Dupilumab treatment significantly improves skin barrier function in adult and adolescent patients with moderate to severe atopic dermatitis

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Rationale: Atopic dermatitis (AD) is characterized by abnormal skin lipid and filaggrin (FLG) content. The role of dupilumab therapy in the regulation of skin barrier has not been fully evaluated.

Methods: Transepidermal water loss (TEWL), and skin tape strip (STS) samples were collected from AD lesions (n=26), and healthy controls (n=26) over a 16-week course of dupilumab treatment (age:12-63 years; BALISTAD study [NCT04447417]). Quantitative lipidomic and FLG breakdown product analysis of STS samples collected at days 1, 15, 29, 56, 85 and wk16 was performed by liquid chromatography tandem mass spectrometry.

Results: Mean TEWL in AD lesions were significantly reduced from day 1 (47.2 g/m² x h) to wk16 (23.6 g/m² x h) representing 52% reduction (p<0.0001). STS samples from AD lesions had reduced levels of FLG breakdown products (urocanic and pyroglutamic acids (UCA, PCA)) at baseline vs healthy controls (p<0.05). Significantly increased levels of non-hydroxy fatty acid sphingosine ceramides (NS-CER) and decreased levels of esterified omega-hydroxy fatty acid sphingosine ceramides (EOS-CER) were found in AD lesions at baseline vs healthy controls (p<0.05). With dupilumab treatment, significant increases in UCA and PCA were found in AD skin (p<0.05). Additionally, a significant decrease in NS-CER and increase in EOS-CER were found in AD (p<0.05), resulting in normalization of NS-CER/EOS CER ratio following treatment. Partial changes for these parameters were already observed after 2-weeks, with a maximal response achieved after 8 weeks of dupilumab treatment.

Conclusions: Dupilumab treatment significantly improves TEWL, lipid composition, and FLG in AD lesions, providing normalization of epidermal barrier function.

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Disclosures: