

Apogee

CLINICAL IMMERSION

Diagnosis & Assessment
of Atopic Dermatitis

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Health**[®]

Breathing Science is Life.[™]

Atopic Dermatitis (AD) / Eczema

- Chronic inflammatory skin disease
- Relapsing and remitting
- Most common skin condition in young kids
 - 13% of children, 7% of adults in the US
- 50% diagnosed within the first year of life
- 90% by age 5
- (Can present at any age!)



Natural history of AD

Children



- 9.8% - 16.5%
- Onset typically before 5 years

Adults



- Usually improves over time

- 7.3%
- New onset can occur

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Ann Allergy Asthma Immunol 2021 Apr;126(4):417-428.

JACI. 2009 Dec;124(6):1251-1258.

J Invest Dermatol. 2019 Mar;139(3):583-590.

Complicating features

Ocular problems

- Atopic keratoconjunctivitis
- Keratoconus
- Anterior subcapsular cataracts



Hand dermatitis



Infections

- Molluscum contagiosum
- Herpes simplex virus (HSV)



- *Staphylococcus aureus*



Quality of life & comorbidities

- Itch ¹
- Skin pain ¹
- Sleep loss ¹
- Cigarette smoking ⁵
- Alcohol use ⁶
- Allergic conditions (food allergy, asthma)

- Bleeding
- Guilt

Lifestyle impacts ¹

Isolation

Stress

Bullying

Anxiety ²

Depression ²

Suicidal ideation ²

Dementia ³

Self esteem

Infections ⁴

It's more than skin deep



¹Ann Allergy Asthma Immunol 2018; 121: pp. 340-347.

²J Am Acad Dermatol 2018; 79: pp. 448-456.e430.

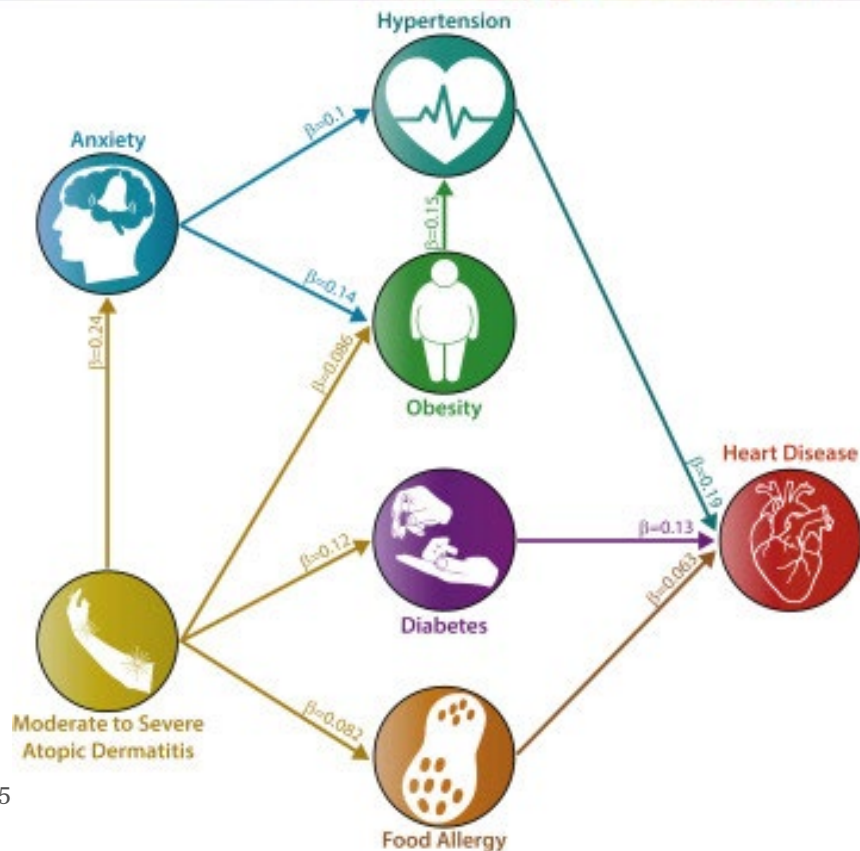
³Ann Allergy Asthma Immunol. 2021 Aug;127(2):200-205

⁴J Allergy Clin Immunol 2014; 133: pp. 1041-1047.

⁵J Am Acad Dermatol 2016; 75: pp. 1119-1125.

⁶J Allergy Clin Immunol 2015; 135: pp. 721-728.

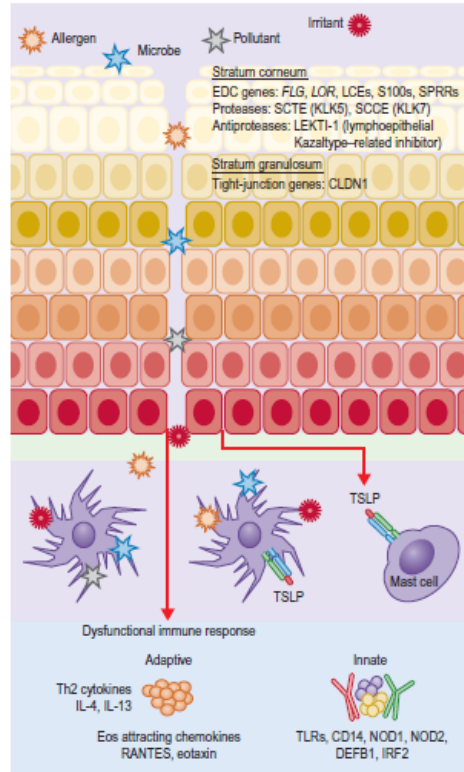
J Allergy Clin Immunol 2015; 135: pp. 721-728.



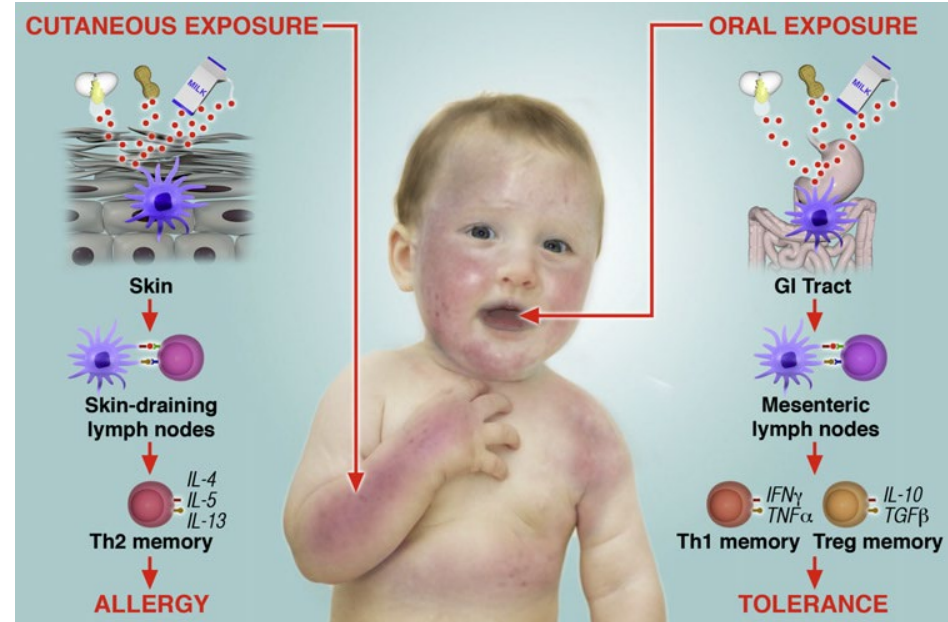
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Impaired skin epithelium

- Allows entry of allergens and irritants from the environment
- Type 2 inflammation is activated, leading to increased “allergic” cytokines (IL-4, IL-5, IL-13)



Sugita et al. Outside-in hypothesis revisited. *Ann Allergy Asthma Immunol.* 2020 Nov;125(5):517-527.



Boguniewicz M, Leung DY. Atopic Dermatitis. *Middleton's 9th Edition.*

BOX 33.1 Clinical Features of Atopic Dermatitis

Major Features

Pruritus

Facial and extensor involvement in infants and children

Flexural lichenification in older children and adults

Chronic or relapsing dermatitis

Personal or family history of atopic disease

Minor Features

Xerosis

Cutaneous infections

Nonspecific dermatitis of hands or feet

Ichthyosis, palmar hyperlinearity, keratosis pilaris

Pityriasis alba

Nipple eczema

White dermatographism and delayed blanch response

Anterior subcapsular cataracts

Elevated serum IgE levels

Positive immediate-type allergy skin tests



Box 1. Features to be considered in the diagnosis of patients with atopic dermatitis

ESSENTIAL FEATURES—Must be present:

- Pruritus
- Eczema (acute, subacute, chronic)
 - Typical morphology and age-specific patterns*
 - Chronic or relapsing history

**Patterns include:*

1. Facial, neck, and extensor involvement in infants and children
2. Current or previous flexural lesions in any age group
3. Sparing of the groin and axillary regions

IMPORTANT FEATURES—Seen in most cases, adding support to the diagnosis:

- Early age of onset
- Atopy
 - Personal and/or family history
 - Immunoglobulin E reactivity
- Xerosis

ASSOCIATED FEATURES—These clinical associations help to suggest the diagnosis of atopic dermatitis but are too nonspecific to be used for defining or detecting atopic dermatitis for research and epidemiologic studies:

- Atypical vascular responses (eg, facial pallor, white dermographism, delayed blanch response)
- Keratosis pilaris/pityriasis alba/hyperlinear palms/ichthyosis
- Ocular/periorbital changes
- Other regional findings (eg, perioral changes/periauricular lesions)
- Perifollicular accentuation/lichenification/prurigo lesions

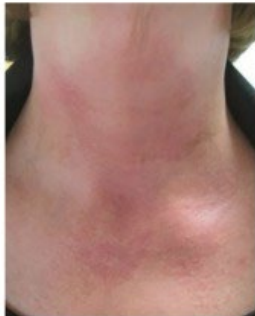
EXCLUSIONARY CONDITIONS—It should be noted that a diagnosis of atopic dermatitis depends on excluding conditions, such as:

- Scabies
- Seborrheic dermatitis
- Contact dermatitis (irritant or allergic)
- Ichthyoses
- Cutaneous T-cell lymphoma
- Psoriasis
- Photosensitivity dermatoses
- Immune deficiency diseases
- Erythroderma of other causes

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Erythema



Papules/Spongiotic Vesicles



Excoriations



Erosions



Dyspigmentation



Lichenification



Scoring systems

- There is no biomarker to define AD or severity
- There are multiple scoring systems, each a bit different

Validated Investigator Global Assessment scale for AD (vIGA-AD)

- Erythema
- Induration/papulation
- Lichenification
- Oozing/crusting

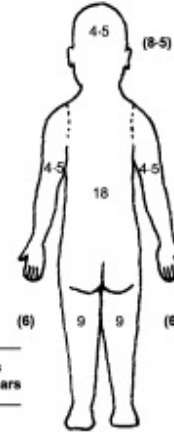
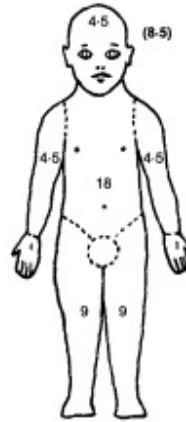
Score	Morphological Description
0 – Clear	No inflammatory signs of atopic dermatitis (no erythema, no induration/papulation, no lichenification, no oozing/crusting). Post-inflammatory hyperpigmentation and/or hypopigmentation may be present.
1 – Almost clear	Barely perceptible erythema, barely perceptible induration/papulation, and/or minimal lichenification. No oozing or crusting.
2 – Mild	Slight but definite erythema (pink), slight but definite induration/papulation, and/or slight but definite lichenification. No oozing or crusting.
3 – Moderate	Clearly perceptible erythema (dull red), clearly perceptible induration/papulation, and/or clearly perceptible lichenification. Oozing and crusting may be present.
4 – Severe	Marked erythema (deep or bright red), marked induration/papulation, and/or marked lichenification. Disease is widespread in extent. Oozing or crusting may be present.

Scoring AD (SCORAD)

SCORAD INDEX

EUROPEAN TASK FORCE ON ATOPIC DERMATITIS

Last Name First Name
 Date of Birth: DD/MM/YY
 Date of Visit:



Figures in parenthesis
for children under two years

A: EXTENT Please indicate the area involved

B: INTENSITY

C: SUBJECTIVE SYMPTOMS
PRURITUS + SLEEP LOSS

$$A/5 + 7B/2 + C$$

CRITERIA	INTENSITY
Erythema	
Oedema/Papulation	
Oozing/crust	
Excoriation	
Lichenification	
Dryness*	

* Dryness is evaluated
on uninvolved areas

MEANS OF CALCULATION

INTENSITY ITEMS
(average representative area)
 0 = absence
 1 = mild
 2 = moderate
 3 = severe

Visual analog scale
(average for the last
3 days or nights)

PRURITUS (0 to 10) 0 10
 SLEEP LOSS (0 to 10)

Eczema area and severity index (EASI)

Severity Score	Area Score							
Grade each sign on a scale: 0=clear/none 1=mild 2=moderate 3=severe	% Involvement	0	1-9%	10-29%	30-49%	50-69%	70-89%	90-100%
	Area Score	0	1	2	3	4	5	6

EASI Calculator (Adults)							
Body Region	Erythema (0-3)	Edema/Papulation (0-3)	Excoriation (0-3)	Lichenification (0-3)	Area Score (0-6)	Multiplier	Score
Head/Neck	(+)	(+)	(+)	()	x	x 0.1	
Trunk	(+)	(+)	(+)	()	x	x 0.3	
Upper Extremities	(+)	(+)	(+)	()	x	x 0.2	
Lower Extremities	(+)	(+)	(+)	()	x	x 0.4	
The final EASI score is the sum of the 4 region scores (0-72):							_____

EASI Calculator (Pediatrics < 8 years old)							
Body Region	Erythema (0-3)	Edema/Papulation (0-3)	Excoriation (0-3)	Lichenification (0-3)	Area Score (0-6)	Multiplier	Score
Head/Neck	(+)	(+)	(+)	()	x	x 0.2	
Trunk	(+)	(+)	(+)	()	x	x 0.3	
Upper Extremities	(+)	(+)	(+)	()	x	x 0.2	
Lower Extremities	(+)	(+)	(+)	()	x	x 0.3	
The final EASI score is the sum of the 4 region scores (0-72):							_____

EASI Score Interpretation					
Clear	Almost Clear	Mild	Moderate	Severe	Very Severe
0	0.1-1.0	1.1-7.0	7.1-21.0	21.1-50.0	50.1-72.0

Patient oriented eczema measure (POEM)

How is the scoring done?

Each of the seven questions carries equal weight and is scored from 0 to 4 as follows:

No days	= 0
1-2 days	= 1
3-4 days	= 2
5-6 days	= 3
Every day	= 4

What does a poem score mean?

To help patients and clinicians to understand their POEM scores, the following bandings have been established (see references below):

• 0 to 2	= Clear or almost clear
• 3 to 7	= Mild eczema
• 8 to 16	= Moderate eczema
• 17 to 24	= Severe eczema
• 25 to 28	= Very severe eczema

Patient-Oriented Eczema Measure (POEM) (Questionnaire for adults or children)

Patient details:	Date:
	Total POEM score: (maximum 28)

Please circle one response for each of the seven questions below. Young children should complete the questionnaire with the help of their parents. Please leave blank any questions you feel unable to answer.

1. Over the last week, on how many days has your/your child's skin been itchy because of the eczema?

No days 1-2 days 3-4 days 5-6 days Every day

2. Over the last week, on how many nights has your/your child's sleep been disturbed because of the eczema?

No days 1-2 days 3-4 days 5-6 days Every day

3. Over the last week, on how many days has your/your child's skin been bleeding because of the eczema?

No days 1-2 days 3-4 days 5-6 days Every day

4. Over the last week, on how many days has your/your child's skin been weeping or oozing clear fluid because of the eczema?

No days 1-2 days 3-4 days 5-6 days Every day

5. Over the last week, on how many days has your/your child's skin been cracked because of the eczema?

No days 1-2 days 3-4 days 5-6 days Every day

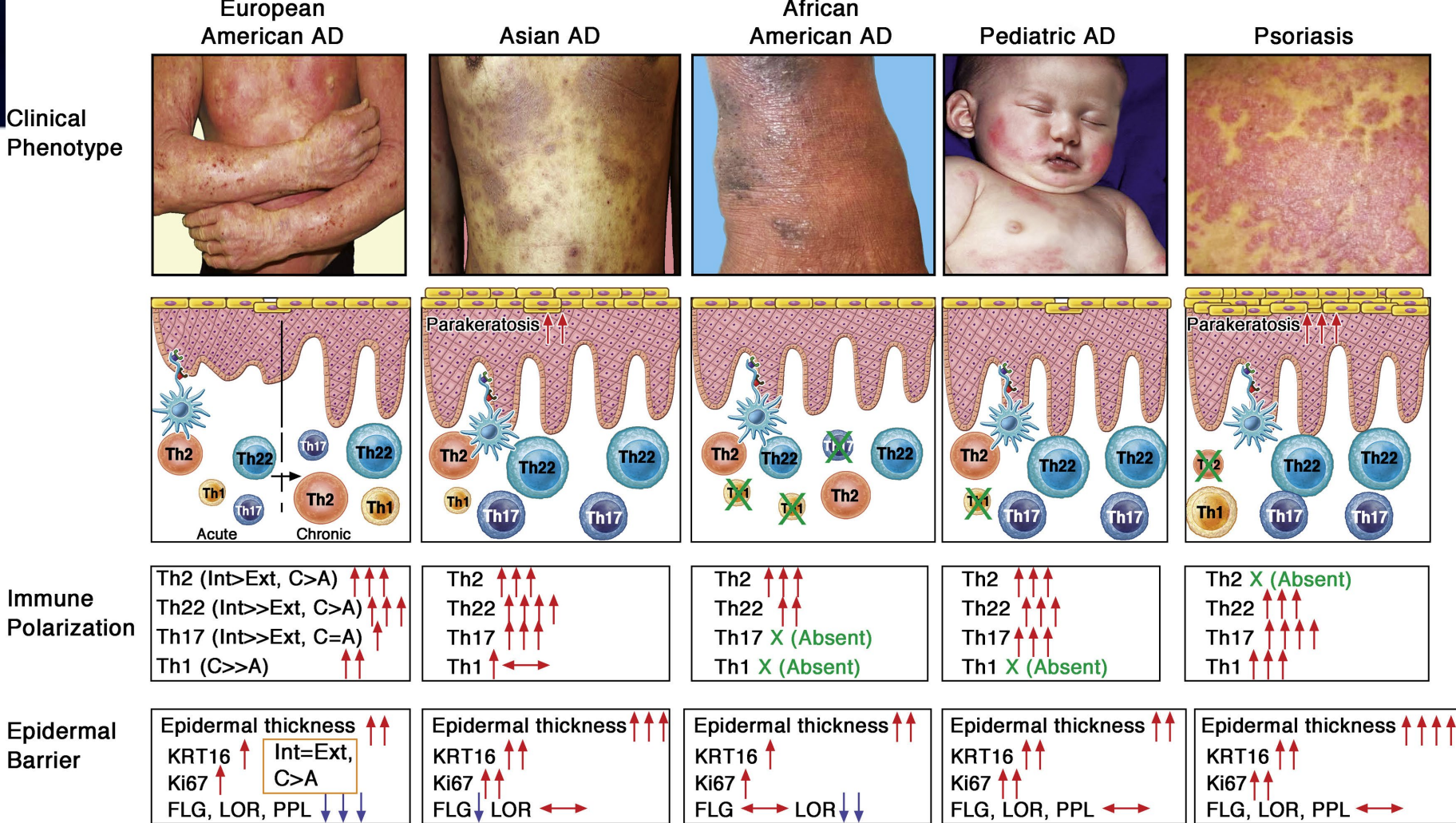
6. Over the last week, on how many days has your/your child's skin been flaking off because of the eczema?

No days 1-2 days 3-4 days 5-6 days Every day

7. Over the last week, on how many days has your/your child's skin felt dry or rough because of the eczema?

No days 1-2 days 3-4 days 5-6 days Every day

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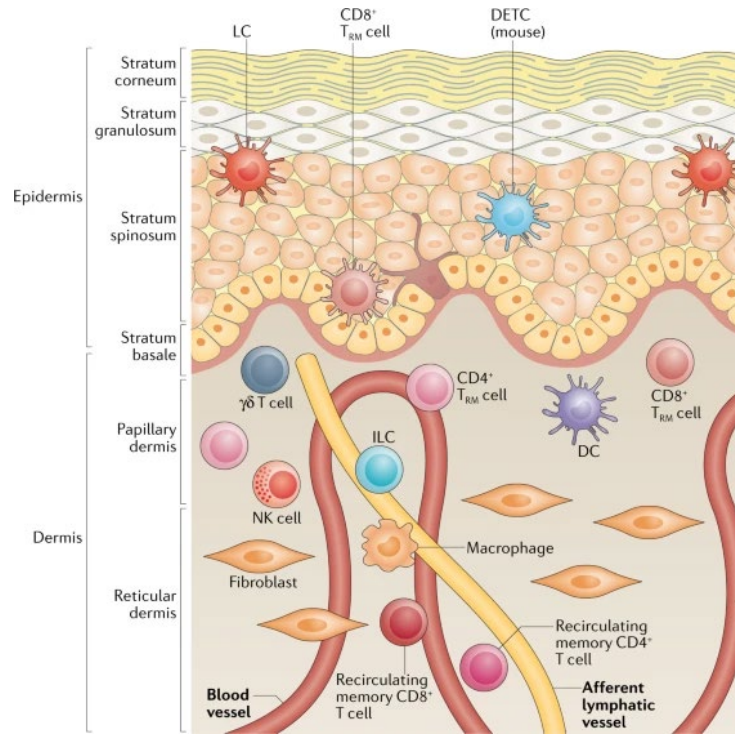
Regional differences in skin maturation

- Cheek is slow to mature

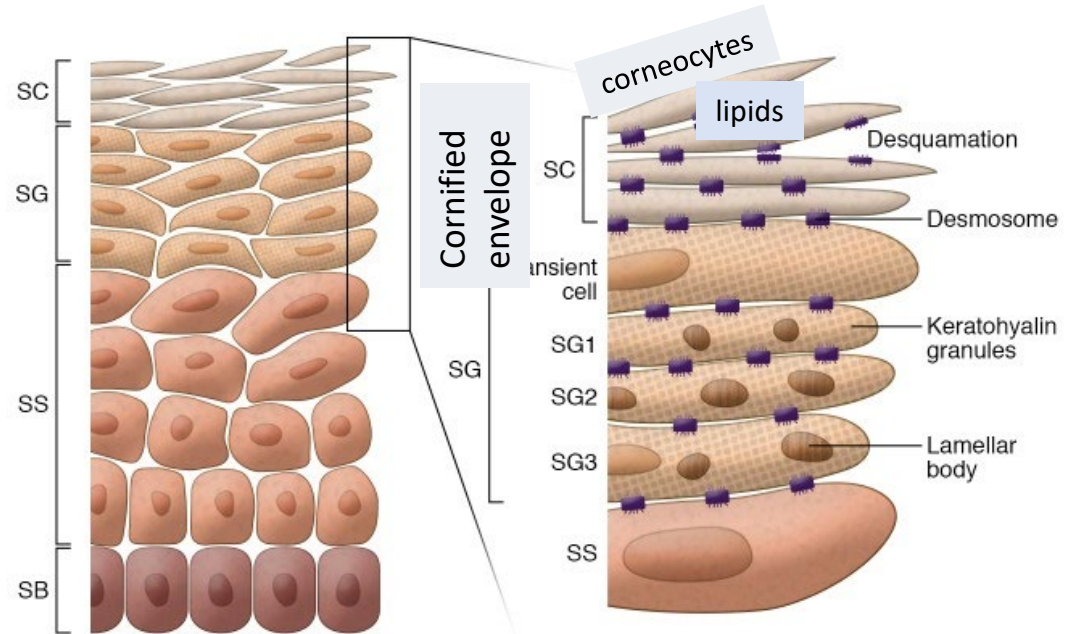
McAleer MA, Jakasa I, Raj N, O'Donnell CPF, Lane ME, Rawlings AV, Voegeli R, McLean WHI, Kezic S, Irvine AD. Early-life regional and temporal variation in filaggrin-derived natural moisturizing factor, filaggrin-processing enzyme activity, corneocyte phenotypes and plasmin activity: implications for atopic dermatitis. *Br J Dermatol.* 2018 Aug;179(2):431-441.



Healthy Skin



Structure of the Epidermis



Ho AW, Kupper TS. T cells and the skin: from protective immunity to inflammatory skin disorders. *Nat Rev Immunol.* 2019 Aug;19(8):490-502. .

Goleva E, Berdyshev E, Leung DY. Epithelial barrier repair and prevention of allergy. *J Clin Invest.* 2019 Apr 1;129(4):1463-1474.

•AD in Skin of Color

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Skin of color

- Brown, gray, purple
- Follicular, papular
- Prurigo nodules
- Lichenification
- Hyper and hypopigmentation



- Prurigo nodularis



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<https://eczemainskinofcolor.org/image-library/>

- Lichenification
- Hypopigmentation



<https://eczemainskinofcolor.org/image-library/>

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- Erythema is hard to appreciate

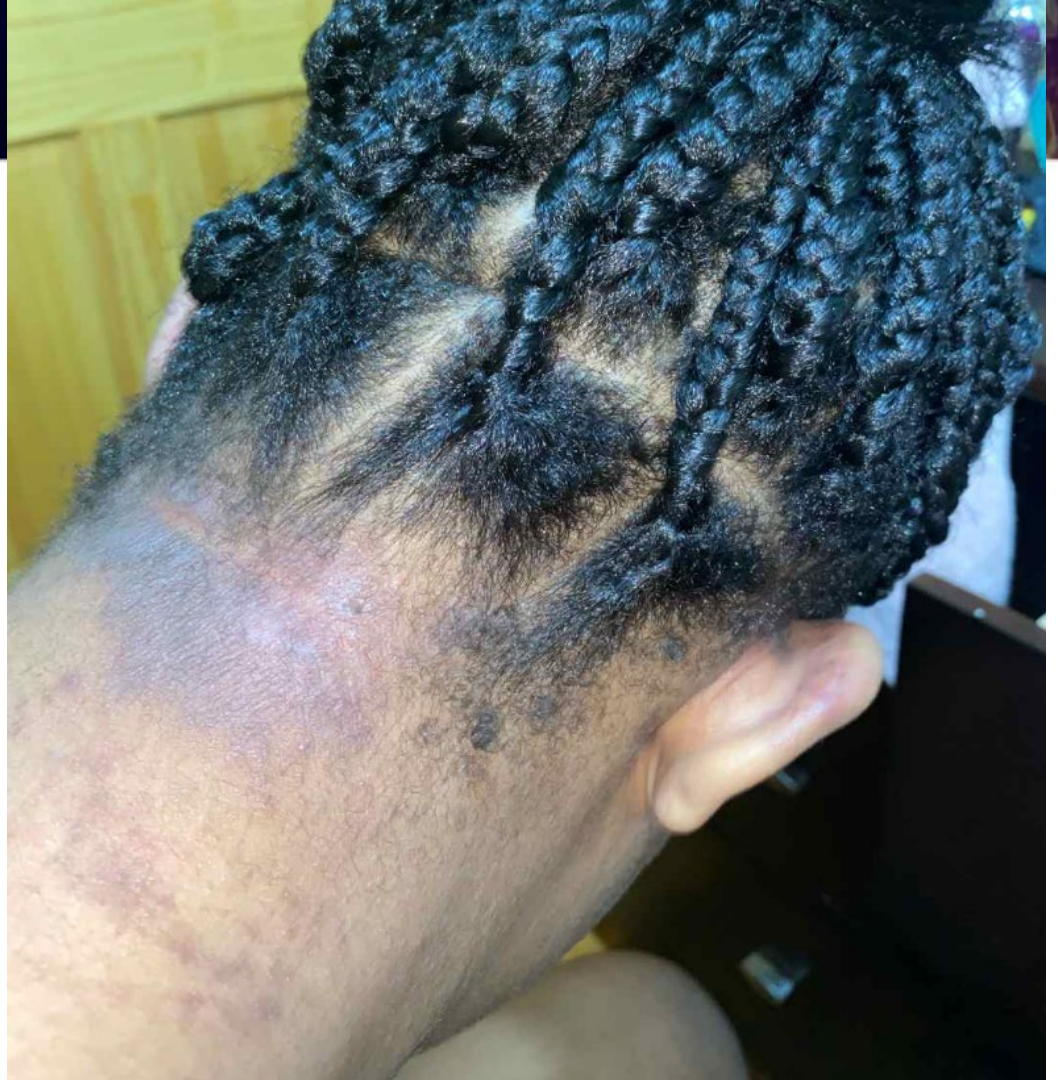


<https://eczemainskinofcolor.org/image-library/>

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Skin of color

- Lichenoid
- Silvery grey, purple



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Questions?

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