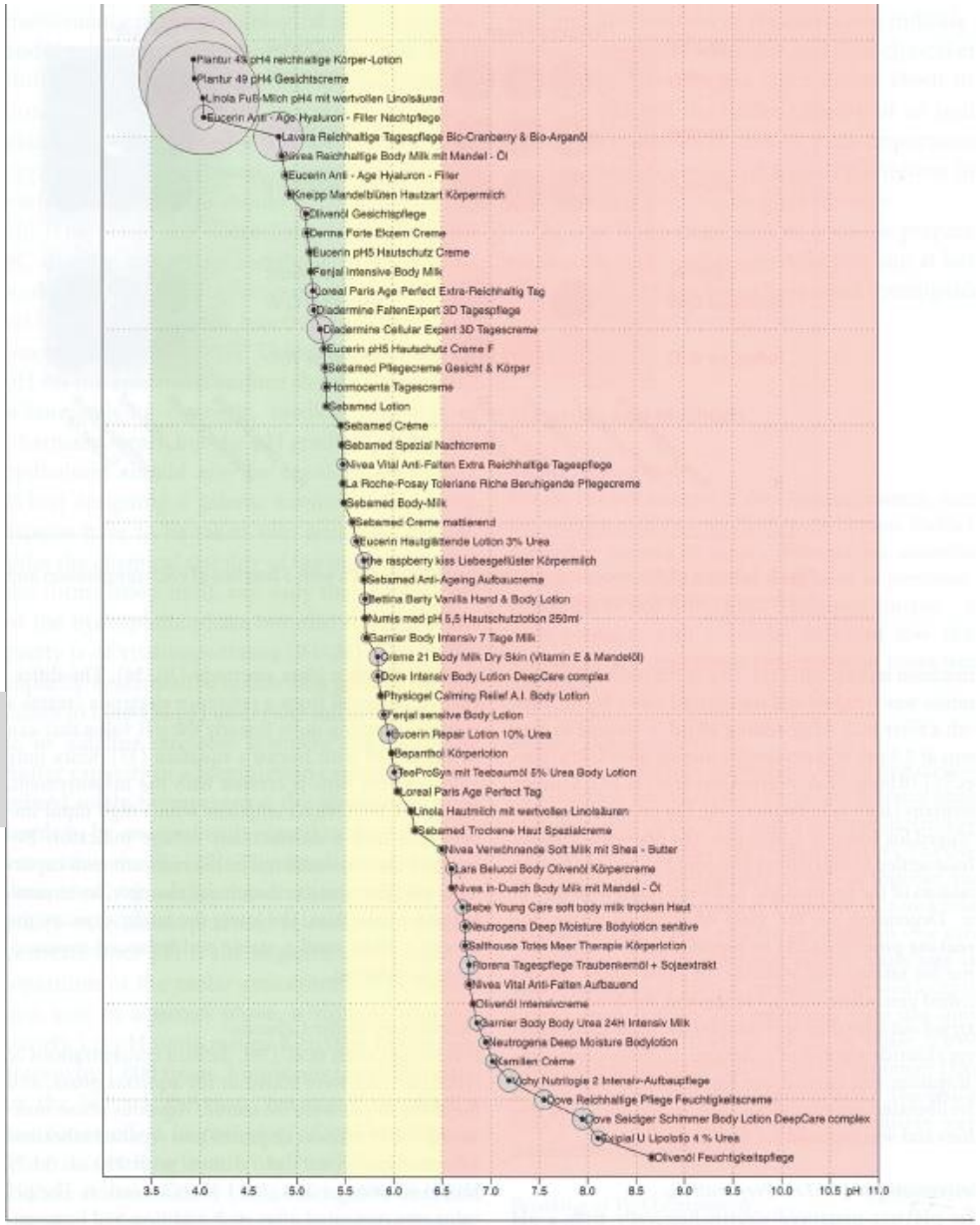


Fig. 2. Ranking of the tested preparations: Green = suitable pH, Yellow = suitable to a limited extend, Red = unsuitable pH, Grey circles = buffer capacity (a larger diameter corresponds with a higher buffer capacity).

Clinical studies for the prevention of AD in infants

No	Authors	Nations	Years	Name Moisturizer	pH	pH < 5.5	Contents	Results	Numbers	Appl. Duration	HR/OR/RR
1	Kataoka et al	Japan	2010	Unspecified	-	-		No effect	Con 35, Tx 36	Birth ~ 6 mo	
2	Horimukai et al	Japan	2014	2e Douhet emulsion	6.14	X		Positive	Con 59, Tx 59	Birth 1 wk ~ 32 wk	HR 0.48 RR 0.6786
3	Simpson et al	UK/USA	2011	Sunflower seed oil	7.38	X		Positive	Con 53 Tx 55 Oil 13 Cream+Gel 37 Ointment 5	Birth 3 wk ~ 6 mo	RR 0.50
				Double base gel	7.13	X					
				Cetaphil cream	4.71	O					
				Aquaphor ointment	6.82	X					
4	Lowe et al	Australia	2018	Epiceram	5.0	O	Ceramide	Positive	Con 39, Tx 41	Birth 3 wk ~ 6 mo	RR 0.32
5	Bellemere et al	Europe	2019	Balm-French brand	-	-		Positive	Con 60, Tx 120	Birth 2 wk ~ 6 mo	RR 0.54
6	Yonezawa et al	Japan	2018	Pigeon baby milk lotion	4.89	O		No effect	Con 106, Tx 96	Birth 1 wk ~ 12 wk	
				Atopita milky lotion	6.87	X					
7	Dissanayake et al	Japan	2019	Lokobase Repair Cream	4.0	O	Ceramide	No effect	Con 117, Tx 120	Birth ~ 6 mo	RR 1.1080
8	Dissanayake et al	Japan	2019	Lokobase Repair Cream	4.0	O	Ceramide	No effect	Con 117, Tx 113	Birth ~ 6 mo	RR 1.0825
9	McClanahan et al	USA	2019	Cetaphil Restoraderm moisturizer	5.94	X	Psedo-ceramide	Positive	Con 46, Tx 54	Birth 3 wk ~ 24 mo	RR 0.6085
10	Skjerven et al	Sweden/ Norway	2020	Bath oil with liquid paraffin (Ceridal cream)	-	-		No effect	Con 596, Tx 575	Birth 2 wk ~ 8 mo	
11	Chalmers et al	UK	2020	Double base gel	7.13	X		No effect	Con 612, Tx 598	Birth 3 wk ~ 12 mo	aRR 0.95
				Diprobase cream	4.92	O					
12	Thitthiwong et al	Thailand	2020	Cold cream	4.35	O		Positive	Con 27, Tx 25	Birth 10 wk ~ 9 mo	RR 0.1197
13	Techasatian et al	Thailand	2021	Ezerra lotion	5.5	O		Positive	Con 72, Tx 74	Birth 3 wk ~ 6 mo	0.39
				Eucerin Omega Plus Extra Soothing lotion	5.0	O					
				Eucerin Omega Soothing lotion	5.0	O					
				Physiogel AI restoring lipid balm	4.84	O					
				Lyl hydrating moisturizer	-	-					
14	Ng et al	Singapore	2021	Cetaphil Restoraderm moisturizer	5.94	X	Psedo-ceramide	No effect	Con 100, Tx 100	Birth within 3 wk ~ 6 mo	RR 0.39
15	Simpson et al	USA	2025	CeraVe Healing Ointment	pH 4.5 – 6.5	O	Ceramides	Positive	Con 625, Tx 603	Birth 0 - 9 wk	RR 0.84
				Petrolatum	pH 7	X					
				Cetaphil Cream	4.71	O					
				CeraVe Cream	4.27	O	Ceramides				
				Vanicream	3.73	O	Ceramides				
16	Chaoimh et al	Ireland	2022	AVEENO® Dermexa Fast & Long Lasting Balm	-	-	Ceramides	Positive	Con 136, Tx 117	Birth ~ 8 wk	RR 0.71
17	Kottner et al.	Germany	2016	HiPP Babysanft Pflegemilch	4.7-5.3	O		No effect	Con 80, Tx 70	Birth 2 wk ~ 12 mo	OR 1.00

CASCADE Trial : Moisturizer had a preventive effect on the development of AD.

JAMA Dermatology

"Both high-risk and low-risk groups were included."

RCT: Emollients to Prevent Pediatric Eczema

CASCADE Trial

POPULATION

674 Males, 553 Females

Infants aged 0-9 wk, no eczema/ immunodeficiency, born >25 wk gestation, guardian speaks English/Spanish

Mean age, 23.9 d

INTERVENTION

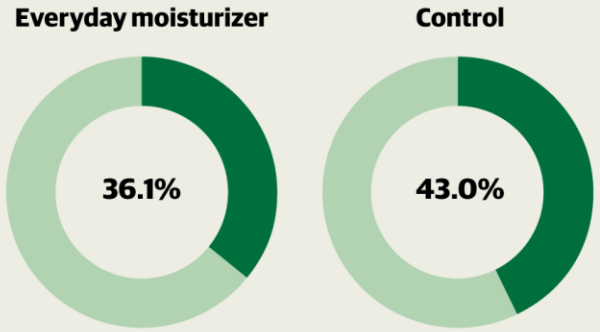
1247 Parent-infant dyads

603 Everyday moisturizer
Applied 1 of 5 approved moisturizers daily, followed current general skincare guidelines

625 Control
Avoided daily moisturizer use, followed current general skincare guidelines

FINDINGS

Starting daily emollients before 9 wk reduces AD incidence by 24 mo in a general US infant population and may help lower AD burden through routine pediatric skin care



SETTINGS / LOCATIONS

25 Primary care clinics in the US

PRIMARY OUTCOME

Physician-diagnosed atopic dermatitis (AD) recorded in the patient's medical record by 24 mo of age

Diagnosis of AD

Everyday moisturizer: 36.1%
Control: 43.0%

Simpson EL, Michaels LC, Ramsey KL, et al. Emollients to prevent pediatric eczema: a randomized clinical trial. *JAMA Dermatol.* Published online July 23, 2025. doi:10.1001/jamadermatol.2025.2357

(Simpson EL et al. JAMA Dermatology 2025)

Moisturizers used in clinical trial and their corresponding pH values

CASCADE Trial

Product	Main Composition Highlights	pH Range	Select (%)
CeraVe Healing Ointment (L′Oréal)	Petrolatum + **Ceramides** NP, AP, EOP + Hyaluronic acid	pH 4.5 – 6.5	13
Petrolatum (Unilever)	Pure petrolatum	pH 7	23
Cetaphil Cream (Galderma)	Petrolatum + humectants + oils + pH adjusters	4.71	11
CeraVe Cream (L′Oréal)	**Ceramides** + glycerin + petrolatum + buffers	4.27	45
Vanicream (Vanicream)	**Ceramides** + squalane + neutralizers	3.73	8

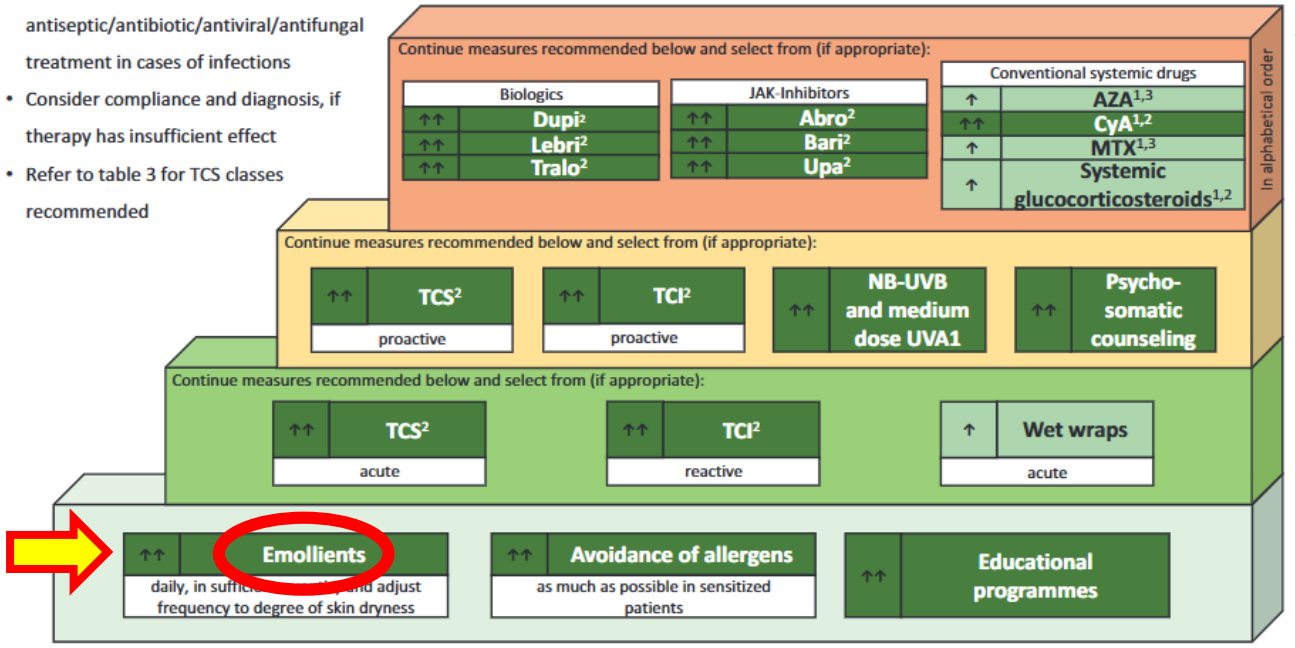
(Simpson EL et al. JAMA Dermatology 2025)

Contents

Moisturizer is still maintained as a baseline treatment.

Updated guideline for AD treatment in Europe

- Add antiseptic/antibiotic/antiviral/antifungal treatment in cases of infections
- Consider compliance and diagnosis, if therapy has insufficient effect
- Refer to table 3 for TCS classes recommended



(Wollenberg A et al. JEADV 2025)

Treatment guidelines of AD in Korea (2024)

	Mild AD	Moderate AD	Severe AD
Basic therapies	Moisturizer, cleansing and bathing, avoidance of allergens, educational program		
Topical therapies	• Topical corticosteroids (acute and proactive) • Topical calcineurin inhibitors (reactive and proactive) • Wet wrap therapy (acute)		
Systemic therapies		• Conventional systemic drugs: cyclosporine, methotrexate, azathioprine, mycophenolate mofetil, alitretinoin, corticosteroids (short-term) • Biologics : dupilumab, tralokinumab, lebrikizumab *	• JAK inhibitors : baricitinib, upadacitinib, abrocitinib *
		• Phototherapy	
Other therapies	• Antibiotics (infected state) • Antihistamine • Antifungals (head and neck dermatitis) • Allergen-specific immunotherapy	• Probiotics and prebiotics • Evening primrose oil • Vitamin D	

* ↔

Moisturizers are included in the WHO's essential medicines list.

AD Essential Medicines included in the WHO 2025 Lists!

The International Society of Atopic Dermatitis (ISAD) and the World Health Organization (WHO) have successfully included urea- and glycerol-based moisturizing creams on the Essential Medicines Lists (EML and EMLc) for treating atopic dermatitis!

In real-world, only 24% of patients use moisturizers consistently.

Table 3. AD-related treatments received in the past 12 months, overall and across subgroups by disease severity

AD Treatment	All patients (n=1,163)‡	Disease severity by EASI			
		Mild (n=548)§	Moderate (n=488)§	Severe (n=127)§	Moderate-to-severe (n=615)§
Medical					
Systemic					
Any of systemic immunosuppressant (cyclosporin, azathioprine, mycophenolate, methotrexate, and other ST)	603 (51.9)	233 (42.5)	283 (58.0)*	87 (68.5)*,†	370 (60.2)*
Cyclosporin	531 (45.7)	197 (35.9)	255 (52.3)*	79 (62.2)*,†	334 (54.3)*
Systemic corticosteroid	471 (40.5)	195 (35.6)	216 (44.3)*	60 (47.2)*	276 (44.9)*
Dupilumab	51 (4.4)	8 (1.5)	26 (5.3)*	17 (13.4)*,†	43 (7.0)*
Methotrexate	30 (2.6)	12 (2.2)	13 (2.7)	5 (3.9)	18 (2.9)
Azathioprine	3 (0.3)	0 (0.0)	1 (0.2)	2 (1.6)*	3 (0.5)
Mycophenolate	3 (0.3)	1 (0.2)	2 (0.4)	0 (0.0)	2 (0.3)
Other ST	114 (9.8)	57 (10.4)	45 (9.2)	12 (9.5)	57 (9.3)
Antibiotic	187 (16.1)	82 (15.0)	77 (15.8)	28 (22.1)	105 (17.1)
Antihistamine	1,018 (87.5)	468 (85.4)	438 (89.8)*	112 (88.2)	550 (89.4)*
Topical					
TCS	863 (74.2)	402 (73.4)	359 (73.6)	102 (80.3)	461 (75.0)
TCI	569 (48.9)	230 (42.0)	269 (55.1)*	70 (55.1)*	339 (55.1)*
PDE-4 inhibitors	2 (0.2)	0 (0.0)	1 (0.2)	1 (0.8)	2 (0.3)
Other topical (e.g. antibiotic, antihistamine)	124 (10.7)	52 (9.5)	60 (12.3)	12 (9.5)	72 (11.7)
Adjuvant					
Immunotherapy	70 (6.0)	24 (4.4)	36 (7.4)*	10 (7.9)	46 (7.5)*
Phototherapy (UV treatment)	42 (3.6)	12 (2.2)	21 (4.3)	9 (7.1)*	30 (4.9)*
Non-medical					
Comprehensive					
Emollients	259 (22.3)	112 (20.4)	118 (24.2)	29 (22.8)	147 (23.9)
Soap/cleanser for AD	84 (7.2)	45 (8.2)	31 (6.4)	8 (6.3)	39 (6.3)

Assessment of Disease Severity and Quality of Life in Patients with Atopic Dermatitis from South Korea

Sang Wook Son*, Ji Hyun Lee[1,*], Jiyoung Ahn[2], Sung Eun Chang[3], Eung Ho Choi[4], Tae Young Han[5], Yong Hyun Jang[6], Hye One Kim[7], Moon-Bum Kim[8], You Chan Kim[9], Hyun Chang Ko[10], Joo Yeon Ko[11], Sang Eun Lee[12], Yang Won Lee[13], Bark-Lynn Lew[14], Chan Ho Na[15], Chang Ook Park[16], Chun Wook Park[7], Kui Young Park[17], Kun Park[18], Young Lip Park[19], Joo Young Roh[20,†], Young-Joon Seo[21], Min Kyung Shin[22], Sujin Lee[23], Sang Hyun Cho[24]

(Son SW et al. Ann Dermatol 2022)

Conclusion

Skin barrier researches are still important in the era of targeted therapy for atopic dermatitis.

Even in the era of biologics, the skin barrier management remains fundamental - its relevance is greater than ever.

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Thank you for your attention