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**ABSTRACTS**

from

**12<sup>th</sup> Georg Rajka  
International Symposium on  
Atopic Dermatitis**

**October 17–19, 2022**

**Montréal, Québec, Canada**

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**Abstracts from**  
**12<sup>th</sup> Georg Rajka International Symposium on**  
**Atopic Dermatitis**  
**Montréal, Québec, Canada**  
**October 17–19, 2022**

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## Welcome Address from ISAD 2022 Co-Chairs

Dear Colleagues and Friends,

Welcome to Montréal! Whether you are joining us in-person or virtually, we invite you to embrace, engage, and enjoy the latest emerging science, technology, and expertise that has been developed by our colleagues and that we are proud to showcase for the 12th Georg Rajka International Symposium on Atopic Dermatitis.

After two years of limited meetings face-to-face, we are excited to see you! We look forward to engaging and networking again with our Colleagues – in-person in Montréal or virtually via the conference virtual platform. This year, we are focusing on *Back to our Future... AD in childhood: successes and challenges*.

ISAD was created in 1979 with the primary focus to reunite health care providers, researchers and dedicated associations to expand and disseminate knowledge about the pathogenesis, the treatment of AD and to promote the holistic and personalized care of all patients suffering from it. We hope you enjoy the Scientific Program which has been designed to showcase a global progress using novel methods to understand, assess and manage AD with a patient-focused approach.

We also hope that you will be able to take time to visit our cosmopolitan city, and stunning surrounding regions that are bursting with magnificent fall colors. You will not be disappointed with an autumn weekend in the Laurentians or Charlevoix. We are honored to be hosting you in this uniquely beautiful part of Canada and know you will want to return.

Welcome to Montréal for the 12<sup>th</sup> Georg Rajka International Symposium on Atopic Dermatitis.

On behalf of the Local Organizing Committee

*Danielle MARCOUX, MD*

*ISAD 2022 General Chair*

*Sainte-Justine University Medical Center and University of Montréal, Québec*

*Michele RAMIEN, MD*

*ISAD 2022 General Chair*

*University of Calgary, Calgary, Alberta*

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**Monday, October 17, 2022**

Time (EDT)	Program	Speaker
<b>Opening Welcome</b>		
13:00–13:30 (UTC 17:00–17:30)	Welcome Address	Danielle Marcoux, Michele Ramien
	ISAD Board Welcome	Alain Taieb
<b>Session 1</b> <b>13:30–14:30</b> <b>(UTC 17:30–18:30)</b>	<b>Keynote: Atopic Dermatitis in Children</b>	<b>Moderators: Danielle Marcoux, Michele Ramien</b>
	Milestones in the history of atopic dermatitis (IL.1)	Daniel Wallach
13:30	Today and in Canada (IL.2)	Danielle Marcoux
	The future in pediatrics (IL.3)	Amy Paller
14:30–15:15 (UTC 18:30–19:15)	Refreshment break in the Exhibit Hall	
<b>Session 2</b> <b>15:15–16:50</b> <b>(UTC 19:15–20:50)</b>	<b>Outcome Measures, Primary Prevention &amp; Diagnosis</b>	<b>Moderators: Aaron Drucker, Amy Paller</b>
15:15	Introduction of session	
15:20	HOME update, prevention update and diagnostic conundrums (IL.4)	Eric Simpson
15:40	Emollients for atopic dermatitis prevention: 5-year results from the BEEP Randomised Trial (OL.1)	Hywell Williams
15:50	Remote severity assessment in atopic dermatitis: Validity and reliability of the remote EASI and SA-EASI (OL.2)	Aviël Ragamin
16:00	Atopic dermatitis: factors associated with age of onset in adulthood versus childhood (OL.3)	Laura Maintz
16:10	Validating the use of RECAP of atopic eczema (RECAP) instrument to measure eczema control of adult patients in an Asian clinical setting (OL.4)	Yik Weng Yew
16:20	Prevalence, clinical features, and risk factors of severity of atopic dermatitis in children with skin phototype VI in Senegal (OL.5)	Birame Seck
16:30	The Burden of Stigma in Pediatric Atopic Dermatitis: Measurement using the new, validated PROMIS Pediatric Stigma and Skin Module (OL.6)	Amy Paller
16:40	Summary and unmet needs	Aaron Drucker, Amy Paller, Eric Simpson
<b>17:15–17:45</b> <b>(UTC 21:15–21:45)</b>	<b>e-Poster Presentation 1 and Visit Exhibits</b>	
17:00–19:00 (UTC 21:00–23:00)	ISAD Board Meeting	
<b>18:00–20:00</b> <b>(UTC 22:00–00:00)</b>	<b>Welcome Reception in Exhibit Hall</b>	

**Tuesday, October 18, 2022**

Time (EDT)	Program	Speaker
07:45–09:00 (UTC 11:45–13:00)	Continental Breakfast	
<b>08:15–08:45</b> <b>(UTC 12:15–12:45)</b>	<b>e-Poster Presentation 2</b>	
<b>Session 3</b> <b>09:00–10:35</b> <b>(UTC 13:00–14:35)</b>	<b>Mechanisms of Disease &amp; Models</b>	<b>Moderators: Kirk Barber, Chih-ho Hong</b>
09:00	Introduction of session	
09:05	The exposome in atopic dermatitis (IL.5)	Carsten Flohr
09:25	Direct experimental evidence establishing staphylococcus aureus superantigens drive atopic march, from atopic dermatitis to asthma (OL.7)	Govindarajan Rajagopalan
09:35	Diagnosis and management of pediatric chronic hand eczema: The PEDRA CACHES Survey (OL.8)	Michael Haft
09:45	IgE-mediated autoimmunity in atopic dermatitis associates with atopic disorders and is influenced by environmental and lifestyle factors (OL.9)	Inge Kortekaas Krohn
09:55	Distinct IL-13 production and accumulation in lesional and non-lesional skin of atopic dermatitis patients (OL.10)	Gaurav Isola
10:05	Aero-allergen exposure in the house is associated with atopic dermatitis in children from urban, rural, and peri-urban areas of South Africa (OL.11)	Janine Dewar
10:15	Antimicrobial and anti-inflammatory effects of vernix caseosa on the epidermal barrier of atopic dermatitis models (OL.12)	Carolina Caballín
10:25	Summary and unmet needs	Kirk Barber, Carsten Flohr, Chih-ho Hong
10:35–11:05 (UTC 14:35–15:05)	Refreshment Break and Visit Exhibits	

<b>Session 4</b> 11:05–12:10 (UTC 15:05–16:10)	<b>The Canadian Experience (Outreach/Research)</b>	<b>Moderators: Rachel Asiniwasis, Robert Bissonnette</b>
11:05	Introductions of session	
11:10	Infant trajectories to atopic disease (IL.6)	Padmaja Subbarao
11:30	The McGill University Hospital Center for Adult Atopic Dermatitis: Patient-oriented research (IL.7)	Carolyn Jack
11:40	Development of "Living with Eczema", an educational animated video for children with moderate to severe atopic dermatitis aiming at reducing disease burden (OL.13)	Danielle Marcoux
11:50	Atopic Dermatitis in Canadian Indigenous Peoples: Results from a systematic scoping review on indigenous skin disease in North America (IL.8)	Rachel N. Asiniwasis
12:00	Summary and unmet needs	Rachel Asiniwasis, Robert Bissonnette, Padmaja Subbarao
12:10–13:50 (UTC 16:10–17:50)	Lunch and Visit Exhibits	
<b>13:00–13:30</b> (UTC 17:00–17:30)	<b>e-Poster Presentation 3</b>	
<b>Session 5</b> 13:50–15:05 (UTC 17:50–19:05)	<b>Itch and Pain / Therapeutic Patient Education</b>	<b>Moderators: Sunil Kalia, Natalie Cunningham</b>
13:50	Introduction of session	
13:55	Itch and pain: Unraveling the symptomatic burden of atopic dermatitis (IL.9)	Raj Chovatiya
14:15	Type 2 cytokines sensitize human sensory neurons to itch-associated stimuli (OL.14)	Madison Mack
14:25	Efficacy and sustainability of a four-hour structured compact patient education program for atopic dermatitis patients - A prospective monocentric trial (OL.15)	Teodora Pumnea
14:35	Results of two online randomised controlled trials of the Eczema Care Online intervention for parents/carers of children and young people with eczema (OL.16)	Kim Thomas
14:45	Functional somatosensory adaptation to acute stress is diminished in atopic dermatitis (OL.17)	Macarena Tejos-Bravo
14:55	Summary and unmet needs	Raj Chovatiya, Natalie Cunningham, Sunil Kalia
15:05–15:35 (UTC 19:05–19:35)	Refreshment break in the Exhibit Hall	
<b>Session 6</b> 15:35–16:30 (UTC 19:35–20:30)	<b>Quality of Life and Comorbidities</b>	<b>Moderators: Philippe Bégin, Marissa Joseph</b>
15:35	Introduction of session	
15:40	How might evolving therapies for atopic dermatitis change comorbidities and perspectives on quality-of-life impact and outcomes? (IL.10)	Lawrence Eichenfield
16:00	The impact of systemic treatment of atopic dermatitis on depressive symptoms: a prospective clinical cohort study (OL.18)	Lina Ivert
16:10	Patients' and caregivers' experiences with atopic dermatitis-related burden, medical care, and treatments in 8 countries (OL.19)	Korey Capozza
16:20	Summary and unmet needs	Phillippe Bégin, Lawrence Eichenfield, Marissa Joseph
<b>Session 7</b> 16:35–17:10 (UTC 20:35–21:10)	<b>Building Global Atopic Dermatitis Awareness</b>	<b>Moderator: Rachel Asiniwasis</b>
16:35	Introduction of session	
16:40	How to include atopic dermatitis and common chronic skin diseases within the WHO strategic framework for the integrated control and management of skin NTDs (IL.11)	Alain Taieb
17:00	Q&A discussion	Rachel Asiniwasis, Alain Taieb
<b>19:00–22:00</b> (UTC 23:00–02:00)	<b>Gala Dinner and Georg Rajka Award Ceremony</b> <b>Le Windsor Ballrooms (offsite)</b>	

## Wednesday, October 19, 2022

Time (EDT)	Program	Speaker
07:45–09:00 (UTC 11:45–13:00)	Continental Breakfast	
<b>08:15–08:45</b> (UTC 12:15–12:45)	<b>e-Poster Presentation 4</b>	
<b>Session 8</b> 09:00–10:35 (UTC 13:00–14:35)	<b>Technology and AD</b>	<b>Moderators: Joseph Lam, Miriam Weinstein</b>
09:00	Introduction of session	
09:05	Specific considerations when using teledermatology to diagnose and manage atopic dermatitis (IL.12)	Trevor Champagne

09:25	Recency bias in weekly POEM recording and its effects on POEM prediction (OL.20)	Ariane Duverdier
09:35	Fully automated assessment of atopic dermatitis severity from real-world digital images (OL.21)	Reiko Tanaka
09:45	Personalised predictions of atopic dermatitis severity dynamics and treatment recommendations using a Bayesian machine learning approach (OL.22)	Reiko Tanaka
09:55	Skin testing to determine atopic dermatitis risk: An observational birth cohort study (OL.23)	John Chittock
10:05	Feasibility of a digital therapeutic program for patients with atopic dermatitis: Analysis of engagement, retention and acceptability (OL.24)	Sigríður L. Guðmundsdótti
10:15	Assessing properties of eczema skin with spectroscopy (OL.25)	Sunil Kalia
10:25	Summary and unmet needs	Joseph Lam, Trevor Champagne, Miriam Weinstein

10:35–11:05 Refreshment break in the Exhibit Hall  
(UTC 14:35–15:05)

**Session 9 ISAD Fellow Research**  
11:05–11:40 **Moderators: Michele Ramien, Kenji Kabashima, Peter Schmid**  
(UTC 15:05–15:40)

11:05	Introduction of session	
11:10	Improvement of the global management of atopic dermatitis by tele dermatology in peripheral health centres in Togo (TeleAD) (OL.26)	Julienne Teclessou
11:20	Leaning on epidemiology and evidence-based medicine during the translational revolution (IL.13)	Aaron Drucker
11:30	Summary and unmet needs	Kenji Kabashima, Michele Ramien, Peter Schmid

**Session 10 Novel and Targeted Management of Atopic Dermatitis (part 1)**  
11:45–12:20 **Moderator: Melinda Gooderham, Johannes Ring**  
(UTC 15:45–16:20)

11:45	Introduction of session	
11:50	Therapeutic agents for atopic dermatitis in 2022 and beyond (IL.14)	Andreas Wollenberg
12:10	Dupilumab inhibits expression of fibronectin and fibrinogen, skin proteins that regulate staphylococcus aureus adhesion to atopic dermatitis skin (OL.36)	Elena Goleva

12:20–13:10 Lunch and Visit Exhibits  
(UTC 16:20–17:10)

**Session 10 Novel and Targeted Management of Atopic Dermatitis (part 2) & Closing Remarks**  
13:10–15:30 **Moderator: Melinda Gooderham, Johannes Ring**  
(UTC 17:10–19:30)

13:10	Introduction to part 2	
13:15	A randomised controlled trial protocol assessing the effectiveness, safety and cost-effectiveness of methotrexate versus ciclosporin in the treatment of severe atopic eczema in children: The TREATment of severe Atopic eczema Trial (TREAT) (OL.27)	Carsten Flohr
13:25	The effects of systemic immunomodulatory treatments on COVID-19 outcomes in patients with atopic dermatitis: results from the global SECURE-AD registry (OL.28)	Conor Broderick
13:35	Clinical and histopathological characterization of atypical lymphoid reactions in patients with atopic dermatitis treated with new advanced systemic therapies (OL.29)	Celeste Boesjes
13:45	The pathogenesis and course of ocular surface disease during dupilumab treatment in atopic dermatitis patients (OL.30)	Roselie Achten
13:55	Living network meta-analysis of systemic treatments for atopic dermatitis (OL.31)	Aaron Drucker
14:05	Patient-centered dupilumab dosing regimen leads to successful dose reduction in persistently controlled atopic dermatitis (OL.32)	Lotte Spekhorst
14:15	Recapture of response with tralokinumab every second week in patients with moderate to severe atopic dermatitis relapsing after a step down to every 4 week dosing (OL.33)	Eric Simpson
14:25	AMLITELIMAB reduces serum IL-13 in a Phase 2A clinical trial in atopic dermatitis without impacting T-cell expansion in a T-cell recall assay (OL.34)	Michael Cork
14:35	Efficacy and safety of CM310 in moderate-to-severe atopic dermatitis: Results form a multicenter, randomized, double-blind, placebo-controlled phase 2B trial in China (OL.35)	Jianzhong Zhang
14:45	Summary and unmet needs	Melinda Gooderham, Johannes Ring, Andreas Wollenberg

14:55–15:30 **CLOSING REMARKS**  
(UTC 18:55–19:30)

## INVITED LECTURE ABSTRACTS (IL)

**IL.1  
MILESTONES IN THE HISTORY OF ATOPIC  
DERMATITIS***Daniel Wallach  
Paris, France*

The term “atopic dermatitis” was first used in 1933, but clinical descriptions compatible with this condition have been known since antiquity. In this presentation, I will highlight some significant milestones of this fascinating history, including: Clinical report on an atopic Roman emperor; Hippocratic basis of the everlasting reluctance to treat; Classic descriptions of infantile itchy cephalic rashes and their various denominations; Diathetic prurigo, a forerunner of atopic dermatitis; Immunologic basis for the definition of atopy; and, To-day’s complexity of understanding and managing atopic dermatitis, due to its impressive heterogeneity.

**IL.2  
TODAY AND IN CANADA***Danielle Marcoux  
Division of Dermatology, Department of Pediatrics, University of Montreal and CHU Sainte-Justine University Hospital Center, Montreal, QC, Canada*

An overview of the successes and challenges faced in Canada in the past and today with regards to atopic dermatitis, particularly for pediatric patients, shows that therapeutic education has taken an essential place in treatment algorithms, that the various topical drugs are used more appropriately, that new targeted treatments remarkably improve not only eczema lesions and symptoms, but also the quality of life of children and their families and reduce the multidimensional burden associated with this disease particularly in moderate to severe cases. Furthermore, great clinical research teams have blossomed in many Canadian provinces and are intimately involved in various international atopic dermatitis clinical trials. On the other hand, parents’ beliefs are often tinged with erroneous information received on the Web, by relatives or friends and even by health professionals. Access to care, particularly for children from disadvantaged families living in urban or remote areas, particularly First Nations, is inadequate. Although Health Canada has granted the indication for atopic dermatitis to several new targeted therapies, access conditions are often difficult, particularly for a paediatric population. The acquisition of cultural competence by the caregiver will help ensure better adherence to treatments and promote greater success.

**IL.3  
THE FUTURE IN PEDIATRICS***Amy S. Paller  
Departments of Dermatology and Pediatrics, Northwestern University Feinberg School of Medicine, Chicago, IL, USA*

The past few years have witnessed an unprecedented expansion in our understanding of pediatric atopic dermatitis and the introduction of new, more targeted topical and systemic therapeutics. We have learned that tape stripping is a noninvasive way to collect materials from the outer epidermis and have leveraged this for understanding gene expression in pediatric AD and how barrier and immune markers differ across the ages. During the next few years, we will better understand barrier lipids, proteins, and metabolism through big data assessment using tape strips samples and, hopefully, other materials collected with minimal or no pain. While use of dupilumab has transformed our treatment of pediatric patients already, including with the recent FDA approval for 6 months to 5 years of age, we will see many new treatment modalities available for children. These likely will

include expansion of our repertoire of topical phosphodiesterase 4 and Janus kinase inhibitors, the first therapeutic aryl hydrocarbon modulating agent/TAMA (tapinarof), and use of topical commensals to reduce *S. aureus* and inflammation. Tralokinumab and lebrikizumab will be the next biologics available for children, but others are in trial that may modify disease course, the next frontier. Although safety is superb with our IL-4 receptor and IL-13 targeting agents and the lack of need for blood monitoring is a benefit, the continued requirement for painful injection demands research related to the development of new technologies for painless injection. Ultimately, the “wish list” for pediatric AD treatment will be a systemic agent with a great safety profile; the oral Janus kinase inhibitors meet the need for development of oral agents that effectively combat the inflammation of AD, but remain of concern until safety is guaranteed, which will take years. Future clinical trials require collection of data that accurately reflect the patient experience. On the horizon and already in use are new tools for collection of patient-reported outcomes and quantitative data, such as wearable sensor devices that can capture a range of quantitative data, including in young babies, related to itch, scratch, skin inflammation and barrier function. Through these new monitoring and therapeutic tools, early and effective intervention can be achieved, ideally reducing disease duration and the risk of development of the many comorbidities associated with AD in children and adolescents.

**IL.4  
HOME UPDATE, PREVENTION UPDATE AND  
DIAGNOSTIC CONUNDRUMS***Eric L. Simpson  
Department of Dermatology, Oregon Health & Science University, Portland, OR, USA*

Abstract summary not available at the time of printing

**IL.5  
THE EXPOSOME IN ATOPIC DERMATITIS***Carsten Flohr  
St John’s Institute of Dermatology, King’s College London and Guy’s & St Thomas’ Hospitals, London, UK*

Atopic dermatitis (AD) is a chronic inflammatory skin disorder affecting around 20% of children and 5% of adults worldwide, contributing to significant disease-related morbidity. The aetiopathogenesis of AD is underpinned by multiple factors, including genetic susceptibility, skin barrier defects, a skewed cutaneous immune response and microbiome perturbation in both the skin and the gut. In this lecture, I will describe the biological effects of key environmental exposures (the sum of which is termed the “exposome”) at the population, community and individual levels and how they impact on AD pathogenesis. It is now understood that as well as considering the type of environmental exposure with regards to its effect on AD pathogenesis, the dosage and timing of the exposure are both critical domains that may lead to either exacerbation or amelioration of disease. I will summarize our latest understanding of the effects of population wide exposures such as climate change, migration and urbanization; community specific exposures such as air pollution, water hardness and allergic sensitization and individual factors such as diet, microbiome alteration, psychosocial stress and the impact of topical and systemic therapy. Finally, I will highlight how these environmental factors interact with the other domains of AD pathogenesis, namely the inherent genetic defects, the skin barrier, immune system and the cutaneous and gut microbiota.



**IL.6****INFANT TRAJECTORIES TO ATOPIC DISEASE – LESSONS FROM THE CHILD STUDY**Padmaja Subbarao<sup>1,2</sup><sup>1</sup>CRC Tier 1, Pediatric Asthma & Lung Health, Toronto, Ontario, Canada, <sup>2</sup>The Hospital for Sick Children, Peter Gilgan Center for Research & Learning, Toronto, Ontario, Canada

The Canadian Healthy Infant Longitudinal Development (CHILD) Cohort study, a national birth cohort study of almost 3500 infants, their mothers and most fathers, is one of the largest most intensively investigated and phenotyped population-based cohorts focused on understanding the diversity of environmental and host factors predisposing to asthma and allergy. Funded by CIHR and the Allergy, Genes and Environment (AllerGen) NCE, and sustained by AllerGen, this landmark Canadian study involved some 50 investigators and their teams to create a data science platform of health data. Through additional funding from Genome Canada, CIHR and philanthropic donations, CHILD cohort study has been following children to age 8 years with over 80% retention and has now started the 12 year phase assessment. This platform has already produced key insights into environmental, genetic, nutritional and microbiome factors associated with these allergy and asthma. We will identify new knowledge gained from this study relating to Developmental Origins of Health and Disease (DOHaD) and highlight the ongoing importance of this study to Canadian research community interested in non-communicable diseases, particularly allergy-related, and the public.

**IL.7****THE MCGILL UNIVERSITY HOSPITAL CENTER FOR ADULT ATOPIC DERMATITIS: PATIENT-ORIENTED RESEARCH**Carolyn Jack<sup>1-3</sup><sup>1</sup>Infectious Diseases and Immunity in Global Health, Center for Translational Biology, The Research Institute of the McGill University Health Center, Montréal, Canada, <sup>2</sup>Department of Medicine, Divisions of Dermatology and Experimental Medicine, McGill University, Montréal, Canada, <sup>3</sup>Innovaderm Research, Montréal, Canada

Abstract summary not available at the time of printing

**IL.8****ATOPIC DERMATITIS IN CANADIAN INDIGENOUS PEOPLES: RESULTS FROM A SYSTEMATIC SCOPING REVIEW ON INDIGENOUS SKIN DISEASE IN NORTH AMERICA**

Rachel N. Asiniwasis

Origins Dermatology Centre, Regina, SK. Assistant Professor, University of Saskatchewan College of Medicine, Regina, SK, Canada

Translational relevance of findings from a systematic scoping review of skin disease in Canadian Indigenous peoples are reviewed, with a focus on pediatric atopic dermatitis and comorbidities embedded in complex historical contexts and disparities in social determinants of health. Drawing on her own personal experience from providing several years of outreach clinics to underserved remote and northern Indigenous (First Nations and Metis) communities in western Canada, Rachel proposes practical calls to action and roles of a multi-stakeholder approach to address this complex health problem in the Canadian landscape.

**IL.9****UNRAVELING THE SYMPTOMATIC BURDEN OF ATOPIC DERMATITIS**

Raj Chovatiya

Department of Dermatology, Feinberg School of Medicine at Northwestern University, Chicago, Illinois, USA

Abstract summary not available at the time of printing

**IL.10****HOW MIGHT EVOLVING THERAPIES FOR ATOPIC DERMATITIS CHANGE COMORBIDITIES AND PERSPECTIVES ON QUALITY OF LIFE IMPACT AND OUTCOMES?**

Lawrence F. Eichenfield

Division of Pediatric and Adolescent Dermatology, Departments of Dermatology and Pediatrics, University of California, San Diego and Rady Children's Hospital-San Diego, San Diego, California, USA

With rapid evolution in topical and systemic therapies there are greater expectations for long term disease control and minimizing the quality of life impact of atopic dermatitis (AD). The 'target' of treatment may evolve over time, with expectation in improvement in signs and symptoms moving beyond historic expectations. Paralleling the development of a larger set of medications and efficacious and relatively safe systemic therapies has been a tremendous expansion in our knowledge of comorbidities associated with AD. These include associations with asthma, food allergies, allergic rhinoconjunctivitis, mental health conditions, metabolic and autoimmune diseases (including alopecia areata and urticaria), cardiovascular risks, bone health impacts, and changes in microbiome and infections. How will our therapies impact on comorbidity development and course? How important is a holistic approach to care and intervention from a patient/family perspective, and how will potential changes in comorbidities drive therapeutic choices over time? Using examples of recent research, we can explore how our perspectives on AD may be influenced by a constellation of findings and associations, and assessing outcomes with a broader perspective that just EASI, SCORAD, IGAs and Itch scores.

**IL.11****HOW TO INCLUDE ATOPIC DERMATITIS AND COMMON CHRONIC SKIN DISEASES WITHIN THE WHO STRATEGIC FRAMEWORK FOR THE INTEGRATED CONTROL AND MANAGEMENT OF SKIN NTDs**Alain Taïeb<sup>1</sup>, Peter Schmid-Grendelmeier<sup>1,12</sup>, Andreas Wollenberg<sup>1</sup>, Fahafahantsoa Rapelanoro Rabenja<sup>2</sup>, Abate Mulugeta Beshah<sup>3</sup>, Jose Antonio Ruiz Postigo<sup>4</sup>, Carsten Flohr<sup>5</sup>, Mamadou Ball<sup>6</sup>, Daudi Mavura<sup>7</sup>, Ncoza Dlova<sup>8</sup>, Rolanda Manuel<sup>9</sup>, Ousmane Faye<sup>10</sup>, Christophe Hsu<sup>11</sup><sup>1</sup>International Society of Atopic Dermatitis, Davos, Switzerland, <sup>2</sup>Department of Dermatology, Antananarivo University, Madagascar, <sup>3</sup>WHO Regional Office for Africa, Brazzaville, Republique du Congo, <sup>4</sup>WHO Department of control of NTDs, Geneva, Switzerland, <sup>5</sup>International League of Dermatological Societies, London, UK, <sup>6</sup>University of Nouakchott, Mauritania, <sup>7</sup>Regional Dermatology Training Centre, Moshi, Tanzania, <sup>8</sup>University of KwaZulu-Natal, Durban, South Africa, <sup>9</sup>Central Hospital of Maputo, Maputo, Mozambique, <sup>10</sup>Dermatology Hospital of Bamako, Bamako, Mali, <sup>11</sup>University Hospital, Basel, Switzerland, <sup>12</sup>World Allergy Organization

This presentation summarizes the meeting on atopic dermatitis (AD) and common skin disorders in sub-Saharan Africa (SSA) sponsored by the International Society of Atopic Dermatitis (ISAD), the World Health Organization (WHO), the World Allergy Organization (WAO), the International League of Dermatological Societies (ILDS) and the Ministry of Public Health of Madagascar, held in Antananarivo on June 6, 2022. This meeting was a follow-up of a workshop held in Geneva summarized in the Schmid et al JEADV 2019 paper DOI: 10.1111/jdv.15972. The simultaneous launch of the WHO framework on skin neglected tropical diseases (NTDs) was timely opening the door for the WHO NTD department to work on skin diseases in general. To

launch with all stakeholders a convergent plan of action in SSA targeting both skin NTDs and common chronic skin diseases in particular atopic dermatitis (AD) in conjunction with the WHO new framework program which aims to reduce morbidity, disability and the psychosocial impacts of skin NTDs and other skin diseases through an integrated approach. Decisions made at the meeting (1) improve training and capacity building e.g. update WHO manuals and apps, including guidelines for the management of AD in low resources countries, online course on AD for the WHO platform, translation of AD leaflets in native languages (2) improve drug accessibility especially for emollients and MTX, but also new molecules, through essential medicine list inclusion and pharma lobbying. Global Accessibility to drugs for AD will be the topic of a satellite symposium at ISAD Gdansk 2023.

### **IL.12 SPECIFIC CONSIDERATIONS WHEN USING TELEDERMATOLOGY TO DIAGNOSE AND MANAGE ATOPIC DERMATITIS**

*Trevor Champagne*

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In stark contrast to the pre-pandemic spectrum, tele dermatology is now ubiquitous in practice and there are funding models which are likely to persist in one form or another for the immediate future. What should tele dermatology look like when managing atopic dermatitis? Specific implementations and concepts are sparsely represented in the literature. Clear wins include bidirectional information provision, patient satisfaction, and the general telemedicine benefits such as improved geographic access. Underrepresented is the effect of specific modalities on the clinician, such as direct access messaging, which demonstrates equivalent outcomes to in-person assessments in AD but may greatly increase the risk of clinician burnout. Diagnostically there are challenges when unable to complete a full skin exam or when relying on suboptimal photo quality. The future applications of machine learning and computer vision dot the horizon: EASI @ home? These too are not without ethical and practical consequences.

### **IL.13 LEANING ON EPIDEMIOLOGY AND EVIDENCE-BASED MEDICINE DURING THE TRANSLATIONAL REVOLUTION**

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The last decade has seen tremendous advances in our understanding of the pathogenesis of atopic dermatitis, leading to breakthroughs in therapy. Those developments are exciting and have improved quality of life for many people living with atopic dermatitis. They have also, in some ways, increased the complexity of therapeutic decision making. With so many new therapies being continually developed, and with testing in mostly placebo-controlled trials, it may be difficult for patients and clinicians to determine how therapies compare and to choose a treatment that is right for them. Additionally, important clinical questions persist regarding the safety of older treatments, including corticosteroids.

As new alternatives to older treatments become available, along with higher costs and with shorter safety track records, addressing concerns about older treatments may become even more important. Evidence synthesis techniques, particularly network meta-analysis, and observational pharmacoepidemiology studies can help answer some of these questions to improve shared therapeutic decision-making for people with atopic dermatitis.

### **IL.14 THERAPEUTIC AGENTS FOR ATOPIC DERMATITIS IN 2022 AND BEYOND**

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Atopic dermatitis is a highly pruritic, common skin disease with an allergic background. When choosing a topical or systemic treatment option, the physician must carefully assess the risks and benefits of the intervention against the background risk of the untreated disease and its complications and discuss the reasonable treatment options in a shared decision process with the patient. Treatment targets of atopic dermatitis are complex, and may involve the skin barrier defect, the innate and the acquired immune system, but allergen avoidance, an imbalance of the skin microbiome and disseminated viral infections are also important. The higher selective any drug is in targeting a specific disease such as atopic dermatitis, and the better its efficacy for improving the disease, and the lower its profile of unwanted on-target and off-target drug effects is, the better will be able to treat atopic dermatitis. The current choice of treatments is therefore directed by a carefully assessed history and clinical inspection. Though several innovative products for topical treatment are currently developed, the mainstay of topical therapy is still a regular use of emollients in sufficient quantities. Special emollient preparations with additional active, non-medicated ingredients such as bacterial lysates or plant extracts known as emollients plus have recently been developed. Topical corticosteroids and topical calcineurin inhibitors together are the mainstay of treatment, while a few other agents are in development such as delgocitinib cream or available in selected markets such as crisaborole and tapinarof. Proactive therapy or wet wraps may improve the outcome of topical interventions. Systemic treatment may be conducted with traditional immunosuppressants such as cyclosporine A, methotrexate, or short-term oral corticosteroids, but all of them have considerable off-target drug effects. Three different januskinase inhibitors named baricitinib, abrocitinib and upadacitinib have recently been licensed for atopic dermatitis; nausea, headache, acneiform eruptions, herpes virus infection, herpes zoster and thrombosis may be possible side effects. The Th2 blocking monoclonal antibodies dupilumab, tralokinumab and lebrikizumab are highly selective in their mode of action, and their side effects are mostly caused by on-target effects of the drug. A bilateral conjunctivitis may be observed more frequently in patients with pre-existing ocular disease. The IL31-receptor blocker Nemolizumab is currently in phase III, and highly active against the itch in atopic dermatitis. Some other systemic drugs with various proposed modes of action are in earlier stages of development. Choosing the right form of treatment for atopic dermatitis is a challenge and a complex issue.

## ORAL LECTURE ABSTRACTS (OL)

### OL.1

#### EMOLLIENTS FOR ATOPIC DERMATITIS PREVENTION: 5-YEAR RESULTS FROM THE BEEP RANDOMISED TRIAL

Lucy E. Bradshaw<sup>1</sup>, Laura A. Wyatt<sup>1</sup>, Joanne R. Chalmers<sup>2</sup>, Rachel H. Haines<sup>1</sup>, Alan A. Montgomery<sup>1</sup>, Kim S. Thomas<sup>2</sup>, Sara J. Brown<sup>3,4</sup>, Matthew J. Ridd<sup>5</sup>, Sandra Lawton<sup>6</sup>, Eric L. Simpson<sup>7</sup>, Michael J. Cork<sup>8</sup>, Tracey H. Sach<sup>9</sup>, Carsten Flohr<sup>10</sup>, Eleanor J. Mitchell<sup>1</sup>, Richard Swinden<sup>1</sup>, Joanne Brooks<sup>1</sup>, Stella Tarr<sup>1</sup>, Hilary Allen<sup>11</sup>, Stella T. Lartey<sup>9</sup>, Susan Davies-Jones<sup>2</sup>, Nicola Jay<sup>12</sup>, Ma-eve Kelleher<sup>11</sup>, Michael R. Perkin<sup>13</sup>, Robert J. Boyle<sup>2,11</sup>, Hywel C. Williams<sup>2</sup>

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Skin barrier enhancement with daily whole body emollients for the first year in babies at high risk of developing atopic dermatitis (AD) did not prevent AD at 2 years in the BEEP multi-centre randomised controlled trial (ISRCTN 21528841). To evaluate a possible delayed protective effect of emollients on AD development or AD severity to 5 years, and if associated food allergy, asthma and hay fever can also be prevented. 1394 term newborns with family history of atopic disease were randomised (1:1) to daily emollient for the first year plus standard skin-care advice (693 emollient group) or standard skin-care advice (701 controls). Long term follow-up at 36, 48 and 60 months of age was via parental questionnaires (online or postal). Main outcomes were parental report of a clinical diagnosis of AD and food allergy. Overall questionnaire completion was 70%. Parents reported a clinical diagnosis of AD between 12 and 60 months for 188/608 (31%) in the emollient group and 178/631 (28%) in control, adjusted relative risk (aRR) 1.10 (95% confidence interval (CI) 0.93 to 1.30). A clinical diagnosis of food allergy by 60 months was reported for 92/609 (15%) allocated to the emollient group and 87/632 (14%) allocated to control (aRR 1.11, 95% CI 0.84 to 1.45). Similar lack of evidence of differences were seen for asthma and hay fever at 36, 48 and 60 months. We did not find any evidence to support a delayed protective effect of emollients to prevent AD, food allergy, asthma or hay fever in the BEEP trial over a 5 year period.

### OL.2

#### REMOTE SEVERITY ASSESSMENT IN ATOPIC DERMATITIS: VALIDITY AND RELIABILITY OF THE REMOTE EASI AND SA-EASI

Aviël Ragamin<sup>1,2</sup>, Renske Schappin<sup>1,2</sup>, Marie-Louise Schuttelaar<sup>3</sup>, Anouk E.M. Nouwen<sup>1,2</sup>, Lisanne F. Hoekstra<sup>1,2</sup>, N. Tan Nguyen<sup>1,2</sup>, Suzanne G.M.A. Pasmans<sup>1,2</sup>

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Reliable remote assessment of atopic dermatitis (AD) severity is necessary to facilitate telehealth. To investigate remote severity assessment by investigating the validity and reliability of the Eczema Area and Severity Index (EASI) based on images. To investigate the role of patient-assessed AD severity using the Self-Administered EASI (SA-EASI). During consultation total-body images were taken from children with AD. Thereafter, caregivers photographed their child's AD at home and completed the SA-EASI. Four raters assessed all images twice. Criterion validity, inter- and intra-rater reliability were evaluated using intra-class correlation metrics and standard error of measurement (SEM) was calculated. Correlation between EASI and SA-EASI was evaluated using Spearman rank correlation 1534 professional and 425 patient-provided images were included from 87 and 32 children, respectively. Excellent (0.90) and good (0.86) agreement was found between in-person EASI and remote EASI based on professional and patient-provided images respectively. Additionally, good inter (0.77), excellent (0.91) intra-rater reliability and acceptable SEM (4.31) was found. Moderate correlation (0.60) between SA-EASI and EASI was found. Remote AD severity assessment strongly correlates with in-person assessment. Good inter- and excellent intra-rater reliability, and acceptable SEM of the remote EASI confirm its feasibility for clinical practice and research. Moderate correlation between SA-EASI and in-person EASI suggest limited value of self-assessment, however more research is needed to understand its potential.

### OL.3

#### ATOPIC DERMATITIS: FACTORS ASSOCIATED WITH AGE OF ONSET IN ADULTHOOD VERSUS CHILDHOOD

Laura Maintz<sup>1,2</sup>, Marie-Therese Schmitz<sup>2,3</sup>, Nadine Herrmann<sup>1,2</sup>, Thomas Welchowski<sup>2,3</sup>, Svenja Müller<sup>1,2</sup>, Regina Havenith<sup>1,2</sup>, Juliette Brauer<sup>1,2</sup>, Claudio Rhyner<sup>2,4,5</sup>, Anita Dreher<sup>2,5</sup>, Eugen Bersuch<sup>2,6</sup>, Danielle Fehr<sup>2,6,7</sup>, Gertrud Hammel<sup>2,8,9</sup>, Matthias Reiger<sup>2,8,9</sup>, Daria Luschkova<sup>2,8,9</sup>, Claudia Lang<sup>4</sup>, Ellen D. Renner<sup>10,11</sup>, Peter Schmid-Grendelmeier<sup>2,4</sup>, Claudia Traidl-Hoffmann<sup>2,8,9</sup>, Cezmi A. Akdis<sup>2,4</sup>, Roger Lauener<sup>2,12</sup>, Marie-Charlotte Brüggemann<sup>2,6,7,13</sup>, Matthias Schmid<sup>3</sup>, Thomas Bieber<sup>1,2,5</sup>

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Despite increasing evidence for a high rate of adulthood-onset atopic dermatitis (AD), risk factors and (endo)phenotypes are only partly known. Characterization of (endo)phenotypes of

adulthood-onset AD versus (vs.) childhood-onset AD and controls. Cross-sectional data of the CK-CARE-ProRaD cohorts Bonn, Davos, Zürich, Augsburg (903 adults: 736 AD, 167 controls) were analyzed using binary logistic regression, stratification by age at onset of AD (onset $\geq$ 18years:  $n = 174$ (23.6%); <18y:  $n = 562$ (76.4%)) and the models: (1) adulthood- vs. childhood-onset AD, (2) adulthood-onset AD vs. controls, (3) childhood-onset AD vs. controls. Circulating biomarkers were measured in 333 AD patients. Main factors associated with onset of AD in adulthood compared to childhood were daily smoking and trunk eczema, while self-reported allergies showed a negative association. Shared risk factors for both adult- and childhood-onset AD compared to controls were maternal AD, number of atopic stigmata, high levels of eosinophils and tIgE. Main additional associated factors for childhood-onset AD compared to controls were food allergies and palmar hyperlinearity. CDCP1, OPG, CCL-11, GDNF, CXCL9, CST-5, MCP-1, MMP-1 and LIFR correlated with age at onset of AD, but all except of LIFR also with age with different effect sizes. We identified partly shared, but also diverse associated factors of AD with onset in adult- compared to childhood, suggesting varying endo- and exogenous mechanisms and presentation of AD depending on life period and disease courses.

#### OL.4

### VALIDATING THE USE OF RECAP OF ATOPIC ECZEMA (RECAP) INSTRUMENT TO MEASURE ECZEMA CONTROL OF ADULT PATIENTS IN AN ASIAN CLINICAL SETTING

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RECAP is a self-reported seven-item questionnaire recommended by Harmonising Outcome Measures in Eczema initiative (2019) to measure eczema control. To validate RECAP as a measure of eczema control in our clinical setting with Asian adult eczema patients. Patients with atopic dermatitis (AD) from July 2019 to January 2020 were recruited to complete RECAP, Patient-Oriented Eczema Measure (POEM) and Dermatology Life Quality Index (DLQI). Clinical severity data with SCORAD (SCORing Atopic Dermatitis) and Eczema Area Severity Index (EASI) were collected. Construct validity in the form of correlation analysis and floor or ceiling effects of RECAP were assessed. Qualitative feedback was obtained with structured interview surveys. Results: A total of 260 AD patients aged between 15 to 87 years-old were recruited. Majority of participants were Chinese (87.1%). RECAP scores were normally distributed with a mean score of 13.7( $\pm$ 6.9) and no floor or ceiling effect was noted. There were strong correlations of RECAP with POEM( $r=0.84$ ,  $p < 0.001$ ), DLQI( $r=0.81$ ,  $p < 0.001$ ) and SCORAD( $r=0.60$ ,  $p < 0.001$ ). Discriminative validity was demonstrated by a significant linear trend of RECAP scores with increasing eczema severity by both POEM ( $p < 0.001$ ) and SCORAD ( $p < 0.001$ ). Patients with more severe eczema had higher mean RECAP scores. RECAP demonstrates good construct validity evidenced by strong correlations with symptoms and quality of life and moderate correlations with eczema signs. RECAP is useful to measure eczema control in our Asian clinical setting.

#### OL.5

### PREVALENCE, CLINICAL FEATURES, AND RISK FACTORS OF SEVERITY OF ATOPIC DERMATITIS IN CHILDREN WITH SKIN PHOTOTYPE VI IN SENEGAL

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Atopic dermatitis (AD) is the most common inflammatory skin disease in childhood. But, in sub-Saharan Africa, data on AD in children is scarce. To determine the prevalence, clinical features, and risk factors of severity of AD in Senegalese children with skin phototype VI. A cross-sectional study was carried out on skin phototype VI children under 15 years with AD seen in 2 dermatology centres in Senegal over six months (January 1 to July 1, 2019). The diagnosis of AD was based on the United Kingdom Working Party (UKWP) criteria. AD severity was evaluated using the Scoring of Atopic Dermatitis (SCORAD) index. Among the 630 children consulted during the study period, 104 had AD i.e. a hospital prevalence of 16.5%. The mean age of children with AD was 36 months with a sex ratio of 1. Personal and family history of atopic disease were reported respectively in 86.5 and 84.6% of patients. Xerosis was the most common clinical feature, observed in 80.8% of patients. Post-inflammatory hyperpigmentation and keratosis pilaris were observed respectively in 44.2 and 37.5% of patients. Severe AD was noted in 12.5% of patients. Risk factors associated with the severity of AD were exposure to incense smoke, age of onset before 24 months, food allergy, and impetiginisation. Daily use of shea butter was a protective factor. Our study shows a high hospital prevalence of AD in children with skin phototype VI in Senegal. The result observed with shea butter as a protective factor against severe AD is very important. However, it needs to be confirmed by randomised studies.

#### OL.6

### THE BURDEN OF STIGMA IN PEDIATRIC ATOPIC DERMATITIS: MEASUREMENT USING THE NEW, VALIDATED PROMIS PEDIATRIC STIGMA AND SKIN MODULE

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Mental health issues linked to pediatric atopic dermatitis (AD) may partly result from stigma related to disease severity. We used a new, validated pediatric stigma measure to test our hypothesis that stigma is correlated with AD severity, quality of life (QoL), and mental health. Children with AD completed the PROMIS Pediatric Stigma & Skin Module. Spearman's, ANOVA, and regression analysis were used. Stigma tool showed discriminant validity when comparing mild, moderate, and severe disease (EASI 39.9 $\pm$ 8.9/45.1 $\pm$ 9.2/47.4 $\pm$ 8.4; POEM 37.2 $\pm$ 9.1/44.9 $\pm$ 7.8/48.1 $\pm$ 8.5; CDLQI 38.5 $\pm$ 8.0/44.6 $\pm$ 8.1/51.0 $\pm$ 6.8,  $p < 0.01$ ). Stigma was moderate at baseline (mean t-score=44.1). Child and proxy stigma scores were strongly correlated (Spearman's  $r=.640$ ), but not with sex or ethnicity. Stigma scores (322 responses from 180 children) were moderately to strongly correlated with Itch NRS ( $r=.79$ ) and PROMIS depression (.55), psychological stress (PS) (.53), anxiety (.50), sleep impairment (.50), fatigue (.49), sleep

disturbance (SD) (.48), and pain interference (PI) (.45), and negatively correlated with mobility (.49), peer relationships (PR) (.41), and global health (GH) (.40) (all  $p < 0.001$ ). 30% had anxiety and 31% had depression ( $t > 55$ ). Regression analysis showed positive changes between child stigma and stigma proxy (B=.97), anxiety (.85), fatigue (.88), depression (.86), GH (.87), itch (.98), mobility (.83), PI (.85), PR (.81), PS (.78), and SD (.74) (all  $p < 0.001$ ) from baseline to month 12, demonstrating stigma's negative impact on mental health. Focus on identifying and reducing stigma is likely to improve QoL in pediatric AD.

### OL.7

#### DIRECT EXPERIMENTAL EVIDENCE ESTABLISHING STAPHYLOCOCCUS AUREUS SUPERANTIGENS DRIVE ATOPIC MARCH, FROM ATOPIC DERMATITIS TO ASTHMA

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The Gram-positive bacterium, *Staphylococcus aureus* (SA) producing superantigen (SAg) exotoxins, has shown a strong association with atopic dermatitis (AD) onset as well as AD exacerbations. SA-SAGs are also thought to play a role in the atopic march, from AD to asthma. However, to date, direct mechanistic evidence linking SA-SAG with AD, AM, and the development of asthma is lacking. To demonstrate that skin infection with SAg-producing SA precipitates eosinophilic lung injury and promotes AM. HLA-DR3.WT and HLA-DR3.IFN-gamma KO mice (as AD patients produce significantly less IFN-g, and administration of recombinant IFN-g is beneficial in AD) were infected with SA producing the staphylococcal superantigen, staphylococcal enterotoxin B (SEB+MNHOCH), or its isogenic mutant in which SEB gene is inactivated (SEB-MNHOCH) ( $1 \times 10^7$  CFU in 50 microliters of PBS). After 3 days, the bronchoalveolar lavage (BAL) fluids were collected, cells analyzed by flow cytometry, cytokines determined by ELISA, and lung pathology determined by H&E staining. Only BAL fluids from HLA-DR3.IFN-gKO mice infected with only SA-producing SEB, but not its isogenic control, had significantly higher eosinophils (more than 60% eosinophils in SEB+MNHOCH vs 0.5% in SEB-MNHOCH) with a corresponding increase in TH2 cytokines such as IL-4, IL-5, and IL-13 in the BAL fluid and significantly greater lung inflammation. We provide the first direct experimental evidence using our novel humanized mouse model that skin infection with SA producing SAg promotes the development of asthma in atopic individuals.

### OL.8

#### DIAGNOSIS AND MANAGEMENT OF PEDIATRIC CHRONIC HAND ECZEMA: THE PEDRA CACHES SURVEY

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Chronic hand eczema (CHE) significantly impacts quality of life. Published literature on pediatric CHE in North America (P-CHE) including knowledge on epidemiology and standard evaluation

and management is limited. Our objective was to assess diagnostic practices when evaluating patients with P-CHE in the U.S. and Canada, produce data on therapeutic agent prescribing practices for the disorder, and lay the foundation for future studies. We surveyed pediatric dermatologists to collect data on clinician and patient population demographics, diagnostic methods, therapeutic agent selection, among other statistics. From June 2021 to January 2022, it was distributed to members of the Pediatric Dermatology Research Alliance. 50 survey emails were sent to members of the group. The survey was completed by 21 members. For patients with P-CHE, providers most often utilize the diagnoses of irritant contact dermatitis, allergic contact dermatitis, dyshidrotic hand eczema, and atopic dermatitis. Contact allergy patch testing and bacterial hand culture are the most used tests for workup. Nearly all utilize topical steroids as first line therapy. Most responders report that they have treated less than 6 patients with systemic agents. The preferred first-line systemic agent was dupilumab. This is the first characterization of P-CHE among pediatric dermatologists in the United States and Canada. Many questions remain regarding P-CHE's domains. Our findings can serve as a starting point for future investigations.

### OL.9

#### IGE-MEDIATED AUTOIMMUNITY IN ATOPIC DERMATITIS ASSOCIATES WITH ATOPIC DISORDERS AND IS INFLUENCED BY ENVIRONMENTAL AND LIFE STYLE FACTORS

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IgE antibodies to self-peptides in the skin have been described in patients with atopic dermatitis (AD). The prevalence of IgE autoantibodies, patient characteristics and risk factors remain elusive. IgE-autoreactivity was determined in serum samples ( $n = 672$ ) from patients with AD and controls. Participants were recruited in the Department of Dermatology, University Hospital Bonn, within the PRORAD CK-CARE study. Subjects were subdivided in groups based on other concomitant Type-2 diseases (asthma, allergic rhinitis, food allergy); AD+Type2 ( $n = 431$ ) AOnly ( $n = 115$ ), controls+Type2 ( $n = 51$ ) and healthy controls ( $n = 75$ ). An immunoassay was used for detection of IgE autoantibodies to proteins from primary human keratinocytes. IgE autoantibodies were found in 16.4% (15 highly positive, 56 positive) of the AD+Type2 patients and in 9.6% of the AOnly patients (1 highly positive, 10 positive). High levels of IgE autoantibodies (15 out of 16) were patients with AD+Type2. The prevalence of IgE autoantibodies was 9.6% of the controls+Type2 and 2.7% of the healthy controls. Younger age and higher total serum IgE levels characterized AD+Type2 patients with autoantibodies. Factors that affected the likelihood to develop IgE autoreactivity were birth between January and June, diversity of pets at home and exposure to cigarette smoke. IgE-mediated autoimmunity in AD is related with the presence of other atopic diseases and can be influenced by environmental and life style factors. Whether IgE autoantibodies can act as a biomarker needs further research.

**OL.10****DISTINCT IL-13 PRODUCTION AND ACCUMULATION IN LESIONAL AND NON-LESIONAL SKIN OF ATOPIC DERMATITIS PATIENTS**

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IL-13 is a central mediator of atopic dermatitis (AD) pathophysiology. While strongly elevated in atopic dermatitis skin, the cellular origins and the localization of this cytokine in human tissue remain poorly defined, largely due to technical limitations. To use validated methodologies for the detection of IL-13 protein and mRNA in human skin biopsies from atopic dermatitis patients Confocal microscopy. We show that IL-13 protein is highly sensitive to paraformaldehyde fixation and PFA-free protocols or heat-induced epitope retrieval lead to successful detection and accurate quantification of this cytokine in human epidermis and dermis. In order to distinguish between accumulation and production of IL-13 in AD patient skin, we next compared the localization of IL-13 protein with mRNA expression by using in-situ hybridization in lesional versus non-lesional skin of AD patients ( $n=4$ ). IL-13 protein mean fluorescent intensity was significantly higher in epidermis compared to the dermis in both lesional and non-lesional skin of AD patients. The majority of IL-13+ cells co-expressed mRNA for T-cell receptor as well as Th2 transcription factor GATA3. Our findings also confirm the presence of TCR- IL-13+ cells. The detection of IL-13 mRNA correlated with some but not all sites of IL-13 protein accumulation, indicating that the target epidermal compartment for IL-13 receptor binding in human skin is distinct from the predominantly dermal production site. These methods and results pave the way for more precise identification of the role of IL-13 in human skin during health and disease.

**OL.11****AERO-ALLERGEN EXPOSURE IN THE HOUSE IS ASSOCIATED WITH ATOPIC DERMATITIS IN CHILDREN FROM URBAN, RURAL, AND PERI-URBAN AREAS OF SOUTH AFRICA**

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Environmental exposures related to urban living, and the absence of protective rural exposures, may contribute to the high prevalence of childhood atopic dermatitis (AD) in South African cities. To identify exposures associated with AD in children living in three residential areas 3144 children aged 3-11 years participated in a cross-sectional study. Included were a suburban area, peri-urban informal settlement and a rural village. Local point prevalence estimates and validity of UK Working Party criteria were previously published. This analysis relates to a case-control subset of 743 children - 264 cases and 479 controls. A questionnaire relating to exposures was completed by caregivers. Multivariate logistic regression was used for analysis. The presence of mold (AOR 2.96 (95%CI 1.69–5.24)), use of insecticides in the house (1.79 (1.27–2.55)) and on the bed (2.22 (1.57–3.13)) were associated with increased odds of AD, as was breastfeeding >18 months (1.67 (1.22–2.29)) and weaning at 4 months (1.97 (1.41–2.75)). Exposure to smoking, animals, pests, vehicle traffic and type of toilet were not associated with AD. In the peri-urban area, the use of solid fuels related to increased odds of AD (7.20 (2.18–27.79)).

Exposure to aeroallergens within the home was associated with AD in our study population, while ambient exposures were not. Late weaning and prolonged breastfeeding were not shown to be protective. Findings were not consistent when stratified by area, suggesting that the complex exposome related to urban and rural living plays an important role in the pathogenesis of AD.

**OL.12****ANTIMICROBIAL AND ANTI-INFLAMMATORY EFFECTS OF VERNIX CASEOSA ON THE EPIDERMAL BARRIER OF ATOPIC DERMATITIS MODELS**

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Vernix caseosa (VC) is a proteolipid material covering human newborns' skin. The VC has microbicidal effects and reparative functions on the skin. Thus, VC could establish a model for a new effective treatment to restore skin homeostasis in AD. To assess the impact of VC on the antimicrobial activity and epidermal barrier of *in vitro* AD models. VCs were collected from healthy newborns. VC was studied in bacterial culture, AD-keratinocyte HaCaT cell line, and in a full-thickness AD model. Bacterial loads were assessed by optical density and qPCR. The integrity of the skin barrier was evaluated through tight junction expression by ELISA, transepidermal water loss (TEWL), and transepithelial electrical resistance (TEER). AD biomarkers were determined by ELISA. VC has a direct and keratinocyte-mediated bacteriostatic and bactericidal effect on commercial and clinical *S. aureus* strains. VC decreases TEWL, but not TEER. VC increases filaggrin and occludin protein expression but does not alter claudin 1 and loricrin. VC increases the release of antimicrobial peptides LL-37, RNase7, and DEFβ2. VC reduces AD biomarkers such as TSLP and S100A8 but increases IL-33. VC has antimicrobial activity against *S. aureus*, ameliorates AD severity biomarkers and improves TEWL in *in vitro* AD models. This study expects to generate the first preclinical results to translate the VC or its bioactive components into a novel multitarget topical treatment for AD.

**OL.13****DEVELOPMENT OF "LIVING WITH ECZEMA", AN EDUCATIONAL ANIMATED VIDEO FOR CHILDREN WITH MODERATE TO SEVERE ATOPIC DERMATITIS AIMED AT REDUCING DISEASE BURDEN**

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There are no tools to educate, reassure and provide ways to cope in children with moderate to severe atopic dermatitis (AD). Therapeutic education typically addresses parents and caregivers' needs. To create an educational video appropriate for children aged 6-12 with moderate to severe AD to address aspects of the disease burden. We surveyed a representative group of children with moderate to severe AD via Survey Monkey to capture the unmet needs for an eczema video. Over a series of 5 Zoom meetings, our group leveraged the survey results and our collective experience to refine the content of a 5-minute video. An experienced script writer and a videographer were engaged to execute video production. The efficacy of this educational tool will be evaluated by having participating children complete POEM and CDLQI questionnaires prior to and after having viewed the video. The domains of interest of the surveyed children with moderate to severe AD reflected the content of the CDLQI and POEM. The English video can be viewed at this link: [https://www.dropbox.com/s/n4ey0esizv45hxt/Eczema\\_Video\\_1080pHD\\_English\\_v5.mp4](https://www.dropbox.com/s/n4ey0esizv45hxt/Eczema_Video_1080pHD_English_v5.mp4) POEM and CDLQI results will be presented. "Living with eczema", a video developed for children with moderate to severe AD using a patient-oriented approach, provides child-directed information to improve understanding and quality of life.

#### OL.14

### TYPE 2 CYTOKINES SENSITIZE HUMAN SENSORY NEURONS TO ITCH-ASSOCIATED STIMULI

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Chronic itch is a central symptom of atopic dermatitis (AD). Cutaneous afferent neurons express receptors for Type 2 cytokines, including IL-4, IL-13, and IL-33; these neuronal cytokine receptors are required for different murine models of itch. Additionally, prior exposure of murine neurons to either IL-4 or IL-33 increased their response to subsequent chemical pruritogens. To test the hypothesis that Type 2 cytokine stimulation sensitizes sensory neurons to future itch stimuli in a fully human *ex vivo* system. We measured calcium flux from human dorsal root ganglia cultures from cadaveric donors in response to pruritogens following either 2- or 24-hour exposure to Type 2 cytokines. We also measured their effect on calcium flux in response to electrical field stimulation and changes in gene expression. Type 2 cytokines IL-4, IL-13, and IL-33 were each capable of sensitizing human dorsal root ganglia neurons to both histaminergic and nonhistaminergic itch stimuli. Sensitization was observed after only 2 hours of pruritogen incubation. We further observed rapid neuronal calcium flux in a small subset of neurons in response to IL-4 and to IL-13, but not IL-33, which was dependent on the presence of extracellular calcium. This study provides direct evidence of transcription-independent mechanisms of peripheral sensitization by Type 2 cytokines and demonstrates both unique and overlapping roles of these cytokines in sensory neurons.

#### OL.15

### EFFICACY AND SUSTAINABILITY OF A FOUR HOUR STRUCTURED COMPACT PATIENT EDUCATION PROGRAM FOR ATOPIC DERMATITIS PATIENTS – A PROSPECTIVE MONOCENTRIC TRIAL

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Interdisciplinary patient education programs for atopic dermatitis (AD) are an established concept in many countries, but a relevant number of our patients decline participation because the well-established German ARNE concept is rather time consuming. We investigated the short-term effectiveness and sustainability of a structured compact patient education program on signs, symptoms and quality of life (QoL) of AD patients. We developed NeKoS, a compact 4-hour training, spread over 2 days and evaluated its efficacy and sustainability in a prospective, monocentric study. The participants included adults and parents of affected children with moderate-to-severe AD. A team of qualified physicians conducted the training. Outcome parameters included disease severity, QoL, attitude towards applying steroids, psychosocial factors and personality type. Data was collected at 3 time points: before the educational intervention, directly after it and at a 1-year-follow-up. Pre-defined primary outcomes were an improvement of the EASI, the SCORAD and the Skindex-29 questionnaire. Pre-defined secondary outcomes were an improvement in DLQI, PO-SCORAD and HADS. Patients who participated showed significant immediate and long-term (1-year) improvements in EASI ( $p < 0.001$ ), SCORAD ( $p < 0.001$ ) and Skindex-29 ( $p < 0.001$ ), but no significant effects in HADS. This prospective monocentric study on patient education following the NeKoS concept showed significant and sustained benefits on signs, symptoms and QoL in the participating AD patients.

#### OL.16

### RESULTS OF TWO ONLINE RANDOMIZED CONTROLLED TRIALS OF THE ECZEMA CARE ONLINE INTERVENTION FOR PARENTS/CARERS OF CHILDREN AND YOUNG PEOPLE WITH ECZEMA

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Behavioural interventions to support eczema self-care are lacking. To test the effectiveness of two online interventions to support self-management for parents of children (Trial A) and for young people (Trial B) with eczema. Two online RCTs; randomised to usual care plus online intervention (Eczema Care Online), or usual care only. Participants completed 4-weekly questionnaires online for a year. Primary outcome: eczema severity over 24 weeks (Patient-Oriented Eczema Measure (POEM)). A process evaluation explored intervention engagement. 677 participants (340 Trial A/337 Trial B) were recruited, with 92% Trial A/90% Trial B follow-up at 24 weeks. Adjusted mean difference in POEM at 24 weeks was -1.5 (95% CI -2.5 to -0.5) for Trial A, and -1.8 (95% CI -3.4 to -0.2) for Trial B. Benefit was maintained for both trials to 52 weeks. For children (Trial A), 58% in the intervention group and 39% in the usual care group reported the minimal clinically important difference (MCID) of 2.5 points at 24 weeks. For young people (Trial B), this was 56% vs 39% respectively. Enablement showed an important difference in favour of the intervention group in both trials. Adjusted mean difference at 24 weeks -0.7 (95% CI -1.0 to -0.4) for Trial A and -0.9 (95% CI -1.3 to -0.6) for Trial B. Participants viewed the intervention as a useful adjunct to clinician advice, felt reassured about the safety of treatments and more confident in self-management. Online interventions can

support eczema management with sustained benefits demonstrated for up to a year.

### OL.17

#### FUNCTIONAL SOMATOSENSORY ADAPTATION TO ACUTE STRESS IS DIMINISHED IN ATOPIC DERMATITIS

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Stress is a state of sensing actual or potential environmental threats and involves an adaptive response. Stressors may perpetuate the itch-scratch cycle in atopic dermatitis (AD), potentially leading to damaged small fibers and alterations in sensory alterations. We aim to determine the epidermal innervation of chronic lesions and the functional response of sensory fibers to acute stress in AD. Skin biopsies were obtained to analyze the intraepidermal nerve fiber density (IENFD) in active lesions (L) and non-lesioned skin (NL) of adult AD patients and skin from healthy controls (HC). Also, we studied the changes in the somatosensory profile by the Quantitative Sensory Test (QST) before and after an acute stress stimulus induced by the Montreal Imaging Stress Task (MIST). Mean age was 28±6 years in HC ( $n=16$ , 56.3% females) and 27.7±7.1 years in AD ( $n=16$ ; 68.7% females). Notably, L skin was less innervated ( $p<0.05$ ), and IENFD was negatively correlated with the epidermal thickness ( $p<0.01$ ). The stress task increased the heart rate (Time effect  $p<0.0001$ ) in both groups, but only AD patients scratched their skin during the MIST ( $p<0.05$ ). The QST showed a reduced sensitivity for temperature detection in HC and NL skin (HC  $p<0.01$ , NL  $p<0.05$ ) after stress. Regarding pain, the MIST modified the mechanical pain sensitivity only in NL skin ( $p<0.05$ ), without major effects on L skin. Active and chronic AD lesions have reduced IENFD, suggesting local damage of small fibers and functional alterations, such as the deficient sensory adaptation observed in AD patients after acute stress.

### OL.18

#### THE IMPACT OF SYSTEMIC TREATMENT OF ATOPIC DERMATITIS ON DEPRESSIVE SYMPTOMS: A PROSPECTIVE CLINICAL COHORT STUDY

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Information on depressive symptoms among patients with atopic dermatitis (AD) on systemic treatment in a real-world setting is scarce. The primary aim of this study was to describe the prevalence and magnitude of depressive symptoms, including suicidal ideation, in adults before and during systemic treatment of moderate-to-severe AD in routine dermatological care. This prospective real-world clinical cohort study analysed data from SwedAD, a Swedish national register comprising patients with AD on systemic treatment. Data was collected at baseline ( $n=120$ ) and at follow-up at 6 months (range 3–9 months,  $n=59$ ), and 12 months (10 months or later,  $n=36$ ). Depression was assessed with the Montgomery-Åsberg Depression Rating Scale-Self-report (MADRS-S) and AD with the Eczema Area Severity Index, the Patient-Oriented Eczema Measure, the Dermatology Life Quality Index and evaluation of pruritus. More than half of patients with moderate-to-severe AD eligible for systemic treatment had depressive symptoms, 24% presented with a moderate-to-severe depres-

sion and 3% with pronounced suicide ideation. Systemic treatment of AD significantly reduced depressive symptoms at 6 months; this positive effect remained stable at 12 months. All aspects of depressive symptoms in MADRS-S, including suicidal ideation, improved significantly. There were significant correlations between MADRS-S and POEM, DLQI and EASI, respectively, during the study period. Greater awareness of depression among patients with AD and a proper management of the skin disease might have impact on the depressive symptoms.

### OL.19

#### PATIENTS' AND CAREGIVERS' EXPERIENCES WITH ATOPIC DERMATITIS-RELATED BURDEN, MEDICAL CARE, AND TREATMENTS IN 8 COUNTRIES

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Little is known about how the experience of living with eczema (including using medical care and treatments) varies by country. Our primary aim was to characterize and compare health-related quality of life, long-term control of symptoms, satisfaction with treatments, and the prevalence of patient-centered care among adult and pediatric AD patients in eight developed nations. We developed a 53-item anonymous survey for adult patients and caregivers of children with AD that was offered in 5 languages and distributed through social media and the publications of 11 patient organizations. The survey received 3,171 responses (self-reported AD severity: 41.1% moderate, 17.6% severe). Health-related quality of life of adult patients was worse than that reported for asthma and type 2 diabetes in prior studies (0.72; 95% CI = 0.65–0.78). In all countries adults reported better control of symptoms than children, but neither group nor any nationality reported adequate control on average (mean = 57.5, 95% CI = 56.1–58.9). Control of symptoms correlated negatively with disease severity. Satisfaction with treatments was much lower for those with more severe disease ( $F(3,3165)=5.5$ ,  $p<.001$ ). Self-management training and shared decision-making were uncommon in all countries except the US. Both were associated with better long-term control of symptoms and higher satisfaction. Expansion of patient-centered care practices (specifically, self-management training and shared decision-making) may improve symptom control and boost satisfaction with treatments, particularly for patients with more severe AD.

### OL.20

#### RECENCY BIAS IN WEEKLY POEM RECORDING AND ITS EFFECTS ON POEM PREDICTION

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We recently developed a computational tool (EczemaPred) for personalised prediction of AD severity dynamics using PO-



SCORAD. We aim to investigate whether EczemaPred can be applied to predict POEM score recorded weekly. We used data from 247 AD patients aged 11 to 65 years in a dose-finding study with up to 6 measurements of POEM and daily symptom scores for POEM over 16 weeks. We investigated the influence of the recency bias in reporting POEM by computing the partial cross-correlation between the observed POEM score and daily symptom scores recorded on the previous seven days using linear mixed-effects models. We also modelled the evolution of individual daily symptom scores using EczemaPred (Bayesian state-space) models and generated POEM predictions. We found a systematic difference between the observed POEM scores and those calculated from the daily symptom scores. The symptom scores on the day of POEM recording had the strongest correlation with the observed POEM score, among those recorded on the previous seven days. This alludes to a recency bias where patients may be more strongly influenced by their current symptoms while they are supposed to report their scores over the past week. EczemaPred models predict next week's POEM scores with an accuracy of 80% when trained on 15 weeks of daily symptom scores. Prediction of POEM is challenging as it compresses daily presence of symptoms into a weekly average and is subject to recency bias. Recency bias can be mitigated by recording daily symptom scores for POEM.

### OL.21

#### FULLY AUTOMATED ASSESSMENT OF ATOPIC DERMATITIS SEVERITY FROM REAL-WORLD DIGITAL IMAGES

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Assessing the severity of Atopic Dermatitis (AD) traditionally relies on face-to-face assessments by healthcare professionals. Such approaches are resource-intensive for participants and staff, challenging during pandemics, and prone to inter- and intra-observer variation. We aim to investigate to what extent computer vision algorithms can help standardise and automate the detection and assessment of AD severity using real-world digital images, without human intervention. We developed EczemaNet, a deep learning computer vision pipeline to detect and assess AD severity from digital camera images. We first trained a model that can detect AD lesions in images using the data provided by four dermatologists who delineated ("segmented") AD regions in 1345 images from 287 children. We then trained a second model that can assess seven AD disease signs from the AD regions identified. EczemaNet demonstrated good performance for assessing the AD severity in real-world images, while being robust to poor imaging conditions. We noted poor inter-rater reliability in the segmentation of AD regions by dermatologists, i.e. dermatologists rarely reached a consensus on the location of AD lesions in the images. We demonstrated the potential of deep learning for assessing AD severity from digital camera images. Nevertheless, we highlighted the challenge of accurately detecting AD lesions. It may limit the performance of algorithms attempting to assess AD severity from real-world camera images.

### OL.22

#### PERSONALIZED PREDICTIONS OF ATOPIC DERMATITIS SEVERITY DYNAMICS AND TREATMENT RECOMMENDATIONS USING A BAYESIAN MACHINE LEARNING APPROACH

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People with atopic dermatitis (AD) would benefit from personalised treatment strategies. We aim to develop a computational tool that makes personalised predictions of AD severity dynamics and generates treatment recommendations. We introduced EczemaPred, a computational framework to predict patient-dependent dynamic evolution of AD severity using Bayesian state-space models. We used EczemaPred to predict the dynamic evolution of Patient-Oriented Scoring Atopic Dermatitis (PO-SCORAD) by combining predictions for the nine severity items of PO-SCORAD (six intensity signs, extent of eczema, and two subjective symptoms). We validated this approach using longitudinal data of 347 AD patients with twice-weekly measurements over 17 weeks. We further extended EczemaPred to integrate treatment data available on another dataset of 16 AD patients with daily recording of PO-SCORAD for 12 weeks. We estimated treatment effects and used Bayesian decision analysis to generate treatment recommendations. EczemaPred achieved good performance for predicting PO-SCORAD and its nine severity items daily to weekly. Estimated treatment responses strongly depended on the patient's clinical phenotype and allowed us to generate patient-specific treatment recommendations. We demonstrated the use of EczemaPred as a coherent framework for personalised AD severity predictions and treatment recommendations, while dealing with missing values and measurement errors. EczemaPred could be applied to other AD severity scores such as EASI or POEM.

### OL.23

#### SKIN TESTING TO DETERMINE ATOPIC DERMATITIS RISK: AN OBSERVATIONAL BIRTH COHORT STUDY

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From birth, the stratum corneum undergoes a period of maturation that coincides with an increased risk of developing Atopic Dermatitis (AD). To investigate biomarkers of skin barrier development and breakdown from birth to assess their feasibility as predictors of disease risk by 12 months of age. An observational, longitudinal, birth cohort study with skin barrier assessments performed after birth on the maternity ward and repeated at 4 weeks and 12 months by visiting the family home (NCT03143504). Common Filaggrin (FLG) risk mutations were screened and chemometric modelling employed to quantify Natural Moisturising Factor (NMF) abundance from infrared spectra. Of the 180 neonates recruited, 128 completed the study and 20% developed mild AD. Significant changes in Transepidermal Water Loss (TEWL), NMF and desquamatory protease activity were observed longitudinally but only subtle breakdown preceded disease. Carrying at least one FLG mutation was associated with a 6-fold increased risk of disease and conferred a significant reduction in NMF and water content by 4 weeks. Accounting for parental atopy, logistic regression modelling of disease risk by FLG mutation status and Kallikrein-7 activity offered the greatest predictive value (area under the curve=0.78,  $p < 0.01$ ). TEWL measured in ambient conditions was not associated with a diagnosis of AD. Skin barrier development from birth continues to at least 12 months of age. A portfolio of tests performed during the neonate period may improve current AD risk evaluations.

**OL.24****FEASIBILITY OF A DIGITAL THERAPEUTIC PROGRAM FOR PATIENTS WITH ATOPIC DERMATITIS: ANALYSIS OF ENGAGEMENT, RETENTION AND ACCEPTABILITY**

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Patient education and lifestyle support can improve treatment adherence, symptoms management, and quality of life for patients with atopic dermatitis (AD). To test the feasibility and usability of a digital therapeutic program (DTx) for AD. A 6-week, single-arm study was conducted in Iceland. Participants received a digital intervention through an app, themed around disease and trigger education, mindfulness, physical activity, medication reminders and in-app patient-reported outcomes (PROs) on AD symptoms. The primary outcomes were retention and engagement, and specific feature use was also analyzed. Twenty-one adults with mild to severe AD were enrolled (17 female, mean age of 32.6 years); 95% completed the program and used the app a median of 6.5 days per week. On average, the overall number of completed tasks per day was high (8.9), with a slight decrease from week one (10.3) to week six (8.6). All users interacted with the educational content and medication reminders on the first week, and respectively 19 and 18 continued using these until week 6. Almost every user completed the PROs on AD symptoms when assigned; dryness and itch were most commonly reported. The number of symptoms and their reported severity decreased over time. The median user satisfaction was high, 6.2 out of 7 at the mHealth app usability questionnaire. The high engagement, retention and user satisfaction found in our study demonstrate that a DTx is feasible for AD patients.

**OL.25****ASSESSING PROPERTIES OF ECZEMA SKIN WITH SPECTROSCOPY**

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Raman spectroscopy is an optical method and can be used to study the molecular composition profiles in the skin. In addition, due to its non-invasive modality, it can be used to assess serial measurements on the same body site to monitor disease progression. In this study, we characterize the molecular composition, including lipid, protein and water content in eczema patients. Patients with eczema were evaluated and baseline demographics were collected including age, Fitzpatrick skin type, body site, and gender. Measurements were conducted with an integrated real-time Raman system. The hardware comprises a diode laser (785 nm), fiber and fiber bundle delivery system, hand-held probe, spectrograph, and a charge couple device camera. A total of 55 patients with eczema (male=49%) were evaluated. Body sites measured were the head and neck, trunk and extremities. The total Raman intensity was lower for eczema compared to perilesional skin in both the fingerprint and high wavenumber region. In the high wavenumber region, Raman intensity was high between 3400-3525 nm and between 2800-3000 nm with three

major peaks. The three major peaks corresponded to ceramide and keratin values. Compared to perilesional skin, eczematous skin showed lower symmetric and asymmetric lipid ( $p < 0.05$ ), asymmetric protein ( $p < 0.05$ ) and bound water ( $p < 0.05$ ). Our study has shown that eczema contains a lower amount of lipids such as ceramide, asymmetric protein and bound water. Further studies are planned to correlate these findings with morphologic traits, disease severity, and treatment response.

**OL.26****IMPROVEMENT OF THE GLOBAL MANAGEMENT OF ATOPIC DERMATITIS BY TELEDERMATOLOGY IN PERIPHERAL HEALTH CENTERS IN TOGO (TELEAD)**

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Atopic dermatitis is a chronic inflammatory skin disease that is probably underdiagnosed and poorly managed in subSaharan Africa due to the lack of dermatologists. The aim of this study is to use Information and Communication Technologies to improve diagnosis and management of AD in Togo. Twenty health centers in 19 different cities in Togo without dermatologists were included. In each center, a health worker had been trained in the diagnosis and management of AD. Suspected cases of AD were sent for a dermatologist's expertise through a numeric platform. One hundred forty-two (78%) of the 182 cases suspected as AD by a non-dermatologist health worker were confirmed by expert dermatologists. The mean age of the patients was 9.6 years and the sex ratio was 0.97. A medical history of atopy was found in 76 (53.52%) patients. The average duration of AD before consultation was 2.7 years. Pruritus or tremor was present in all patients. The lesions were mainly erythematous (100%) and papular (88.7%). In infants aged from 0 to 2 years, lesions were mainly located on the face (81.08%) and neck (78.34%), whereas in older children the main site was the neck (84.21%). The lesions were impetiginized in 18.3% of cases and prurigo strophulus was associated in 9.86% of patients. Regarding the performance of the trained health workers, erythematous and papular lesions were the most recognized as AD elementary lesions with respective confirmation rates of (97.9% and 97.8%). AD can be managed by non-dermatologist health workers by using ICT. This is characterized on the black skin by papular lesions.

**OL.27****A RANDOMISED CONTROLLED TRIAL PROTOCOL ASSESSING THE EFFECTIVENESS, SAFETY AND COST-EFFECTIVENESS OF METHOTREXATE VERSUS CICLOSPORIN IN THE TREATMENT OF SEVERE ATOPIC ECZEMA IN CHILDREN: THE TREATMENT OF SEVERE ATOPIC ECZEMA TRIAL (TREAT)**

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Immuno-suppressive medication (ISM) is frequently used in children and young people (CYP) with severe atopic dermatitis (AD). However, no firm RCT evidence exists in this target group. We conducted a multi-centre, assessor-blind RCT to assess the efficacy and safety of ciclosporin (CyA) versus methotrexate (MTX) in CYP with AD. We compared CyA (4mg/kg/day) with MTX (0.4mg/kg per week) over 36 weeks and then followed up for 24 weeks of therapy. Co-primary outcomes: i) change from baseline to 12 weeks in o-SCORAD and ii) time to having to restart systemic therapy following treatment cessation. Secondary outcomes included change in EASI and POEM scores over time. Drug safety was also assessed. 103 patients were randomised. CyA vs MTX showed greater improvement in o-SCORAD by 12 weeks ( $p = 0.01$ ), with no significant difference between the treatment arms in the number of those needing to restart systemic therapy following treatment cessation ( $p = 0.16$ ). 48.1% of participants in the CyA and 27.5% in the MTX arm reached an o-SCORAD-50 by 12 weeks ( $p = 0.01$ ). There was no difference in o-SCORAD-50 between groups at 36 weeks (0.86). However, by 60 weeks MTX was superior (0.02). Similar results were seen for EASI (EASI-50, o-SCORAD-/EASI-75) and POEM at 12 and 36 weeks between the groups, with statistically significantly poorer disease control with CyA vs MTX after treatment cessation. Frequency of adverse events was comparable between both trial arms, and both treatments appeared generally safe. While CyA shows more rapid treatment response, MTX induces more sustained disease control.

## OL.28

### THE EFFECTS OF SYSTEMIC IMMUNOMODULATORY TREATMENTS ON COVID-19 OUTCOMES IN PATIENTS WITH ATOPIC DERMATITIS: RESULTS FROM THE GLOBAL SECURE-AD REGISTRY

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The effects that systemic treatments for atopic dermatitis (AD) have on COVID-19 outcomes is unknown. To investigate COVID-19 outcomes in patients with AD treated with or without systemic immunomodulatory treatments. Cases of COVID-19 in patients with AD were reported to the SECURE-AD global registry (1/4/20 to 31/10/21). Using logistic regression, adjusted odds ratios (aOR) for hospitalization from COVID-19 were estimated for different AD treatments. 442 patients with AD (mean age 35.9 years) from 27 countries with COVID-19 were included. Patients were treated with topical therapy only ( $n = 131$ ), dupilumab ( $n = 216$ ), methotrexate ( $n = 30$ ), ciclosporin ( $n = 22$ ), systemic corticosteroids ( $n = 7$ ), JAK inhibitors ( $n = 12$ ), other systemic treatments ( $n = 10$ ) or with combinations of systemic treatments ( $n = 14$ ). Compared to dupilumab (monotherapy), topical treatment alone had significantly higher odds of hospitalization (aOR 4.99, 95%CI 1.4-20.84). Ciclosporin (aOR 3.02, 95%CI 0.14-25.72) and systemic corticosteroids (aOR 2.85, 95%CI 0.08-38.11) were associated with higher odds of hospitalization than dupilumab, but the findings were not statistically significant. Methotrexate and dupilumab had equivalent odds of hospitalization (aOR 0.98 95%CI 0.05-7.58). Hospitalization

was most likely in patients treated with combination systemic therapy which included systemic corticosteroids (aOR 45.57, 95%CI 4.54 - 616.22), compared to single agent non-steroidal immunosuppressive systemic treatments. Topical and systemic treatments for AD are associated with differing rates of hospitalization from COVID-19.

### OL.29

#### CLINICAL AND HISTOPATHOLOGICAL CHARACTERIZATION OF ATYPICAL LYMPHOID REACTIONS IN PATIENTS WITH ATOPIC DERMATITIS TREATED WITH NEW ADVANCED SYSTEMIC THERAPIES

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Since the increased use of dupilumab in daily practice, multiple cases have been reported on the development of cutaneous T-cell lymphomas (CTCL) and lymphoid infiltrates. As new targeted therapies for atopic dermatitis (AD) have been emerging, it is of great importance to better identify these patients. To provide insight in the clinical presentation and histopathological findings of atypical lymphoid reactions in AD patients treated with new advanced systemic therapies. A retrospective observational study of AD patients with suspected CTCL during treatment with new advanced systemic therapies was performed. Relevant patient-, disease- and treatment characteristics were evaluated and biopsies before, during and after treatment were assessed. Eleven patients suspected for CTCL with deterioration of symptoms during dupilumab ( $n = 10/502$ ) or upadacitinib ( $n = 1/44$ ) treatment were included. Three (27.3%) patients were retrospectively diagnosed with pre-existent mycosis fungoides (MF) before dupilumab initiation. Eight (72.7%) patients with prior biopsy-proven AD were eventually diagnosed with an atypical lymphoid reaction. These patients showed MF-like symptoms, however, histopathological findings were distinguishable for an atypical lymphoid infiltrate. Post-treatment biopsies showed complete clearance of the atypical lymphoid reaction in almost all patients. This study shows that both dupilumab and upadacitinib can cause a reverse, and therefore benign atypical lymphoid reaction with specific histopathological features.

### OL.30

#### THE PATHOGENESIS AND COURSE OF OCULAR SURFACE DISEASE DURING DUPILUMAB TREATMENT IN ATOPIC DERMATITIS PATIENTS

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Ocular surface disease (OSD) is frequently reported as adverse event during dupilumab treatment in atopic dermatitis (AD) patients. To investigate frequency, severity, and pathogenesis of OSD in moderate-to-severe AD patients before and during dupilumab treatment. This prospective study included moderate-to-severe AD patients who were examined by a dermatologist and an ophthalmologist before start of dupilumab (baseline), and after 4 and

28 weeks of dupilumab treatment. Conjunctival impression cytology was conducted to measure conjunctival goblet cell density (GCD) and additionally analyzed by flow cytometry. Preliminary analysis of 70 patients showed OSD at baseline in 61/70 (90%), requiring treatment in 47/70 (67.1%) patients. Worsening of OSD was seen in 10/64 (14.3%) patients at week 4 of dupilumab treatment, of whom 6/10 (60%) patients despite ongoing OSD treatment. At week 28 of dupilumab treatment, 12/68 (17.6%) patients had worsening of OSD compared to OSD severity at baseline. In 11/12 (91.7%) patients, worsening was regardless of OSD treatment. Median GCD decreased from 341.3 GC/mm<sup>2</sup> (IQR 182.1-664.3,  $n = 67$ ) at baseline to 264.2 GCs/mm<sup>2</sup> (IQR 107.2-590.4,  $n = 64$ ) at week 4 of dupilumab treatment. GCD at week 28 and flow cytometry results will follow. OSD at baseline was seen in 90% of moderate-to-severe AD patients. At week 28 of dupilumab treatment, 17.6% patients experienced worsening of OSD despite treatment. A decrease in GCD was found at week 4 of dupilumab, suggesting that dupilumab may affect GCD, leading to dupilumab-associated OSD.

### OL.31

#### LIVING NETWORK META-ANALYSIS OF SYSTEMIC TREATMENTS FOR ATOPIC DERMATITIS

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New systemic agents are available for atopic dermatitis, most of which have not been compared with each other in head-to-head trials. To enable ongoing comparisons of the efficacy of systemic treatments for atopic dermatitis, we conduct a living systematic review and network meta-analysis. We search online reference databases and clinical trial registries every 4 months for randomized controlled trials examining  $\geq 8$  weeks of treatment with systemic immunomodulatory medications for moderate-to-severe atopic dermatitis. We perform screening as well as data abstraction and risk of bias assessment independently in duplicate. We perform random-effects Bayesian network meta-analyses comparing medications' effect on clinical signs, symptoms (including itch) and quality of life using pooled standardized mean difference (SMD) with 95% credible intervals (CrI). In this latest analysis, including studies between 8 and 16 weeks' duration in adults up to June 2021 (which will be updated before the ISAD meeting), abrocitinib 200 mg (SMD -0.3, 95% CrI -0.4, -0.1) and upadacitinib 30 mg (SMD -0.5, 95% CrI -0.7, -0.3) reduced the signs of AD more than dupilumab, whereas baricitinib 4 mg (SMD 0.4, 95% CrI 0.2, 0.6) and tralokinumab (SMD 0.3, 95% CrI 0.1, 0.5) reduced clinical signs less than dupilumab. Change in signs

with abrocitinib 100 mg and upadacitinib 15 mg were similar to dupilumab. Higher doses of abrocitinib and upadacitinib may be somewhat more efficacious than dupilumab whereas baricitinib and tralokinumab may be less efficacious.

### OL.32

#### PATIENT-CENTERED DUPILUMAB DOSING REGIMEN LEADS TO SUCCESSFUL DOSE REDUCTION IN PERSISTENTLY CONTROLLED ATOPIC DERMATITIS

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At present no studies are available on different dupilumab dosing regimens in controlled atopic dermatitis (AD) in daily practice. The aim of this study was to clinically evaluate a patient-centered dupilumab dosing regimen in patients with controlled AD and relate this to serum drug levels and serum biomarkers. Ninety adult AD patients from the BioDay registry were retrospectively included based on their dupilumab administration interval according to a predefined patient-centered dosing regimen. Group A did not fulfill the criteria for interval prolongation and continued using the standard dupilumab dosage (Q2W), group B prolonged dupilumab interval with 50% (Q4W) and group C prolonged dupilumab interval with 66-75% (Q6-8W). AD severity score, patient-reported outcomes, serum dupilumab levels and biomarkers were analyzed over time. Disease severity scores did not significantly change over time during the tapering period in any of the groups. In group B and C, the Numeric Rating Scale (NRS)-pruritus temporarily significantly increased after interval prolongation but remained low (median NRS-pruritus  $\leq 4$ ). Median dupilumab levels remained stable in group A (Q2W), but significantly decreased in group B and C (24.1 mg/L (IQR=17.1-45.6); 12.5 mg/L (IQR=1.7-22.3)) compared to the Q2W levels (88.2 mg/L (IQR=67.1-123.0,  $p < 0.001$ )). Disease severity biomarker levels (CCL17/CCL18) remained low in all study groups during the whole observation period. This study showed that dose reduction was successful in a subgroup of patients with controlled AD by using a patient-centered dosing regimen.

### OL.33

#### RECAPTURE OF RESPONSE WITH TRALOKINUMAB EVERY SECOND WEEK IN PATIENTS WITH MODERATE TO SEVERE ATOPIC DERMATITIS RELAPSING AFTER A STEP DOWN TO EVERY 4 WEEK DOSING

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Tralokinumab is a monoclonal antibody that specifically neutralizes IL-13. In the pivotal trials, ECZTRA 1 and 2, adult patients with moderate-to-severe atopic dermatitis (AD) achieving IGA 0/1 or EASI-75 at Week (Wk) 16 on tralokinumab every 2 wks (q2w) were re-randomized to tralokinumab q2w or every 4 wks (q4w), or placebo for 36 wks. At Wk 52, IGA 0/1 or EASI-75 was maintained without rescue use in 56.2% (73/130;  $P \leq 0.001$  vs placebo), 50.0% (67/134;  $P = 0.003$ ), and 27.4% (20/73) of patients in the q2w, q4w, and placebo arms, respectively. Tralokinumab q4w is an approved dosing option in EU and USA in patients achieving clear/almost clear skin after initial q2w dosing. To evaluate the ability to recapture response with tralokinumab q2w retreatment + optional TCS in Wk 16 responders relapsing on q4w dosing. Patients re-randomized to tralokinumab q4w were transferred to open-label (OL) tralokinumab q2w + optional TCS if they met a pre-defined decline relative to their Wk 16 response (IGA score increase  $\geq 2$  +  $< \text{EASI-75}$  over at least a 4-wk period). Post hoc analysis of time to regain EASI-75 and/or IGA 0/1 response after transfer to OL arm was assessed using Kaplan Meier estimates. After 16 wks retreatment with OL tralokinumab q2w + optional TCS, 89% of the 44 patients relapsing on tralokinumab q4w dosing had recaptured EASI-75 and/or IGA 0/1 response. The median time to response recapture was 31 days. In patients with a relapse after tralokinumab dose reduction, retreatment with tralokinumab q2w + optional TCS effectively recaptured response.

### OL.34

#### AMLITELIMAB REDUCES SERUM IL-13 IN A PHASE 2A CLINICAL TRIAL IN ATOPIC DERMATITIS WITHOUT IMPACTING T-CELL EXPANSION IN A T-CELL RECALL ASSAY

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Amltelimab (SAR445229), a fully human non-depleting, non-cytotoxic, monoclonal antibody, binds to OX40 ligand (OX40L) on antigen-presenting cells (APC) to block OX40-OX40L interactions. In a 16-week, double-blind, Phase 2a trial (NCT03754309), amltelimab induced clinically meaningful disease activity improvement in patients with moderate-to-severe atopic dermatitis (AD). To assess effects of amltelimab on interleukin (IL)-13 and T-cell recall responses. In the trial, 89 patients were randomized to amltelimab low dose (LD; 200 mg loading/100 mg maintenance Q4W), high dose (HD; 500 mg loading/250 mg maintenance Q4W), or placebo. Serum IL-13 levels were assessed by single molecule immunoassay (259 samples). Using human peripheral blood mononuclear cells from 5 healthy donors, a T-cell recall assay was performed. At baseline in the trial, IL-13 levels significantly correlated with disease severity (Eczema Area and Severity Index;  $r = 0.4784$ ,  $p < 0.0001$ ). Week 16 IL-13 levels were significantly reduced with amltelimab versus baseline (LD  $p < 0.0001$ ; HD  $p = 0.0003$ ) but not placebo ( $p = 0.1158$ ). In a T-cell recall assay, amltelimab significantly reduced IL-13 protein levels at Days 3 and 6 without negatively impacting T-cell expansion, based on percentage of proliferating CD4+ T-cells versus isotype control.

Amlitelimab decreased IL-13 levels in patients with AD and in a T-cell recall assay without negative effects on T-cell expansion, thus reducing inflammation without blocking T-cell proliferation during recall responses.

### OL.35

#### EFFICACY AND SAFETY OF CM310 IN MODERATE-TO-SEVERE ATOPIC DERMATITIS: RESULTS FROM A MULTICENTER, RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED PHASE 2B TRIAL IN CHINA

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IL-4 and IL-13 are signature cytokines driving type 2 inflammation that play a pivotal role in atopic dermatitis (AD). CM310 is a humanized monoclonal antibody targeting IL-4R $\alpha$  that blocks the signaling of both IL-4 and IL-13. To assess the efficacy and safety of CM310 in moderate-to-severe AD adults. In this multicenter, randomized, double-blind, placebo-controlled phase 2b study, totally 120 subjects were randomized 1:1:1 to receive subcutaneous injection of high-dose CM310 (300 mg CM310 Q2W following a loading dose of 600 mg on day 1), low-dose CM310 (150 mg CM310 Q2W following a loading dose of 300 mg on day 1) or

matching placebo for 16 weeks, followed by an 8-week follow-up period. Primary endpoint was the proportion of EASI-75 ( $\geq 75\%$  improvement in EASI score from baseline) responders at week 16. Safety of CM310 was assessed until week 24. At week 16, the proportion of EASI-75 responders in CM310 high-dose (70.0%) and low-dose groups (65.0%) were significantly higher than in the placebo group (20.0%). Both doses of CM310 also demonstrated superiority over placebo in secondary endpoints, including the proportions of EASI-90 and EASI-50 responders, the proportion of subjects with both an investigator's global assessment (IGA) score 0 or 1 and a reduction of  $\geq 2$  points from baseline, the proportion of patients with  $\geq 3$ -point and  $\geq 4$ -point improvement in weekly average of daily peak pruritus NRS. The incidence of treatment-emergent adverse events was similar among the three groups. CM310 was efficacious and safe in moderate-to-severe AD patients.

### OL.36

#### DUPILUMAB INHIBITS EXPRESSION OF FIBRONECTIN AND FIBRINOGEN, SKIN PROTEINS THAT REGULATE STAPHYLOCOCCUS AUREUS ADHESION TO ATOPIC DERMATITIS SKIN

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Previous studies have documented that dupilumab treatment decreases skin *Staphylococcus aureus* abundance in atopic dermatitis (AD). The mechanisms responsible for dupilumab-mediated *S. aureus* inhibition are not well known. *S. aureus* has been reported to bind to fibronectin and fibrinogen. We evaluated the effect of dupilumab on the expression of fibronectin and fibrinogen in the skin of patients with moderate-to-severe AD compared with healthy volunteers. BALISTAD (NCT04447417) is a 16-week study in patients with AD aged 12–65 years. Serial skin assessments with skin tape stripping (STS) were performed on lesional and non-lesional AD skin treated with dupilumab and on the normal skin of healthy volunteers. Proteomic analysis or STS protein extracts were performed by liquid chromatography tandem mass spectrometry at Day 1, Day 56, and Week 16 of treatment. Treatment with dupilumab resulted in significant improvement of AD severity. Proteomic analysis revealed high levels of fibronectin and fibrinogen expression in AD STS samples at baseline (Day 1). At Week 8 a significant inhibition of fibronectin and fibrinogen expression was observed in AD lesional skin ( $p < 0.001$  and  $p < 0.0001$ , respectively, as compared with Day 1) and the effect was sustained at Week 16 of treatment. Dupilumab treatment led to reduction in expression of fibrinogen and fibronectin in AD. This finding suggests a potential novel mechanism involved in dupilumab inhibition of *S. aureus* abundance in AD skin.

## E-POSTER PRESENTATIONS

## P2. Itch and Pain

## P2.01

**BARICITINIB RAPIDLY RELIEVES SENILE PRURITUS WITHOUT SIGNIFICANT ADVERSE EFFECTS – A CASE SERIES**

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Chronic pruritus in the elderly can be defined as chronic itch in a person aged 65 years or older and it has a negative impact on quality of life. In many cases, the etiology of pruritus in the elderly is difficult to determine. The use of conventional treatments is limited due to the comorbidities of elderly patients. We present 3 cases of elderly patients with chronic pruritus who responded rapidly to baricitinib, a Janus kinase 1, 2 inhibitor approved for rheumatic arthritis and atopic dermatitis. A 68-year-old male with eczematous dermatitis on his whole body complained of pruritus of 6-year duration. A 67-year-old female with erythematous macules and patches on her chest and back complained of pruritus of 6-year duration. A 65-year-old female with round eczematous patches on her upper and lower extremities. Each patients' pruritus symptom improved dramatically after 2 weeks of baricitinib administration. The anti-pruritic effect of baricitinib was maintained until 16 weeks, which was measured by pruritic numeric rating scale and other subjective measures. In conclusion, we report case series of chronic pruritus in the elderly successfully treated with baricitinib without any adverse effects, which suggests baricitinib as a promising therapeutic option for chronic pruritus in the elderly. We report case series of senile pruritus successfully treated with baricitinib without any adverse effects, which suggests baricitinib as a promising therapeutic option for chronic pruritus in the elderly.

## P2.02

**ABROCITINIB MONOTHERAPY PROVIDES RAPID AND SUSTAINED ITCH IMPROVEMENT AT VARIOUS THRESHOLDS OF RESPONSE IN PATIENTS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS: A POOLED ANALYSIS OF THREE RANDOMIZED TRIALS**

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Itch is a common and burdensome symptom of AD. To assess the efficacy of abrocitinib, a JAK1-selective inhibitor, at various thresholds of itch improvement in patients with moderate-to-severe AD. This post hoc pooled analysis included patients receiving once daily oral abrocitinib (200 mg and 100 mg) as monotherapy or placebo (pbo) in 3 trials (NCT02780167, NCT03349060, and NCT03575871). Proportions of patients with  $\geq 2$ -,  $\geq 3$ -,  $\geq 4$ -point improvement in PP-NRS (PP-NRS2, PP-NRS3, and PP-NRS4, respectively) and those with deep and complete itch responses (PP-NRS 0/1, PP-NRS=0) were assessed up to week (wk) 12. The pooled data set comprised 901 patients (abrocitinib 100 mg, 354; abrocitinib 200 mg, 346; pbo, 201). At wks 2, 4, and 12, PP-NRS2 response with abrocitinib ranged from 55%-61% (abrocitinib 100 mg) and 71%-80% (abrocitinib 200 mg) versus 29%-30% (pbo).

For PP-NRS3, the proportions were 40%-50% (abrocitinib 100 mg), 56%-71% (abrocitinib 200 mg) versus 15%-24% (pbo); for PP-NRS4 they were 25%-43% (abrocitinib 100 mg), 44%-58% (abrocitinib 200 mg) versus 6%-17% (pbo). At wk 2, proportions achieving PP-NRS 0/1 were 7% (abrocitinib 100 mg) and 20% (abrocitinib 200 mg) versus 1% (pbo), which increased to 23% and 37% versus 5% at wk 12. PP-NRS=0 response was seen in 3% (abrocitinib 100 mg) and 7% (abrocitinib 200 mg) versus 0 patients (pbo) at wk 2, which increased to 11% and 19% versus 3% at wk 12. Abrocitinib monotherapy provides rapid and sustained itch relief at various thresholds of response in patients with moderate-to-severe AD.

## P2.03

**EFFICACY OF UPADACITINIB VS DUPILUMAB FOR MODERATE-TO-SEVERE ATOPIC DERMATITIS: ANALYSIS OF TIME SPENT IN ITCH RESPONSE STATE FROM THE HEADS UP STUDY**

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Atopic dermatitis is a chronic inflammatory skin disease characterized by intense and debilitating pruritus – its most burdensome symptom – and requires long-term control. Results from the Heads Up trial (NCT03738397) found that upadacitinib (UPA) 30 mg was superior to dupilumab (DUPI) 300 mg for improving itch as indicated by increases in the percent of improvement from baseline for Worst Pruritus NRS scores (WP-NRS). This analysis compared the proportion of days patients treated with UPA or DUPI spent in itch response states indicated by WP-NRS. Heads Up was a 24-week head-to-head phase 3b multicenter, randomized, double-blind study comparing UPA 30 mg to DUPI 300 mg in adults with moderate-to-severe AD. We compared the proportion of days patients treated with UPA or DUPI spent in an improved-itch state (WP-NRS improvement  $\geq 4$  relative to baseline; among patients with baseline WP-NRS  $\geq 4$ ) or a state of no/minimal itch (WP-NRS 0/1; among patients with baseline WP-NRS  $> 1$ ). Participants included 692 patients randomized into two groups: those taking UPA ( $n = 348$ ) or DUPI ( $n = 344$ ). At 4 and 16 weeks, patients treated with UPA vs DUPI spent a greater proportion of days in an improved-itch state (week 4: 49.1% vs 18.6%; week 16: 59.3% vs 34.6%), and in a state of no/minimal itch (week 4: 21.7% vs 4.1%; week 16: 33.8% vs 11.0%). Treatment of moderate-to-severe AD with UPA 30 mg daily resulted in a greater proportion of days spent with meaningful itch improvement (WP-NRS improvement  $\geq 4$ ) and more time with no/minimal itch (WP-NRS 0/1) compared to treatment with DUPI over 4 and 16 weeks.

### **P2.04 SYNERGISTIC EFFECT BY COMBINATION OF H1-ANTIHISTAMINES AND TOPICAL CORTICOSTEROIDS ON PRURITIS IN ATOPIC DERMATITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS**

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In order to treat pruritis in general skin dermatosis, oral antihistamines (H1-histamine receptor antagonists) are mainly used as treatment option. Yet, their treatment effect on pruritis in atopic dermatitis remains unestablished. To evaluate if combination of H1-antihistamines and topical steroids would have therapeutic effect, a systematic review and meta-analysis was carried out. Articles published between 1967 and 2015 were searched via MEDLINE, Embase, aCENTRAL databases, systematically. 1,206 studies were identified and their titles, abstracts, and full-texts were assessed. The mean differences (MD) with 95% confidence intervals (CI) were calculated using random effects meta-analysis. We selected two studies that matched the inclusion criteria which is antihistamine therapy with mandatory topical steroid usage. In comparison to antihistamine monotherapy, additional antihistamine to topical corticosteroids showed statistically significant clinical improvement on patients (standard MD, -0.24; 95% CI, -0.42 to -0.05;  $p = 0.01$ ). The combination of H1-antihistamines with topical steroids may have synergistic effect as they can influence various associative factors of chronic pruritis in AD.

### **P2.06 ANTI-PRURITIC EFFECT OF SYNTHETIC TRPM8 CHANNEL AGONIST (CRYOSIM-1) GEL ON HISTAMINERGIC AND NON-HISTAMINERGIC ITCH IN HEALTHY HUMAN SKIN: A SINGLE- BLIND, RANDOMIZED VEHICLE-CONTROLLED STUDY**

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Transient receptor potential melastatin member 8 (TRPM8) is an ion channel activated by cooling. It is unclear whether the TRPM8 agonist relieves itch induced by various pruritogens in human skin, and the mechanism of itch-suppression of the TRPM8 agonist has not been confirmed. This study aims to investigate whether TRPM8 agonist relieves itch induced by various histaminergic and non-histaminergic pruritogens in human skin, and to find out the itch-suppression mechanism of TRPM8 agonist. 30 volunteers were pretreated on the forearm with vehicle-only gel and TRPM8 agonist gel in random order. After each pretreatment, skin prick tests were done with 5 pruritogens (histamine, compound 48/80,  $\beta$ -alanine, BAM 8-22, chloroquine) and control (normal saline). Itch and pain intensities were recorded using a numeric rating scale (NRS). At each test, skin moisture, transepidermal water loss, and the mechanical pain threshold with Von frey filament were measured. All 5 pruritogens provoked significant itch compared to normal saline. When the TRPM8 agonist gel was pretreated, the intensity of itching induced by histamine ( $p = 0.005$ ) and compound 48/80 ( $p = 0.049$ ) was reduced compared to the vehicle-only gel in repeated measures. Peak NRS and area under the curve of NRS for 10 min were significantly decreased in the group of pretreatment with TRPM8 agonist gel for all pruritogens ( $p < 0.05$ ). The mechanical pain threshold was raised after pretreat-

ment with the TRPM8 agonist gel compared to the vehicle-only gel. In human skin, TRPM8 agonist suppressed itch and raised mechanical pain threshold.

## **P3. Mechanisms of Disease and Models**

### **P3.01 THE MRNA LEVELS OF COLLAGENS IN ATOPIC DERMATITIS SKIN – PILOT STUDY**

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Atopic dermatitis (AD) is a multifactorial, inflammatory skin disease. To date we know not much about genes implicated in relationship between extra cellular matrix expression (ECM) and pathogenesis of atopic dermatitis. The aim of our study was to examine the expression level of genes encoding collagen type I, II, III and IV in lesional and non-lesional skin from atopic dermatitis patients compared to the controls. Next step was to look for the associations between collagens mRNA levels and subjective and objective clinical symptoms of AD. The total RNA was isolated from non-lesional and lesional AD patients skin. Biopsies were received from 12 AD patients. The gene expression level of COL1A1 COL3A4 and COL4A1 was determined by real-time RT-PCR. AD severity was assessed with SCORAD, and pruritus level with visual analog scale (VAS). The outcome was statistically significant difference between expression level for mRNA of COL3A4 and COL4A1 in lesional and non-lesional parts of skin of patients suffering from AD ( $p$  value = 0,0002 and  $p$  value = 0.0416 respectively). The mRNA level of COL3A4 in lesions skin was associated with higher pruritus and severity of the disease ( $p < 0.05$ ). This pilot study may suggest some role of COL3A4 in AD pathogenesis, however further studies on larger groups are needed.

### **P3.03 SULFHYDRATION OF TETS FACILITATES FOXP3 DEMETHYLATION TO REVERSE TREG REPRO- GRAMMING INTO TH2-LIKE LINEAGE IN ATOPIC DERMATITIS**

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Pathologic T-helper (Th2)-like reprogramming of regulatory T cells (Treg) promotes allergic diseases, and the interventions aimed at resetting such reprogramming as a novel therapeutic approach. Th2-like Treg reprogramming was detected by Flow cytometry. DNA methylation and hydroxymethylation levels of Foxp3 were assessed by bisulfite sequencing. Sodium thiosulphate (STS)-mediated sulfhydration on ten-eleven translocation (TET) were assessed by maleimide assay and mass spectrometry assay. The recruitment of TET proteins binding to Foxp3 by IL-2-induced pSTAT5 were identified by Co-IP and ChIP-qPCR. A significant correlation between Th2-like Treg reprogramming and serum levels of IL-4 in AD patients was observed. STS promoted the stability of Tregs expanded by IL-2, and reversed IL-4-induced Th2-like Treg reprogramming. The underlying epigenetic mechanism is that STS-mediated sulfhydration of Ten-eleven translocation (TET) proteins enhanced their functional activity and potentiated their recruitment to the Foxp3 locus, which facilitated DNA demethylation. The combination therapy of STS and low-dose IL-2 could reverse Th2-like Treg reprogramming and reduce Th2 cytokine levels in AD patients. IL-4 can induce Th2-like Treg



reprogramming in AD patients. Combination of STS and low-dose IL-2 might potentially serve as a novel epigenetic therapy that can rapidly and sustainably improve clinical symptoms and reverse pathological Th2-like Treg reprogramming in AD patients, which is achieved by STS-mediated sulfhydrylation of TET proteins to promote DNA demethylation of the Foxp3 locus.

### P3.04

#### ATOPIC DERMATITIS SEVERITY AND RISK FOR PSORIASIS: A NATIONWIDE POPULATION-BASED STUDY

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Recently, as research on the role of the Th17/IL-23 pathway becomes important, the relationship between atopic dermatitis (AD) and psoriasis is being elucidated. To evaluate whether AD and its severity affects the risk for psoriasis. This retrospective population-based study used the database from the 2009 National Health Insurance Services-Health Screening Cohort in Korea. A total of 3,957,922 adult subjects were included and observed until 2018. The primary outcome was newly diagnosed psoriasis. After adjusting possible confounding factors, the moderate to severe AD group had a highest hazard ratio (HR) of psoriasis (HR = 2.50; 95% confidence interval (CI), 2.40-2.61), followed by mild AD group (HR = 2.31; 95% CI, 2.19-2.44) compared with the non-AD group during a median 8.11 ± 1.19 years of follow-up. Using a claims database, it is difficult to define AD which are not standardized, and exclude patients who were misdiagnosed as AD. Patients with severe AD showed increased risk for psoriasis compared with controls, and the risk for psoriasis were increased according to the AD severity. This suggests that psoriasis and AD could share inflammatory, immune, and genetic features with each other.

### P3.05

#### EVIDENCE FOR LYSOSOMAL DYSFUNCTION WITHIN THE EPIDERMIS IN ATOPIC DERMATITIS AND ITS CORRECTION UPON DUPILUMAB THERAPY

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Atopic dermatitis (AD) is frequent chronic inflammatory skin diseases. Autophagy plays a substantial role in the homeostasis of the organism. Loss or impairment of autophagy is associated with multiple diseases. To investigate the possibility that autophagy plays a role in AD and is affected by therapy. We investigated the levels of key autophagy-related proteins (ATGs) in human skin specimens taken before and under dupilumab therapy as well as in primary human epidermal keratinocytes exposed to inflammatory stimuli *in vitro*. Our data reveal high levels of both ATG5 and ATG7 as well as evidence for increased numbers of autophagosomes in AD skin lesions compared to healthy skin. To understand the regulation of autophagy in keratinocytes, we exposed primary keratinocytes to several pro-inflammatory cytokines *in vitro*. Tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) appears to play a dual role in the regulation of autophagy. While TNF- $\alpha$  facilitated the induction of autophagy in an initial phase, it reduced the enzymatic activities of lysosomal cathepsins in later time periods resulting

in autophagy inhibition. The protein levels of cathepsin D and L are decreased in lesional AD skin specimens and returned to normal levels upon dupilumab therapy. Our studies suggest a block of autophagy owing to lysosomal dysfunction in keratinocytes, a finding, which may contribute to the chronicity of inflammation. Dupilumab therapy normalized the epidermal expression of cathepsins in AD, suggesting that lysosomal dysfunction in these patients is indeed inflammation-mediated.

### P3.06

#### STRATUM CORNEUM SQUAMOUS CELL CARCINOMA ANTIGEN 2 CAN BE A NEW NON-INVASIVE BIOMARKER OF ATOPIC DERMATITIS

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There are various serum biomarkers of atopic dermatitis (AD), but blood sampling is invasive, especially for children. Several reports showed that AD patients exhibit elevated keratinocyte SCCA2 levels. To identify a non-invasive AD biomarker, we examined the SCCA2 levels of stratum corneum (scSCCA2) samples obtained by tape-stripping. Forty-three AD patients and 35 healthy subjects (HS) were enrolled. We collected stratum corneum (sc) samples by tape-stripping from the cheek, cubital fossa, and back. The scSCCA2 level was measured by enzyme-linked immunosorbent assay and corrected for the sc protein level. We compared the scSCCA2 levels of the AD patients and HS and analyzed the correlations between the AD patients' scSCCA2 levels and clinical scores, serum biomarkers, sc cytokine levels, and epidermal barrier function indicators. At every location, the AD patients' scSCCA2 levels were significantly higher than those of the HS and declined during treatment. They were positively correlated with the itch numerical rating scale score at every location and with the severity scoring of atopic dermatitis score on the cubital fossa and back. The scSCC2 level was positively correlated with sc interleukin [IL]-25 and IL-33, and both serum biomarkers. The scSCCA2 level was correlated with transepidermal water loss, but not epidermal water content. The scSCCA2 levels of the AD patients were higher than those of the HS and reflected the severity of AD. They were also significantly correlated with other biomarkers. scSCCA2 can be a new non-invasive AD biomarker.

### P3.07

#### EPIGENETIC AGE ACCELERATION IN A PEDIATRIC COHORT OF ATOPIC DERMATITIS

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Atopic dermatitis (AD) arises from the poorly understood interplay between genetic, physiologic, and environmental factors. Such heterogeneity adds substantial barriers to predicting disease course and providing targeted, timely treatment, necessitating the discovery of dynamic biomarkers that reflect the nuances of this disease. The epigenetic clock is a marker that has garnered significant interest in complex disease studies due to its ability to predict biological age in healthy human tissues. A discrepancy between epigenetic and chronological age is a mark of "epigenetic age de/acceleration," and has been observed in human tissues from

various complex disorders. We computed and compared epigenetic age within a pediatric cohort of AD ( $n = 24$ ) and healthy controls ( $n = 24$ ) from a publicly-available dataset of DNA methylation (DNAm) of peripheral blood mononuclear cells. We observed significantly increased mean DNAm age in AD versus control across three clock algorithms (Horvath:  $+0.86$  y,  $p = 0.0078$ ; Horvath Skin&Blood:  $+0.62$  y,  $p = 0.00028$ ; GrimAge:  $+1.75$  y,  $p = 0.014$ ) (Figure 1) and significantly higher DNAm age than chronological age in paired individuals in the AD ( $+1.05$ y,  $p = 8 \times 10^{-7}$ ), but not control ( $+0.05$  y,  $p = 0.28$ ) group. Despite the small sample size, we observed significant epigenetic age acceleration in this disease cohort. The implications of our findings have the potential to identify a new biomarker that could serve as a proxy for disease, provide clues to better understand AD pathophysiology and enable prediction of disease course in the clinical setting.

### P3.08

#### **S. AUREUS PROMOTES FILAGGRIN SEGREGATION INTO SMALL EXTRACELLULAR VESICLES SECRETED BY KERATINOCYTES; A NOVEL EVASION STRATEGY?**

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Filaggrin (FLG) protein is indispensable for barrier function (including antimicrobial), but its accumulation in a monomeric form may result in premature keratinocyte death. Currently, it is unclear how FLG levels are controlled before the formation of keratohyalin granules or whether skin pathogens can affect this process. To determine if FLG is secreted within small extracellular vesicles (sEVs) produced by keratinocytes and the impact of skin infection on this cargo. FLG cargo in sEVs was determined by a Vesiclepedia search followed by sEV isolation and purification from keratinocyte-conditioned medium and serum. FLG content was confirmed by western blot and mass spectrometry. FLG cargo was assessed in sEVs from AD patient serum after exposure of keratinocytes to *S. aureus*. STRING analysis and modelling of ubiquitination sites followed. Keratinocyte-secreted sEVs contained FLG cargo; such sEVs cargo was also found in serum in both healthy individuals and AD patients. *S. aureus* enhance packaging and secretion of PFLG-processing products within the sEVs for enhanced FLG export. Modelling results suggested this to be promoted via TLR2 and NOD1-dependent pathways and linked to the ubiquitination process. sEVs constitute a route of removing accumulating FLG from keratinocytes and FLG cargo-containing sEVs are found in the circulation. Hence, sEVs could constitute FLG removal mechanism, preventing premature keratinocyte death and epidermal barrier dysfunction. By inducing FLG elimination from the skin *S. aureus* seem to hijack this mechanism to safeguard its own growth.

### P3.09

#### **SINGLE-CELL PROFILING WITH REGARD TO DISEASE SEVERITY DEFINES SPECIFIC IMMUNE CELL SUBTYPES AND THEIR INFLUENCE ON SKIN STROMAL CELLS IN ATOPIC DERMATITIS**

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The investigation of chronic inflammatory skin diseases such as atopic dermatitis (AD) by single-cell RNA-sequencing has led to novel insights into the pathomechanisms on the level of cell subtypes. Here we report a novel approach that focuses on the role of inflammatory cells in blood and skin and further considers disease severity. We applied single-cell RNA sequencing combined with T cell receptor sequencing on both blood and skin tissue of 10 AD patients and, for comparison, of 10 patients with psoriasis. Patients with mild, moderate, and severe symptoms were included. Cell type-specific gene expression analysis combined with disease severity enabled the identification of cell subtype-specific, severity-associated markers. Within lesional AD skin, these were mostly found within the Th2/Th22 polarized T cell cluster, which also contained most of the clonally propagated T cells and was nearly absent in psoriasis. Respective cell numbers were associated with local and global severity scores. AD patients' skin shared specific T cell receptor motifs, which differed from psoriatic or healthy donors' skin. Applying computational methods, we further show that Th2/Th22 immune responses in AD primarily affect skin stromal cells, such as fibroblasts. In contrast, the disease-specific Th17/Tc17 cells in psoriasis show less effect on the skin, but a stronger impact on circulating immune cells. Investigating the disease-driving subset of immune cells in detail, our study reports severity-associated marker molecules and reveals immune cell-driven pathways underlying AD skin inflammation.

### P3.10

#### **SEB-INDUCED IL-13 PRODUCTION IN CLA+ MEMORY T-CELLS DEFINES TH2 HIGH AND TH2 LOW RESPONDERS IN ATOPIC DERMATITIS**

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There is currently no clear *in vitro* model to study the Th2 status in atopic dermatitis (AD). *Staphylococcus aureus*, skin-homing cutaneous lymphocyte-associated antigen (CLA)+ memory T cells and IL-13 are key players in AD. Circulating CLA+ memory T cells reflect the cutaneous abnormalities in AD. The goal of the

study was to understand AD functional immune Th2 response heterogeneity through the SEB activation of CLA<sup>+</sup> memory T cells. For this, the CLA<sup>+</sup>/- memory T-cell response to SEB when cocultured with autologous lesional epidermal cells from 35 adult non-treated moderate-to-severe AD patients and control subjects was assessed. Also, plasma and mRNA expression from the lesional skin biopsies were analysed. Circulating CLA<sup>+</sup> memory T cells preferentially produced IL-13, IL-4, IL-31, IL-17A, IL-22, CCL17 and CCL22 when activated with SEB. The IL-13 response enabled the stratification of a clinically homogeneous population into Th2 high and Th2 low groups. In the Th2 high group, in contrast to the Th2 low, the SEB-induced CLA<sup>+</sup> T-cell IL-13 response directly correlated with eczema area and severity index (EASI), CCL17, sIL-2R and *S. aureus*-specific IgE plasma levels and inversely correlated with LCN2 mRNA expression from cutaneous lesions. This translational approach can help to understand the complex heterogeneity of AD pathophysiology by identifying the Th2 high and low responders from a clinically homogeneous AD population by functionally analysing the IL-13 response by CLA<sup>+</sup> T cells activated with SEB.

### P3.11

#### INNOVATIVE TRANSLATIONAL MODEL TO STUDY ALLERGEN-INDUCED IL-31 RESPONSE BY MEMORY T-CELLS IN MODERATE-TO-SEVERE ATOPIC DERMATITIS AND ASSOCIATION WITH CLINICAL PATIENT STATUS

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Allergen-induced IL-31 production by memory T cells in atopic dermatitis (AD) is poorly characterized and is mainly based on intracellular flow cytometry without association with the clinical features. The aim of the study was to establish an innovative translational model to analyze the role of allergen in IL-31 production in memory T cells in relation with clinical status. IL-31, together with other AD-associated cytokines (IL-13, IL-4, IL-5, IL-17A, IL-22, IFN- $\gamma$ ), by circulating CLA<sup>+</sup>/- memory T cells cocultured with autologous lesional epidermal cells from 45 non-treated moderate-to-severe AD patients and control subjects activated with HDM was evaluated, as well as plasma and mRNA expression from skin lesions. HDM-induced IL-31 correlates with plasma total IgE and HDM-specific IgE levels preferentially within the CLA<sup>+</sup> memory T-cell subset. In patients producing high IL-31 by HDM-induced CLA<sup>+</sup> T cells, the IL-31 response correlated with plasma CCL27 levels (recently identified as a biomarker of response to nemolizumab (anti-IL-31RA)) and showed high levels of specific IgE. Patients with specific IgE > 100 kUA/L displayed higher IL-31 mRNA expression in lesional skin, plasma total IgE, anti-SEB IgE, CCL18, CCL22, sIL-2R and periostin levels and HDM-induced CLA<sup>+</sup> T-cell IL-31 response than patients with specific IgE < 100 kUA/L. Assessing HDM-specific IgE may help

to identify high IL-31 producers by CLA<sup>+</sup> memory T cells in adult non-treated moderate-to-severe AD patients, and contribute to further understand the IL-31 mechanisms in AD pathophysiology and IL-31-directed therapies.

### P3.12

#### PSORIASIS PRESENTING IN A PATIENT WITH ATOPIC DERMATITIS TREATED WITH DUPILUMAB

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Dupilumab, a humanized IgG4 monoclonal antibody which inhibits both IL-4 and IL-13 pathway, has emerged as an effective treatment for moderate-to-severe atopic dermatitis (AD). Despite its significant efficacy and safety profile demonstrated in clinical trials, unexpected adverse events have been reported after FDA approval in real-world experience. A 30-year-old man was administered dupilumab due to uncontrolled severe AD. At first, eczematous lesions on flexural surfaces and severe itching seemed to improve. However, after 4th injection of dupilumab, he newly presented well-demarcated scaly hyperkeratotic plaques with severe exfoliation, especially on the back and both legs. The histologic examination, performed on the back, showed confluent parakeratosis, Munro-microabscesses in corneal layer, and regular acanthosis, strongly favoring diagnosis of psoriasis (PsO). Although its mechanism is still controversial, it is presumed that PsO may have developed through a shift from Th2-response toward a Th1-response since IL-4 is thought to inhibit maturation along Th1 pathway. Also, IL-17 is currently under the spotlight regarding the pathogenesis of both AD and PsO, which might play a role in this case. Herein, we report a rare case of dupilumab-induced phenotype switching from AD to PsO. Further research is needed to understand the immunologic pathogenesis of AD and PsO.

### P3.13

#### BIOLOGICAL SEX-SPECIFIC ENDOTYPES OF PEDIATRIC ATOPIC DERMATITIS

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Sex-specific phenotypic differences have been described in atopic dermatitis (AD), but male and female endotypes of pediatric AD have not been described. To explore and characterize sex-specific endotypes of pediatric AD. We analyzed cross-sectional data from 93 AD patients <18 years from Santiago, Chile. Phenotype, outcome measures and mechanistic components of AD (immune biomarkers, allergen sensitization, FLG genotype, skin physiology) were compared between boys and girls. A total of 51 boys (55%) and 42 girls (45%) were included. Mean SCORAD was 43.9 ± 17.4 with no difference by sex ( $p = 0.61$ ). Boys had higher rates of sensitization to aeroallergens (OR=5.3,  $p = 0.0001$ ) and food allergens (OR=2.7,  $p = 0.026$ ), as well as higher total IgE ( $p = 0.001$ ), eosinophil count ( $p = 0.027$ ), and serum IL-2 ( $p = 0.028$ ) than girls with AD. In terms of AD phenotype, boys had higher rates of genital eczema and less seborrheic dermatitis. Girls reported higher rates of AD triggered by textiles ( $p = 0.04$ ) and soaps ( $p = 0.04$ ). Non-lesional skin pH was higher in girls vs. boys (4.4 ± 0.6 vs. 4.2 ± 0.6,  $p = 0.035$ ); transepidermal water loss was not significantly different. No sex-specific differences were found regarding family history of AD or FLG loss of function mutation rates. The findings of this study suggest endophenotypic differences between boys and girls with AD, with males having higher rates of allergic sensitization and biomarkers of Th2 im-

munity. Recognizing these sex-specific differences may provide clues on AD pathogenesis and guide personalized treatment.

### P3.14

#### CONTINUOUS EXPOSURE TO OXAZOLONE INDUCES SHIFT IN THE IMMUNOPHENOTYPE OF ATOPIC DERMATITIS IN MICE

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T helper (Th) cells play an important role in the pathogenesis of AD. The “haptent-atopic” hypothesis suggests that sustained exposure to haptens may alter the type of Th cells immune response. This study analyzed the changes in immunophenotypes from acute to chronic skin inflammation under continuous hapten stimulation in mice models. To explore the mechanism of a shift in the immune responses during the progression of AD skin lesions from the acute phase to the chronic phase. In this study, a mouse model of acute, subacute, and chronic dermatitis induced by oxazolone (OX) was established in mice. First, ears thickness and histopathological changes were evaluated. Then, the expression of T cell polarization-related effector cytokines were detected by qPCR. With the increase of OX stimulation times, the skin thickness of mice ears gradually increased and then decreased slowly and tended to be stable. The expression of Th1 cell effector cytokines IFN- $\gamma$  and TNF- $\alpha$  were significantly increased in acute dermatitis lesions. In the skin lesions of subacute dermatitis, the expression of Th2 cell effector cytokines IL-4 and IL-13 was significantly increased. Th17 cell effector cytokine IL-17 was significantly elevated in chronic dermatitis. Increasing the number of OX excitations can gradually induce acute, subacute, and chronic dermatitis in mice. At the same time, the polarization of Th cells in the skin lesions also demonstrated a shift from Th1 dominance in the acute phase to Th2 dominance in the subacute phase, and then to a mixed phenotype of Th1, Th2, and Th17 in the chronic phase.

### P3.15

#### UNSUPERVISED EXPRESSION PROFILING OF CIRCULATING IMMUNE CELLS IN SEVERE KOREAN ATOPIC DERMATITIS PATIENTS BY SCRNA-SEQ

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Atopic dermatitis (AD) is a chronic inflammatory skin disease of which pathophysiology is centered on the Th2/Th22 pathway. Neuroinflammation, microbiome, barrier dysfunction, and other immune cell dysregulation were also reported to contribute to the disease. Previous research showed that circulating regulatory T cells (Tregs) in AD patients have diverse immune phenotypes and contribute to their immune dysregulation among European-American patients. However, limited large-scale research on single-cell levels has been conducted for Asian patients with AD, who may have distinct pathological mechanisms. The present study employed a single-cell RNA-seq analysis with more than 300

thousand cells from 12 severe Korean AD patients and 8 healthy controls. We investigated whether Asian patients with severe AD present with varied immunophenotypes in circulating regulatory T cells. Effector Tregs (activated Tregs) were increased and showed proliferative features in AD. However, their key functional regulators were dysregulated, suggesting the inhibition of the suppressive function of Tregs in AD. In the severest group of patients, memory T cells expressed increased skin-homing receptors. Distinct populations in monocytes and dendritic cells were also found in AD patients, and several critical regulators were inferred through cell-to-cell interaction analysis. With a large-scale number of peripheral blood cells, we could define cellular characteristics in each specific cell type, providing high-quality information on understanding the pathogenesis of AD.

### P3.16

#### SKIN BARRIER FUNCTIONS IN PATIENTS WITH SYSTEMIC SCLEROSIS AND SJÖGREN'S SYNDROME

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Patients with systemic sclerosis (SSc) and sjögren's syndrome (SS) suffer from dry skin while the cause remains obscure. SSc is characterized by the sclerotic fibrosis of the skin, blood vessels and various internal organs. SS is characterized by exocrine gland dysfunction and chronic lymphocytic infiltrations. The close interaction between the epidermis and the dermis has been well established. However, the skin barrier functions of stratum corneum in patients with SSc and in patients with SS are not well known. To investigate skin barrier function in patients with SSc and in patients with SS. We enrolled 34 SSc, 31 SS patients and 25 healthy controls. Transepidermal water loss (TEWL) and hydration of the volar forearms and cheeks were measured in three groups. Moreover, we performed subgroup analyses according to subtype, autoantibodies (scl-70, centromere, Ro), mRSS, and diabetes in patients with SSc. In addition, subgroup analyses according to anti-Ro, salivary gland ultrasound (SGUS), USFR (salivary flow rate), and diabetes were performed in patients with SS. There were no statistically significant differences in TEWL and skin hydration in patients with SSc and in patients with SS compared to healthy controls. In subgroup analyses, there was no significant difference in the levels of TEWL or skin hydration according to the subtype, presence of auto-antibodies, and comorbid diabetes. There was no specific impairment of skin barrier function and hydration in patients with SSc and in patients with SS.

### P3.17

#### SKIN MICROBIOME – HOST INTERACTIONS IN ATOPIC DERMATITIS

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There is increasing evidence for the role of the skin microbiome in atopic dermatitis (AD). The aim of this study was to compare the skin microbiome and metabolome in AD and healthy skin to identify microbe-host interactions. Skin microbiome samples were obtained from lesional and non-lesional skin of adults with moderate-to-severe AD ( $n = 88$ ), and healthy volunteers ( $n = 117$ ). The metagenome was sequenced to quantify microbial species abundances and SA strain abundances in AD. Further skin microbiome and metabolome swabs were obtained from involved

and uninvolved skin sites of adults with mild-to-severe AD ( $n = 10$ ). Metabolites were extracted and identified using NMR spectroscopy. *Staphylococcus aureus* (SA) relative abundance is increased in AD and correlates with disease severity, while the skin microbiota diversity is reduced. Severe AD harbours distinct SA strains which have potential virulence factor genes that were not present in SA strains associated with mild-to-moderate AD. Microbial glucose, proline, histidine and folate metabolism are positively correlated with SA relative abundance, while short chain fatty acid metabolism is negatively correlated with SA in AD. Consistent with these changes, the skin metabolome has increased glucose metabolites, histidine and proline in SA-high AD. This work shows major differences between the AD and healthy skin microbiome and reveals potential SA virulence mechanisms. The associated host metabolome changes may underlie mechanisms of inflammation in AD and may provide SA-AD-specific therapeutic targets for the future.

### P3.18

#### GENE-ENVIRONMENT INTERACTION ANALYSIS FOR ATOPIC ECZEMA SHOWS LIMITED EVIDENCE OF AN EFFECT OF FILAGGRIN NULL GENOTYPE

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Gene-environment interaction is likely to play a role in the pathogenesis of atopic eczema (AE). A systematic review found evidence of interaction between FLG and cat ownership, older siblings, water hardness, phthalates and breastfeeding, but these epidemiological studies had small sample sizes. To use large population-based cohorts and *in vitro* modelling to investigate putative FLG-environment interactions. We tested for interaction between FLG null genotype and early-life environmental exposures with AE as an outcome in 25 European studies. Discovery analysis ( $n = 15,600$ ) showed a nominal significant interaction of FLG with tobacco smoke exposure (interaction OR 1.33 [95% CI 1.05-1.68]  $p = 0.018$ ) and frequent bathing (iOR 0.71 [0.51-0.99]  $p = 0.045$ ) in the first 2 years of life. However, replication analysis ( $n = 196,000$ ) and meta-analysis of all datasets ( $n = 210,000$ ) showed no significant FLG-environment interactions. We investigated the apparent protective effect of washing in one study (BASELINE  $n = 1,034$ ) with detailed information on wash product. FLG null genotype may interact with washing to increase AE risk when soap or foam is used (iOR 1.12 [0.50-2.51]  $p > 0.05$ ). This is supported by evidence of a harmful effect of detergent on organoid skin which is exacerbated by FLG knockdown. There is limited evidence for FLG-environment interaction from population-based cohorts and important details of lifestyle and confounding factors are missing. Further experimental work is needed to define mechanisms of importance for eczema prevention.

### P3.19

#### ANALYSIS OF STAPHYLOCOCCUS BACTERIA LOAD AND SKIN BIOMARKERS FROM VERNIX CASEOSA REVEAL ATOPIC DERMATITIS-PRONE ALTERATIONS IN NEONATES FROM OVERWEIGHT MOTHERS

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Vernix caseosa (VC) is a proteolipid material covering human fetus skin in the last trimester. It plays a fundamental role in skin development and adaptation in the placenta and early life, suggesting intimate maternal-fetal interactions. VC characterization and potential effects of maternal conditions are essential to elucidating the skin barrier formation process in health and disease. To compare the load of Staphylococci and skin barrier biomarkers in VC from neonates from normal vs. overweight mothers. A cross-sectional study was carried out to collect VC from the skin surface of neonates immediately after birth. Bacterial DNA was extracted to quantify *S. aureus*, *S. epidermidis*, and *S. hominis* loads by qPCR. Proteins were extracted from VC to analyze their expression by ELISA. Maternal overweight was defined as body mass index (BMI)  $\geq 25$ . 24 VC samples were collected from neonates from 16 overweight and 8 healthy mothers. VC from mothers with BMI  $\geq 25$  had a lower level of *S. epidermidis* and *S. hominis* load compared with BMI  $< 25$  mothers, while *S. aureus* did not have differences. VC from overweight mothers had decreased expression of Filaggrin and Loricrin proteins, while IgE, IgA, TSLP, IL-33, and S100A8 protein were decreased. No changes were observed in IL-25 or Cathelicidin. VC from neonates from overweight mothers exhibit Staphylococcal dysbiosis and skin barrier protein alterations similar to that observed in atopic dermatitis skin. Our results may aid understanding of perinatal risk factors and incidence prediction of AD.

### P3.20

#### INTERLEUKIN-20 PROMOTES NEURO-INFLAMMATION AND PRURITUS IN ATOPIC DERMATITIS

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Atopic dermatitis (AD) is a chronic skin disease, which is associated with intense itch, skin barrier dysfunction and eczematous lesions. Aberrant IL-20 expression has been implicated in numerous inflammatory diseases, including psoriasis. However, the role of IL-20 in AD remains unknown. To assess the role of IL-20 during chronic itch observed in AD. RNA-seq, Q-PCR, and IHC were utilized to examine changes of expression of IL-20 peptide and receptor in AD versus healthy human skin and murine AD-models. Calcium imaging, knockdown and cytokine array monitor IL-20-evoked responses in keratinocytes and sensory neurons. The murine cheek model was employed to evaluate IL-20-elicited sensations *in vivo*. We found that transcripts and protein of IL-20 were upregulated in the skin of AD patients and mice with AD-like phenotype. Topical MC903 treatment in mice

ear enhanced IL-20R1 expression in trigeminal sensory ganglia, suggesting an epidermal-driven mechanism for sensitization of sensory IL-20 signaling. IL-20 evoked Ca influx in keratinocytes and sensory neurons, promoting release of AD-related molecules and transcription of itch-related genes. In sensory neurons, IL-20 increased TLR2 transcripts, linking the innate immune response with IL-20. In a Mouse model of acute itch, intradermal injection IL-20 and IL-13 elicited significant itch-like behavior, though only when co-injected. Our findings highlight a role of IL-20 signaling in the pathophysiology of AD, thus forming a new basis for the development of a novel antipruritic strategy via interrupting IL-20 epidermal pathways.

## P4. Novel and Targeted Management of AD

### P4.01

#### EFFECTIVENESS AND TOLERANCE OF JANUS KINASE INHIBITORS FOR THE TREATMENT OF RECALCITRANT ATOPIC DERMATITIS IN A REAL-LIFE FRENCH MULTICENTER ADULT COHORT

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JAK inhibitors (JAKi) are newly available drugs for the treatment of moderate-to-severe atopic dermatitis (AD). Their efficacy and safety were demonstrated in clinical trials, but there are few data in real-life practice. This study from the French Group of Research and Study in Atopic Dermatitis (GREAT) aimed to assess the effectiveness and tolerance of JAKi in real-life. We conducted a multicenter retrospective cohort including the first AD patients who received UPADACITINIB and BARICITINIB from March 2021 to January 2022. The primary outcome was the percentage of patients obtaining at 3 months (M3) an Investigator's Global Assessment (IGA) score at 0 or 1, or -2 compared with baseline. We included 100 patients from 18 centers: 54 treated with UPADA 15 mg/day, 12 with UPADA 30 mg/day, 34 with BARI 4 mg/day. Most patients had severe AD and had previously received several lines of systemics before JAKi introduction. The primary outcome was reached at M3 for 33/54 (61.1%), 11/12 (91.7%) and 14/34 (41.2%) patients receiving UPADA 15 mg, UPADA 30 mg or BARI 4 mg respectively. Sixty patients presented at least 1 AE, the most frequent being increased blood level of cholesterol (23.2%) or triglycerides (18.2%), facial papular eruption (12.9%), cytotoxicity (11.1%) and herpes infection (6.4%). JAKi were stopped in 18 patients. This study highlighted the effectiveness of JAKi in a population of patients with AD recalcitrant to conventional systemics and biologics, with a good safety profile subject to the short period of follow-up.

### P4.02

#### REAL-WORLD EXPERIENCE OF BARICITINIB IN KOREAN PATIENTS WITH MODERATE TO SEVERE ATOPIC DERMATITIS

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Little real-world experience regarding the use of baricitinib, an oral selective JAK1/JAK2 inhibitor, for treating moderate to severe atopic dermatitis (AD) has been reported. This study aimed to assess the overall outcomes in Korean patients with AD treated with baricitinib. All patients treated with baricitinib between June 2021 and December 2021 were included, and their cases were retrospectively analyzed using medical records. Patients with moderate to severe AD, aged ≥18 years, including those who demonstrated unsatisfactory improvement with dupilumab, were prescribed baricitinib. The dermatologist evaluated the AD status, including eczema area and severity index (EASI) and degree of itching. We analyzed 30 AD patients who received baricitinib 4mg per day. Eleven patients treated with dupilumab were additionally prescribed baricitinib due to unsatisfactory treatment effects and demonstrated improvement in the remaining lesions despite dupilumab treatment. Among them, seven patients (63.6%) had head and neck dermatitis, and six of them demonstrated improvement after the co-administration of baricitinib. Among the other 19 patients who were prescribed baricitinib only, 16 (84.2%) demonstrated improved clinical disease severity, with 4 (21.1%) revealing an EASI 90. Patients demonstrated improvement in itching after 2.3 weeks. Overall, baricitinib was well-tolerated and resulted in clinical improvement in AD patients in a real-world clinical setting. Additionally, baricitinib may be beneficial in treating lesions refractory to dupilumab therapy.

## P4.03

### REAL-WORLD EXPERIENCE OF DUPILUMAB FOR ATOPIC DERMATITIS: LONG-TERM EFFECTIVENESS AND USAGE OF COMBINATION THERAPIES FOR INADEQUATE TREATMENT RESPONSE AFTER DUPILUMAB TREATMENT

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Dupilumab has shown to be safe and effective in the treatment of atopic dermatitis (AD), but a proportion of patients may experience inadequate response. Attentive use of various systemic agents in combination with dupilumab can obtain an improvement of signs and symptoms of AD. We investigated the long-term effectiveness of dupilumab and the usage of combining systemic agents in patients experiencing insufficient response. This retrospective analysis included patients aged  $\geq 18$  years with moderate to severe AD treated with dupilumab from June 2019 to December 2021. The efficacy was evaluated at week 16 and 52 using EASI. We analyzed data of subjects for whom an additional systemic treatment was combined. Total of 65 patients was included in the study, with a mean baseline EASI was 28.1. EASI 75 was achieved by 70.1% and 90.9% of patients at weeks 16 and 52 of treatment. Combination treatment consisted of cyclosporine ( $n=5$ ), baricitinib ( $n=11$ ), and prednisolone ( $n=1$ ) for inadequate response to dupilumab. Fifteen patients experienced amelioration of signs and symptoms of AD. Adjuvant baricitinib resulted in rapid improvement of patients' itching, and six patients demonstrated improvement of head and neck dermatitis. Long-term treatment of dupilumab results in significant improvement of symptoms and signs of AD. Adding baricitinib can improve recalcitrant lesions such as head and neck dermatitis and rapidly alleviate itch, where short-term cyclosporine or prednisolone can be used for the treatment of atopic flares.

## P4.04

### TWO CASES OF ALOPECIA AREATA AFTER TREATMENT WITH DUPILUMAB IN SEVERE ATOPIC DERMATITIS PATIENTS

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Atopic dermatitis (AD) is a chronic inflammatory skin disorder that can be comorbid with alopecia areata (AA). For the treatment of moderate-to-severe AD, dupilumab is used worldwide. While some case reports have demonstrated improvement of AA with dupilumab, there are also reports of patients developing new-onset hair loss during treatment. A 28-year-old man presented with a lifelong AD, without previous history of alopecia. He was given cyclosporine, 100mg a day for four months, then was transitioned to dupilumab for 300mg every two weeks. In two months, he noted decreased hair density and was given 0.05% clobetasol propionate shampoo. The following month, his hair loss progressed rapidly, with erythematous, scaly patches appearing on the forehead and both parietal scalp. Without discontinuation of dupilumab, he noted conspicuous hair regrowth in two months. A 47-year-old man presented with a lifelong AD. Dupilumab provided initial improvement, but soon, he developed diffuse, hairless patches on both parietal scalp. He received an intralesional injection of 5mg/mL and started noting gradual improvement. Yet, he soon noticed increased hair loss again, which progressed to alopecic patches on both temporal scalps. We present two cases of patients with a new-onset of hair loss

while on dupilumab for AD. The pathway by which dupilumab causes AA has not been elucidated, so further studies are needed to determine the impact of dupilumab on AA.

## P4.05

### COMBINATION THERAPY OF DUPILUMAB AND BARICITINIB FOR THE TREATMENT OF ATOPIC DERMATITIS DUPILUMAB BARICITINIB

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Recently dupilumab, an IL-4/IL-13 receptor inhibitor, has begun to be used for the treatment of severe atopic dermatitis, and it has been proved to be effective. However, not all cases achieved the goal. In a previous study, the combination therapy of dupilumab and immunosuppressants has been introduced. Baricitinib, Janus kinase 1&2 inhibitor, is an excellent alternate for immunosuppressants with the advantage of lesser complication. We described a retrospective study of 5 cases who underwent dupilumab and baricitinib combination therapy. The outcome of the treatment was measured by Eczema area severity index (EASI) score, pruritus numerical rating scale (NRS), patient-oriented eczema measure, dermatological life quality index, and atopic dermatitis control tool. 4 cases series underwent dupilumab and baricitinib combination therapy due to insufficient effect and temporary aggravation. 4 weeks after the use of baricitinib, all of the patients experienced improvement in objective measures of EASI and NRS. Additionally, some patients showed improvement in subjective measures and laboratory findings associated with allergy such as eosinophil count & Immunoglobulin E count. Furthermore, no specific side effects occurred until treatment was completed and discontinued. Even though the number of cases is small, these cases show that adding baricitinib to patients with insufficient dupilumab effect is useful and the incidence of side effects has not been increased. These cases imply that baricitinib might be safely used when dupilumab shows insufficient effect.

## P4.06

### ATOPIC DERMATITIS REFRACTORY TO DUPILUMAB SUCCESSFULLY CONTROLLED BY UPADACITINIB – A CASE REPORT

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Atopic dermatitis (AD) is a chronic inflammatory skin disease characterized by eczematous skin lesions and pruritus. The key elements involved in the etiology of the disease are Th2 cytokines such as interleukin (IL) 4 and IL-13. Dupilumab, a monoclonal antibody that targets the shared receptor component for IL-4 and IL-13, is the first biologic therapy approved for AD. According to clinical trials and real-world data, dupilumab is effective and safe in the treatment of moderate-to-severe AD. However, there are cases in which the disease is not adequately controlled by dupilumab. In this group of patients, a new class of small molecules, Janus kinase (JAK) inhibitors can be a therapeutic option. JAK is an intracellular signal transducer which activates transcription pathways of inflammatory cytokines. Upadacitinib is a JAK 1 inhibitor approved for the treatment of AD. We present a case of a 37-year-old-woman whose AD previously refractory to dupilumab, responded rapidly to upadacitinib. At her initial visit, we introduced dupilumab 300mg every 2 weeks. However, her Eczema Area and Severity Index (EASI) score was increased from 2.8 to 6.2, at 16 weeks. The patient reported only a slight improvement of pruritus. Therefore, we stopped dupilumab treat-

ment and introduced upadacitinib 30mg/day. Her EASI score was decreased to 2 and her pruritus improved dramatically. We report a case of AD uncontrolled by dupilumab, which responded well to upadacitinib, suggesting upadacitinib as a therapeutic option for AD refractory to dupilumab.

#### P4.07

### A CASE OF MYCOSIS FUNGOIDES MIMICKING ATOPIC DERMATITIS TREATED WITH UPADACITINIB

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Mycosis fungoides (MF) is the most common form of cutaneous T-cell lymphoma, which appears in various forms. MF is often misdiagnosed as it has similar clinical patterns to atopic dermatitis. Treatments such as immunosuppressants are used for AD, which may affect the tumorigenesis of MF and thus may be inappropriate treatment. For this reason, it is significant to distinguish between the two diseases. A 43-year-old male came to our clinic for a skin lesion which occurred 7 years and aggravated 3 years ago. He was diagnosed with atopic dermatitis at another hospital and there was no effect with previous treatments. On physical examination, the EASI score was 22.2 and itch NRS was 7. Therefore, a biopsy was conducted, and the findings consistent with chronic eczematous dermatitis were confirmed. Accordingly, treatment with upadacitinib was started with the patient's consent. Within two weeks of administration, lesions improved with post-inflammatory hyperpigmentation. However, the monoclonality was confirmed on the T-cell receptor gamma gene rearrangement, a re-biopsy was performed. As a result, it was finally diagnosed as MF. While inhibition of T-helper 1 cells is important in the mechanism of occurrence of cutaneous T-cell lymphoma, relative enhancement of Th1 arising from inhibition of T-helper 2 cells in upadacitinib may help prevent the progression of MF. This is consistent with the treatment effects shown in this case, suggesting that upadacitinib can be an effective treatment option for MF.

#### P4.08

### A CASE OF ATOPIC DERMATITIS REFRACTORY TO BARICITINIB SUCCESSFULLY TREATED WITH UPADACITINIB

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Atopic dermatitis (AD) is a chronic inflammatory skin disease that remains difficult to treat. The Janus kinase-signal transducer and activator of transcription (JAK-STAT) pathway is an essential cytokine signal in AD. For this reason, JAK inhibitors are novel treatment approaches for AD. There are several types of JAK inhibitors depending on which JAK transducer they inhibit. Baricitinib is a selective JAK1/2 inhibitor whereas upadacitinib is a selective JAK 1 inhibitor. We present the case of a man whose AD previously refractory to baricitinib, responded rapidly to upadacitinib. A 23-year-old male visited our clinic with a lifelong history of AD. He had been treated with systemic corticosteroid and oral cyclosporine but did not improve. His initial Eczema Area Severity Index (EASI) score was 20.3, especially severe in the periauricular region. He initiated treatment with baricitinib 4mg/day on the first visit. Although being treated with baricitinib for 12 weeks, he did not show any improvements and his EASI score was 22.1. Due to his lack of efficacy, we switched baricitinib to upadacitinib. After administering upadacitinib 30mg/day for 2

weeks, his EASI score was decreased to 17.9 and his periauricular lesion was significantly improved. After 16 weeks of upadacitinib, his final EASI score was 7.2, showing remarkable improvements. He remains to be on upadacitinib 30mg/day and his disease is still well controlled. In this case, we present significant improvement after administering upadacitinib; therefore, suggesting its option to the treatment regimen of refractory AD.

#### P4.09

### SHORT-TERM EFFICACY AND SAFETY OF ABROCITINIB BY BASELINE DISEASE SEVERITY IN PATIENTS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS

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Abrocitinib, an oral JAK-1 inhibitor is efficacious and well tolerated in patients with moderate-to-severe AD. To evaluate the efficacy and safety of abrocitinib by baseline (BL) disease severity. This post hoc analysis included patients receiving once daily oral abrocitinib (200 mg and 100 mg) as monotherapy (pooled NCT02780167, NCT03349060, NCT03575871) or in combination with topical therapy (COMPARE; NCT03720470). BL disease severity groups based on IGA and EASI were assessed for IGA 0/1 (with  $\geq 2$  point improvement from BL) and EASI-75 responses at week (wk) 12. Safety was also assessed (pooled monotherapy, COMPARE, REGIMEN [NCT03627767; open label phase], EXTEND [NCT03422822; April 2020 data cut]). At wk 12, improvements occurred with both doses of abrocitinib monotherapy regardless of BL disease severity. Corrected for placebo, IGA 0/1 response was observed in 37.6% of patients with abrocitinib 200 mg and 19.8% with abrocitinib 100 mg in the BL IGA=3 group, and 25.9% and 17.7% in the BL IGA=4 group. EASI-75 was achieved in 54.4% of patients with abrocitinib 200 mg and 36.3% with abrocitinib 100 mg in the BL EASI<25 group, and 45.9% and 25.0% in the BL EASI  $\geq 25$  group. Similarly, improvements were seen with abrocitinib 200 mg and 100 mg plus topical therapy. AEs were similar in both groups (IGA=3 vs IGA=4), with no unexpected safety signals. Abrocitinib, as monotherapy or in combination with topical therapy, provided clinically meaningful improvements in patients with moderate-to-severe AD, regardless of BL disease severity.

#### P4.10

### DUPILUMAB REDUCES BIOMARKERS INDICATIVE OF TYPE 2 INFLAMMATION IN CHILDREN AGED 6 MONTHS TO 5 YEARS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS

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Dupilumab was previously shown to reduce CC chemokine ligand 17 (CCL17) and total IgE levels in multiple type 2 inflammatory diseases, including AD. We evaluated the effects of dupilumab treatment on type 2 biomarkers in children aged 6 months to 5 years with moderate-to-severe AD. In LIBERTY AD PRE-SCHOOL (NCT03346434 part B), a phase 3, double-blind trial, children aged 6 months to 5 years with moderate-to-severe AD inadequately controlled with topical therapies were randomized 1:1 to subcutaneous dupilumab (200 mg if baseline weight  $\geq 5 - < 15$  kg, 300 mg if  $\geq 15 - < 30$  kg) or placebo every 4 weeks for 16 weeks. All patients received standardized low-potency topical corticosteroids. Serum for biomarker analysis was collected at baseline, Week 4, and Week 16. Baseline median serum CCL17 levels for dupilumab/placebo groups ( $n = 83/79$ ) were 3,295/3,190 pg/mL. After 16 weeks of treatment, median values were 522 pg/mL in dupilumab and 1,845 pg/mL placebo – a reduction of 83.1% and 12.8%, respectively ( $p < 0.0001$  vs placebo). Baseline median total IgE levels for dupilumab/placebo groups ( $n = 83/79$ ) were 2,190/3,240 kU/L, respectively. After 16 weeks of treatment, median values were 707 kU/L in dupilumab and 2,410 kU/L in placebo – a reduction of 71.2% and 28.1%, respectively ( $p < 0.0001$  vs placebo). Dupilumab significantly reduces serum CCL17 and total IgE in children aged 6 months to 5 years with moderate-to-severe AD vs placebo-treated controls, reflecting reduction of systemic type 2 inflammation.

#### P4.11

### LEBRIKIZUMAB IMPROVES PATIENT-REPORTED SYMPTOMS OF ANXIETY AND DEPRESSION IN MODERATE-TO-SEVERE ATOPIC DERMATITIS: RESULTS FROM THREE RANDOMIZED, DOUBLE-BLINDED, PLACEBO-CONTROLLED PHASE 3 TRIALS

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Lebrikizumab (LEB), high-affinity monoclonal antibody, demonstrated efficacy in patients with moderate-to-severe atopic dermatitis (AD) during 16 weeks (wks) of treatment in 3 placebo (PBO)-controlled Phase 3 trials: Two 52-wk monotherapy studies, ADvocate1 (NCT04146363) and ADvocate2 (NCT04178967) and a 16-wk topical corticosteroid (TCS)-combination therapy study ADhere (NCT04250337). To evaluate 16-wk improvements in anxiety and depression in adult patients with moderate-to-severe AD. Patients were randomized 2:1 to subcutaneous LEB 250mg (LEB250) or PBO every 2 wks (Q2W) in ADvocate1&2, or LEB250+TCS or PBO+TCS Q2W in ADhere. Improvements in anxiety and depression were measured at Wk16 using the relevant Patient-Reported Outcomes Measurement Information System (PROMIS) scales as exploratory objectives (no multiplicity

control). Missing data were imputed by last observation carried forward; continuous data analyzed using ANCOVA. Baseline anxiety and depression scores were  $\leq 55.0$  in all three studies. In ADvocate1 least squares mean change from baseline (CFB) in anxiety was -3.9 for LEB250 ( $n = 244$ ) vs -0.6 for PBO ( $n = 122$ ;  $p < 0.001$ ); depression CFB was -3.1 vs -0.4 ( $p < 0.001$ ) respectively. In ADvocate2 anxiety CFB was -3.2 for LEB250 ( $n = 246$ ) vs -0.5 for PBO ( $n = 128$ ;  $p < 0.001$ ); depression CFB was -2.6 vs 0.2 (PBO,  $n = 127$ ) ( $p < 0.001$ ) respectively. In ADhere anxiety CFB was -1.9 for LEB250+TCS ( $n = 101$ ) vs -1.1 for PBO+TCS ( $n = 43$ ;  $p = 0.571$ ); depression CFB was -1.4 vs -1.2 ( $p = 0.882$ ) respectively. LEB250 Q2W achieved improvements in anxiety and depression for moderate-to-severe AD patients.

#### P4.12

### EFFICACY AND SAFETY OF ABROCITINIB MONOTHERAPY IN ADULTS AND ADOLESCENTS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS: A POST HOC ANALYSIS OF JADE REGIMEN

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The heterogeneity of atopic dermatitis (AD) requires a flexible treatment regimen. To assess maintenance of response with continuous- or reduced-dose abrocitinib, or withdrawal, in adults and adolescents with moderate-to-severe AD. In the phase 3 JADE REGIMEN trial (NCT03627767), patients who responded (EASI-75, IGA 0/1 +  $\geq 2$ -grade improvement from baseline) to 12-week, open-label, 200 mg/d abrocitinib (induction) were randomly assigned to receive abrocitinib (200 mg/100 mg) or placebo for 40 weeks (maintenance). Flare during maintenance was defined as  $\geq 50\%$  loss of week 12 EASI response and IGA  $\geq 2$ . Proportions of adults and adolescents achieving IGA 0/1, EASI-75, IGA 0/1 + EASI-75, and PP-NRS4 at induction week 12; probability of flare during maintenance; and adverse events (AEs) were analyzed. Induction was received by 987 adults and 246 adolescents. Week 12 adult and adolescent response rates were 68% and 60% (IGA 0/1), 77% and 72% (EASI-75), 67% and 59% (IGA 0/1 + EASI-75), and 71% and 58% (PP-NRS4), respectively. Probability of flare during maintenance with abrocitinib 200 mg, abrocitinib 100 mg, and placebo was 20%, 43%, and 81% (adults) and 15%, 43%, and 80%, (adolescents). Rates of AEs in adults and adolescents were 62% and 68% (abrocitinib 200 mg), 53% and 59% (abrocitinib 100 mg), and 45% and 45% (placebo). Efficacy and safety of abrocitinib 200 mg induction and maintenance with abrocitinib 200 mg or 100 mg were similar in adults and adolescents, but more adults than adolescents achieved PP-NRS4 at induction.

#### P4.13

### EFFICACY OF ABROCITINIB AND DUPILUMAB IN PATIENTS WITH ITCH-DOMINANT ATOPIC DERMATITIS: A POOLED ANALYSIS OF 2 RANDOMIZED TRIALS

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Efficacy data for the treatment of itch-dominant AD (severe itch plus mild-to-moderate skin lesions), a common, recently identified AD subtype, are lacking. This post hoc analysis assessed the efficacy of abrocitinib, a JAK1-selective inhibitor, and dupilumab, an IL-4 receptor blocker, in patients with itch-dominant AD on background topical therapy. We pooled data for patients with itch-dominant AD (Peak Pruritus Numerical Rating Scale [PP-NRS] score  $\geq 7$ ; Investigator Global Assessment [IGA] score of 0-3) treated with abrocitinib (200 mg/day) or dupilumab (300 mg/week) from 2 randomized trials in moderate-to-severe AD (NCT03720470, NCT04345367). Outcomes were proportions of patients with a  $\geq 4$ -point PP-NRS improvement (PP-NRS4) and score of 0-1 (PP-NRS 0/1) and the least squares mean (LSM) changes from baseline in patient-reported Patient-Oriented Eczema Measure (POEM) and Dermatology Life Quality Index (DLQI). The itch-dominant AD pool comprised 498 patients (42% of total; abrocitinib, 255; dupilumab, 243). PP-NRS4 response rates were 56% (abrocitinib) and 31% (dupilumab) at week 2, 68% and 58% at week 8, 68% and 63% at week 12, and 68% and 67% at week 16. PP-NRS 0/1 response rates were higher with abrocitinib at weeks 2 (17% vs 3%), 12 (36% vs 20%), and 16 (35% vs 21%). At weeks 12 and 16, improvements in POEM and DLQI were greater with abrocitinib than with dupilumab. In patients with itch-dominant AD, abrocitinib was associated with a higher early itch response, deep itch response, and greater mean improvements in quality of life than dupilumab.

#### P4.14

### LEBRIKIZUMAB MONOTHERAPY REDUCES FLARES IN PATIENTS WITH MODERATE TO SEVERE ATOPIC DERMATITIS

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Patients with moderate to severe atopic dermatitis (AD) commonly experience worsening of disease severity, often requiring acute treatment with topical corticosteroids (TCS) or other rescue medication. To determine lebrikizumab's ability to reduce flares in patients with moderate to severe AD through two randomized, controlled monotherapy trials: ADvocate 1 (NCT04146363) and ADvocate 2 (NCT04178967). Patients were randomized in a 2:1 ratio to lebrikizumab 250 mg or placebo every two weeks. Flare was defined by 3 models: the per protocol use of at least one rescue medication; the use of high potency TCS or systemic rescue medication; or an exacerbation of AD, captured as a treatment emergent adverse event (TEAE). AD exacerbation was defined using specific MedDRA preferred terms. Baseline disease characteristics and patient demographics were similar between treatment groups and studies. During the 16-week induction period, a smaller proportion of patients treated with lebrikizumab versus placebo used at least one per protocol rescue medication in ADvocate 1 (11.0% vs 33.3%) and ADvocate 2 (18.5% vs 39.7%). Additionally, in ADvocate 1 and ADvocate 2, fewer patients treated with

lebrikizumab used a high potency TCS or systemic rescue medication (4.2% vs 17.0% and 11.7% vs 28.8%, respectively). Fewer patients treated with lebrikizumab versus placebo reported at least one AD exacerbation TEAE in ADvocate 1 (6.0% vs 21.3%) and ADvocate 2 (10.3% vs 26.9%). In patients with AD, treatment with lebrikizumab monotherapy resulted in numerically fewer AD flares than treatment with placebo.

#### P4.15

### MULTICENTRE PROSPECTIVE OBSERVATIONAL STUDY OF DUPILUMAB-INDUCED OCULAR EVENTS IN ATOPIC DERMATITIS PATIENTS

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Dupilumab is approved for the treatment of moderate to severe atopic dermatitis (AD) and severe asthma. Although ocular adverse events are frequent in AD patients treated with dupilumab, the characterisation of these events remains limited due to the absence of prospective studies with a systematic ophthalmological examination. Our study aims to examine the incidence, clinical characteristics, and risk factors of dupilumab-induced ocular adverse events. A prospective, multicentre and real-life study in adult patients with AD treated with dupilumab. At baseline,

27 out of 181 patients (14.9%) had conjunctivitis. At week 16, 25 out of 27 had improved their conjunctivitis and 2 remained stable and 34 out of 181 patients (18.7%) had dupilumab-induced blepharo-conjunctivitis: either de novo ( $n=32$ ) or worsening of underlying blepharo-conjunctivitis ( $n=2$ ). Most events (27/34; 79.4%) were moderate. A multivariate analysis showed that head and neck AD (OR=7.254; 95%IC [1.938-30.07];  $p=0.004$ ), erythroderma (OR= 5.635; 95%IC [1.635-21.50];  $p=0.007$ ) and the presence of dry eye syndrome at baseline (OR= 3.51; 95%IC [3.158-13.90];  $p=0.031$ ) were independent factors associated with dupilumab-induced blepharo-conjunctivitis. Limitations: Our follow-up period was 16 weeks and some late-onset time effects may still occur. This study showed that most dupilumab-induced blepharo-conjunctivitis are *de novo*. AD severity and conjunctivitis at baseline were not found to be associated risk factors in this study.

#### P4.16

### DETERMINING ATOPIC DERMATITIS PATIENTS' PREFERENCES FOR SYSTEMIC TREATMENT

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Along with new systemic treatments for moderate and severe atopic dermatitis (AD), personalized treatment and addressing it to patients' needs comes to be a daily practice. Aim of the study is to evaluate the main features of the systemic drug that are important for patients. Anonymous survey is being conducted with adults suffering from AD in Poland. A total 65 patients responded as a part of pilot study, and by the end of it 300 patients are expected to complete the survey. 65% of respondents prefer to take one pill every day, but if the injectable drug is more effective, almost 90% will choose it instead of the pill. Half of the patients prefer continuous treatment, the other half on-demand treatment. 88% prefer to take the medicine at home, whereas 12% at the clinic or hospital. 66% prefer check-ups every six month, 34% every month. 94% responders would wait longer for the treatment effects, if they'd remain for a longer duration. 80% of respondents prefer a less effective but safer drug. Side effects the responders are mostly concerned about is malignancy (72%), thromboembolism (23%), risk of serious infection (5%). The results can be helpful when it comes to choosing the systemic therapy. Including patients' needs into the treatment process guarantees more efficacious results.

#### P4.17

### ABSOLUTE EASI TARGET IN MODERATE-TO-SEVERE ATOPIC DERMATITIS: ANALYSIS OF DATA FROM THE MEASURE UP 1 AND 2 STUDIES

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The Eczema Area and Severity Index (EASI) is a preferred outcome measure for atopic dermatitis (AD). Relative reductions from baseline EASI scores are commonly used in clinical research of AD, yet little is known about treat-to-target goals and optimal absolute thresholds for EASI scores. To identify an absolute EASI target score threshold that reflects optimal levels of AD symptom and severity reduction. Measure Up 1 & 2 were replicate phase 3 studies of upadacitinib (UPA) at 15 and 30 mg. Sensitivity and specificity were evaluated to identify optimal absolute EASI score threshold values (determined based on the distance from the perfect point where sensitivity and specificity both equal 1) best corresponding to the Patient-Oriented Eczema Measure (POEM) 0-2, Dermatology Life Quality Index (DLQI) 0/1, Worst Pruritus Numerical Rating Scale (WP-NRS) 0/1, Validated Investigator Global Assessment for AD (vIGA-AD) 0/1, and Patient Global Impression of Severity (PGIS) 0/1 at week 16. This analysis included 557 and 567 patients randomized to UPA 15 and 30 mg, respectively. Optimal absolute EASI thresholds were 1.5 and 1 (POEM 0-2), 2 and 1.5 (DLQI 0/1), 2 and 1.5 (WP-NRS 0/1), 2 and 2 (vIGA-AD 0/1), and 2.5 and 2 (PGIS absent/minimal). Absolute EASI thresholds of 1-2.5 yielded sensitivity and specificity values  $\geq 0.70$ .  $EASI \leq 1-2.5$  appears to be an optimal absolute treatment target for moderate to severe AD, aligning with patient and clinician-reported clear or almost clear skin, minimal to absent itch, patient-reported AD severity of absent or minimal, and improved quality of life.

#### P4.18

### SWEDAD – THE NATIONAL REGISTRY FOR SWEDISH ATOPIC DERMATITIS PATIENTS RECEIVING SYSTEMIC TREATMENT

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Several new and emerging systemic treatments for atopic dermatitis (AD) have been evaluated in clinical trials on selected patients but data on real-life patients is scarce. Therefore, we started a research registry for AD patients receiving systemic treatment 2017, which was launched for national use in 2019. To describe the patients included in SwedAD, the national registry for AD-patients receiving systemic treatment in Sweden. All dermatologists in Sweden can get access to SwedAD for free. Patients planned for systemic treatment are recruited consecutively. Baseline characteristics, Eczema Area Severity Index (EASI), and systemic treatment are recorded at inclusion. The patients report Patient-Oriented Eczema Measure (POEM), Numeric Rating Scale (NRS) for pruritus, Montgomery-Åsberg Depression Rating Scale Self-report (MADRS-S), Dermatology Life Quality Index (DLQI), and work limitations due to AD. EASI, POEM, NRS, MADRS-S, DLQI, systemic treatment, and side effects are collected at every visit. As of April 5, 2022, 613 patients in 36 clinics had been enrolled. The mean (SD) age was 43.0 (18.3) and 325 (53%) were male. The 613 patients had 730 registered treatments episodes initiated after January 1, 2017. At the most recent registered contact median [IQR] EASI, DLQI, itch-NRS, and POEM were 2 [1-6], 3 [1-6], 4 [2-10], and 9 [4-17]. SwedAD enables health care providers to follow their patients in a structured way, both on individual and group level, and provides data for studies on AD patients who receive systemic treatment in a real-world setting.

#### P4.19 OPTIMISING STAPHYLOCOCCUS AUREUS-TARGETED THERAPIES FOR ATOPIC DERMATITIS USING A MATHEMATICAL MODELLING APPROACH

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Killing *Staphylococcus (S.) aureus* is hypothesised as a promising therapy for atopic dermatitis (AD) as it produces virulence factors that damage the skin barrier. However clinical trials of *S. aureus*-targeted therapies showed conflicting results on whether they improve AD severity. We aim to optimise *S. aureus*-targeted therapies by investigating the possible causes of conflicting results. We first built a quantitative systems pharmacology (QSP) model describing AD pathogenesis through the interactions between *S. aureus* and Coagulase Negative Staphylococci (CoNS). We assumed CoNS have no detrimental effects on skin barrier. We next built a mechanistic model describing the roles of *S. aureus* and *S. epidermidis* in AD pathogenesis to investigate how the reported skin barrier damage by *S. epidermidis*, a CoNS, may affect the efficacy of *S. aureus*-targeted therapies. The meta-analysis using the QSP model replicated the clinically observed detrimental effects of *S. aureus*-targeted therapies on AD severity. The model suggested that killing CoNS worsens AD severity. The mechanistic model showed that killing *S. aureus* can cause barrier damage due to an increase in *S. epidermidis* density. Our model analysis suggests that *S. aureus*-specific killing improves severity if CoNS do not impair the skin barrier and that therapies that kill *S. aureus* slowly and inhibit its virulence factor production strongly are more effective to prevent *S. epidermidis* overgrowth by maintaining competition between the two species.

#### P4.20 A PRELIMINARY CLINICAL STUDY OF THE EFFECTS AND SAFETY OF 308NM EXCIMER LIGHT TREATMENT ON ATOPIC DERMATITIS PATIENTS

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Atopic dermatitis (AD) is a common skin disease and, depending on its severity, can have a significant impact on the quality of life of affected individuals. In case of severe AD, systemic immunomodulating agents can be considered for treatment. However, the available treatment option range for moderate AD is much narrower. According to previously published reports, 308nm excimer light can potentially be used as part of an effective treatment for localized lesions of moderate AD. We aimed to assess the clinical effect and safety of 308nm excimer light in Korean adults with AD. This study included patients in South Korea over 19 years of age; confirmed to have AD by a dermatologist; and had bilateral, symmetric, eczematous lesions. The symmetrical lesions of each patient were treated as intervention-control pairs. 308nm excimer light treatment was applied to the intervention side lesion twice a week for 4 weeks. Eczema severity, trans-epidermal water loss and epidermal capacitance were measured. A total of 25 subjects was enrolled in the study. After the first visit, 2 subjects withdrew, and the remaining 23 subjects completed the study in full. There was a statistically significant improvement in the change in AD severity in the intervention group over time compared to the control group. There was also an improvement of skin barrier

function compared to the control group. We conclude that there is preliminary evidence for 308nm excimer light to be considered a treatment option that helps to improve symptoms and skin barrier function of moderate localized AD.

#### P4.21 JANUS KINASE INHIBITORS USE IN PATIENTS WITH DUPILUMAB FACIAL REDNESS

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Although dupilumab facial redness (DFR) is a recently described adverse event of dupilumab use, the definite cause or treatment of DFR has not been suggested. This study aimed to investigate the efficacy and safety of Janus kinase inhibitors (JAKi) for DFR arising in patients with severe atopic dermatitis (AD). Between 2021 and 2022, 15 adult DFR patients who had been treated with dupilumab for at least 16 weeks given JAKi were selected for a single-centre retrospective study. Of the 15 patients with DFR, 8 were treated with combination of JAKi with dupilumab and 7 were switched from dupilumab to JAKi. Patients who received 2 mg, 4 mg of baricitinib, and 15 mg of upadacitinib were 3, 9, and 3, respectively. At 2 weeks, 66.6% ( $n = 10/15$ ) percent of patients taking JAKi achieved more than 2-grade improvement from baseline on Investigator's Global Assessment (IGA) scale [combination group: 62.5% ( $n = 5/8$ ), switching group: 71.4% ( $n = 5/7$ )]. Two patients of combination group reported a marked improvement and stopped receiving JAKi for less than 4 weeks. At 4 weeks, 84.6% ( $n = 11/13$ ) percent of patients taking JAKi achieved clear or almost clear skin (IGA 0/1) with 2-grade improvement [combination group: 83.3% ( $n = 5/6$ ), switching group: 85.7% ( $n = 6/7$ )]. Only one patient receiving baricitinib 4mg monotherapy eventually discontinued treatment due to non-effectiveness and severe acne. There were no significant systemic adverse events in the combined and monotherapy JAKi group. Given the uncontrolled burden of DFR, JAKi monotherapy or combination with dupilumab can be a good treatment option.

#### P4.22 OBSERVED WEIGHT GAIN IN MALE ATOPIC DERMATITIS PATIENTS TREATED WITH DUPILUMAB

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After one year on treatment with dupilumab, patients with atopic dermatitis (AD) in our clinic at Karolinska University Hospital ( $n = 12$ ) gained weight (mean 6.1kg). The same was not seen in patients treated with methotrexate. We wanted to explore the findings in a larger cohort. To study weight change among patients with AD treated with dupilumab. We used prospectively collected data from SwedAD, a Swedish national register comprising patients with AD on systemic treatment. Start weight was obtained using a window of -90 days/+30 days. Weight was measured full years (1,2,3 years) +/-180 days. We used cluster robust standard errors for patients being included more than once. The final study population consisted of 85 patients with 207 weight measurements during treatment with dupilumab. In the study population 50/85 (59%) were men. Median (IQR) EASI at treatment start was 13.6 (6.0-23.5) and during maintenance treatment (>16 weeks after treatment start), median (IQR) EASI was 2.7 (1.0-5.1). The mean change in kilograms from treatment start was 2.9 (95% CI: 0.9-4.9) at one year, 4.8 (95% CI: 2.5-7.2) at two years, and 4.2

(95% CI: 1.5-6.9) at three years. Over the entire treatment duration mean and median change in weight from treatment start was 3.5 (2.5-4.5) and 3.7 (2.6-4.8). Men gained weight significantly more compared with women (4.7 vs. 1.3,  $p < 0.01$ ). We report weight gain as an unexpected effect of dupilumab treatment in a clinical setting among patients, especially in men with severe AD. The extent of the association and the mechanism behind this finding is yet to be seen.

#### P4.23

### EFFICACY OF BARICITINIB STRATIFIED BY BASELINE BODY SURFACE AREA IN ADULTS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS: A POST HOC ANALYSIS FROM BREEZE-AD1/2

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The oral Janus kinase 1/2 inhibitor baricitinib (BARI) is approved for the treatment of adults with moderate-to-severe atopic dermatitis (AD). This post-hoc analysis evaluates the impact of baseline body surface area (BSA) on clinical responses to BARI monotherapy. The proportion of randomized patients achieving EASI75 or  $\geq 4$ -point improvement in Itch Numeric Rating Scale (NRS) was evaluated over 16 weeks using logistic regression in pooled data from BREEZE-AD1/2 stratified by baseline BSA (10-50% and  $>50\%$ ). Non-responder imputation was used for data missing due to discontinuation or rescue. Response rates at week 16 for both EASI75 and Itch NRS  $\geq 4$ -point improvement were significantly higher with BARI 4 mg vs placebo (PBO) independent of baseline BSA. 30.6% of patients with BSA 10-50% achieved EASI75 (11.5% PBO,  $p < 0.001$ ) and 15.3% with BSA  $>50\%$  (3.6% PBO,  $p < 0.001$ ). 20.6% of patients with BSA 10-50% achieved Itch NRS  $\geq 4$ -point improvement (8.3% PBO,  $p = 0.003$ ) and 19.6% with BSA  $>50\%$  (3.9% PBO,  $p < 0.001$ ). For BARI 2 mg, greater response vs PBO at week 16 was seen in the BSA 10-50% subgroup only for EASI75 (29.5% vs 11.5%,  $p < 0.001$ ) and Itch NRS  $\geq 4$ -point improvement (18.7% vs 8.3%,  $p < 0.01$ ). Patients receiving BARI 4 mg in the BSA 10-50% subgroup reached significant Itch NRS  $\geq 4$ -point improvement vs PBO at earlier timepoints compared with BARI 2 mg (week 1 vs week 2) and had greater proportion with EASI75 response at Week 8 (35.5% vs 25.0%). BARI 4 mg consistently improved AD signs and itch irrespective of baseline BSA and more rapidly than BARI 2 mg in patients with BSA  $\leq 50\%$ .

#### P4.24

### CONJUNCTIVITIS IN ADOLESCENT PATIENTS AGED 12-17 WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS TREATED WITH TRALOKINUMAB UP TO WEEK 52: RESULTS FROM THE PHASE 3 ECZTRA 6 TRIAL

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Conjunctivitis is common in AD and can increase with biologics targeting the type 2 pathway; the frequency of conjunctivitis as an adverse event of special interest (AESI) in tralokinumab-treated adult patients [pt] (pooled data) is 7.5% (rate [R] 26.6 events/pt years of exposure\*100). To examine conjunctivitis rates in tralokinumab-treated adolescents. Pts received tralokinumab 150mg ( $n = 98$ ) or 300mg ( $n = 97$ ) or placebo (PBO;  $n = 94$ ) every 2 wks from wk0-16, then were transferred to maintenance or open label until wk52. The broad AESI term conjunctivitis included the preferred terms conjunctivitis, conjunctivitis allergic, conjunctivitis bacterial and conjunctivitis viral. By wk16, 2 pts (2.1%; 3 events; R 10.7) in the PBO arm had conjunctivitis (AESI) vs 4 pts (4.1%; 4 events; R 13.6) receiving tralokinumab 150mg and 3 pts (3.1%; 3 events; R 10.2) receiving 300mg; only 2 events of conjunctivitis (preferred term) occurred, both in the 150mg arm. Most events (7/10) were considered mild by the investigator; 2 moderate events occurred in the tralokinumab 150mg arm and 1 in the 300mg arm. Most events (9/10) recovered/resolved during wk0-16 and 0 led to permanent tralokinumab discontinuation. During wk16-52, 3 pts (6%; R 11.9) had a conjunctivitis (AESI) event in the maintenance phase (pooled tralokinumab arms) as did 11 pts (4.7%; 14 events; R 9.3) in open label. Conjunctivitis frequency in adolescents was similar between tralokinumab and PBO arms and numerically lower vs adults through wk16; events were mild or moderate and did not increase through wk52.

#### P4.25

### REAL-WORLD TREATMENT PATTERNS IN ADULTS WITH ATOPIC DERMATITIS

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Insights into long-term, real-world treatment patterns for atopic dermatitis (AD) are relevant to inform clinical decisions. To investigate AD treatment patterns and therapy switching in a real-world setting. EUROSTAD (OBS14620) was a prospective, observational study of adults with moderate-to-severe AD eligible to receive systemic treatment in Europe. Therapy switches (i.e., stop date between informed consent and end of study, and new therapy initiation during the observation period) were permitted. Descriptive analyses of treatment patterns and switches between systemic therapies are reported. 295 patients were included; median follow-up was 20.5 months. Most patients (97.6%) received systemic AD therapies (most commonly cyclosporine [CSA] 44.1%, dupilumab 38.6%, systemic corticosteroids 32.9%, and methotrexate 28.1%); 83.7% received topical corticosteroids. Overall, 79.3% of patients had  $\geq 1$  therapy switch, most commonly from systemic corticosteroids (89/97, 91.8%), azathioprine (19/22, 86.4%) or CSA (112/130, 86.2%), and least commonly from dupilumab (73/114, 64.0%). One-fifth (19.7%) of patients switched between systemic therapies.

There was a mean (SD) of 5.0 (3.2) switches between systemic therapies with mean (SD) 0.7 (0.7) due to lack of efficacy; the fewest of these occurred with dupilumab (mean [SD] 0.1 [0.2]) and the most with CSA (mean [SD] 0.5 [0.6]). Most patients in EUROSTAD switched systemic AD therapy, mainly due to lack of efficacy. There were fewer therapy switches from dupilumab than for other systemic therapies.

#### P4.26

### INADEQUATELY CONTROLLED MODERATE-TO-SEVERE ATOPIC DERMATITIS IN PATIENTS AGED LESS THAN 12 YEARS: REAL-WORLD TREATMENT OUTCOMES FOR UP TO 2 YEARS

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Real-world, long-term data on treatment outcomes in children with atopic dermatitis (AD) are lacking. Assess impact of systemic treatment on disease symptoms/severity in children with inadequately controlled, moderate-to-severe AD in a real-world setting. PEDISTAD (NCT03687359) is an ongoing registry including patients <12 years with moderate-to-severe AD inadequately controlled by topical therapies. Included in this analysis were patients receiving systemic agents dupilumab, methotrexate (MTX), and cyclosporine (CSA). EASI total score, % affected body surface area (BSA), and treatment-emergent adverse events (AEs) were assessed up to 2 years. Analyses are descriptive. Patients received dupilumab ( $n = 144$ , subcutaneous 300 mg q2w), MTX ( $n = 114$ ), or CSA ( $n = 121$ ). Mean EASI total score improved significantly ( $p < 0.001$ ) from therapy start to last observation with dupilumab (20.9 vs 8.6) or MTX (16.6 vs 11.0), but not CSA (18.8 vs 15.5). The % BSA affected significantly improved with dupilumab (39.8 vs 19.9;  $p < 0.001$ ), MTX (33.9 vs 22.1;  $p < 0.001$ ), and CSA (40.6 vs 31.8;  $p < 0.01$ ). At Month 24, cumulative discontinuation rate was 8.3% for dupilumab, 28.9% for MTX, and 43.8% for CSA. AE incidence rates were 18.1% for dupilumab, 28.9% for MTX, and 31.4% for CSA. At 2 years of observation, children with inadequately controlled moderate-to-severe AD receiving dupilumab had bigger improvement in disease severity, a lower rate of treatment discontinuation, and fewer AEs compared with MTX and CSA. Overall safety was consistent with the known dupilumab safety profile.

#### P4.27

### IMPACT OF SYSTEMIC TREATMENTS ON PATIENT-REPORTED SYMPTOMS AND QUALITY OF LIFE IN CHILDREN WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS IN A REAL-WORLD SETTING

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Children with atopic dermatitis (AD) may have a high disease burden and an unmet need for effective therapies with demonstrated safety. Assess the impact of systemic treatments on patient-reported symptoms and quality of life (QoL) in children with moderate-to-severe AD in a real-world setting. PEDISTAD (NCT03687359) is an ongoing, international, observational study including patients <12 years with moderate-to-severe AD, inadequately controlled by topical therapies, receiving systemic medications. This interim, descriptive analysis assessed the impact of dupilumab, methotrexate (MTX), and cyclosporine (CSA) on patient-reported symptoms using POEM and QoL using CDLQI (completed by patient) and IDQOL (completed by parent/carer), from therapy start to  $\leq 2$  years' follow-up. Treatment-emergent adverse events (AEs) were assessed. 144 patients received subcutaneous dupilumab 300 mg q2w, 114 received MTX, and 121 received CSA. POEM total score improved significantly ( $p < 0.001$ ) from therapy start to last observation following dupilumab (mean change:  $-7.0$ ) or MTX ( $-4.7$ ), but not CSA ( $-1.5$ ). Combined CDLQI/IDQOL scores improved significantly ( $p < 0.001$ ) with dupilumab (mean change:  $-4.3$ ) and MTX ( $-3.6$ ), but not CSA ( $-0.5$ ). AE incidence rates were 18.1%, 29.8%, and 31.4% for dupilumab, MTX, and CSA. In this 2-year interim analysis, systemic therapy improved patient-reported symptoms and QoL, with the largest improvement observed with dupilumab, in children aged <12 years with inadequately controlled moderate-to-severe AD. Safety was consistent with the known dupilumab safety profile.

#### P4.29

### EFFECT OF UPADACITINIB ON HAND ECZEMA IN PATIENTS WITH ATOPIC DERMATITIS: DAILY PRACTICE DATA FROM THE BIODAY REGISTRY

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Upadacitinib has proven to be an effective treatment for atopic dermatitis (AD) and hand eczema (HE) in patients with AD in clinical trials. However, no daily practice outcomes are available. To evaluate the effect of upadacitinib on AD and on HE in patients with AD. This prospective observational cohort study includes data at baseline, week 4, and week 16 on upadacitinib-treated patients. Thirty patients were included, of which 26 patients had HE. So far, 28 patients completed week 4 and 15 patients completed week 16. For patients with AD and HE, mean percentage change in Hand Eczema Severity Index (HECSI) was  $-81.1\%$  and  $-69.1\%$  after 4 and 16 weeks, respectively. HECSI-50, HECSI-75, and HECSI-90 were reached by 87.0%, 82.6%, and 65.2% at week 4, and 75.0%, 58.3%, and 41.7% at week 16, respectively. After 4 and 16 weeks, 79.2% and 66.7% achieved (almost) clear on the Photographic guide, respectively. Mean percentage change in Quality of Life in Hand Eczema Questionnaire was  $-51.1\%$  at week 4 and  $-36.0\%$  at week 16. For all AD patients, mean percentage change in Eczema Area and Severity Index (EASI) was  $-51.1\%$  and  $-69.5\%$  at 4 and 16 weeks, respectively. Absolute cutoff scores EASI  $\leq 7$ , Numeric Rating Scale-pruritus  $\leq 4$ , Patient Oriented Eczema Measure  $\leq 7$ , and Dermatology Life Quality Index  $\leq 5$  were reached by respectively 64.3%, 78.6%, 54.5% and 68.2% at week 4, and respectively 80.0%, 66.7%, 41.7%, and 61.5% at week 16. Most reported adverse event was acne ( $n = 5$ ). Upadacitinib improved AD severity, and HE severity in patients with AD in daily practice, with results similar to clinical trials.

**P4.30****REAL-WORLD EFFECTIVENESS OF DUPILUMAB IN ATOPIC DERMATITIS: CONSISTENCY IN RATE AND MAGNITUDE OF IMPROVEMENT ACROSS OBSERVATIONAL STUDY METHODOLOGIES**

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Results from real-world (RW) observational studies may be influenced by differences in study recruitment, design, and clinical practice. Consistent results across RW studies support generalizability of findings. To summarize patient-reported outcomes in the RELIEVE-AD (doi:10.1001/jamadermatol.2021.4778) and PROSE (NCT03428646) RW studies of dupilumab in atopic dermatitis (AD). RELIEVE-AD was a prospective, observational, RW study of dupilumab effectiveness in patients with moderate-to-severe AD recruited from a US patient support program. PROSE is a prospective, observational, multicenter registry of AD patients initiating dupilumab in the US and Canada. Skin pain, heat/burning, and skin sensitivity numeric rating scale (NRS; each scale 0–10) and Dermatology Life Quality Index (DLQI; 0–30) were compared between studies. In RELIEVE-AD ( $n = 698$ )/PROSE ( $n = 764$ ), mean age was 46/41 years, 62%/59% female, 74%/55% white. Trajectory of improvement with dupilumab was similar between RELIEVE-AD/PROSE: mean skin pain NRS improved from 5.9/5.4 at baseline (BL) to 2.3/2.3 at Month (M) 2, and 1.7/1.7 at M12; heat/burning NRS improved from 5.2/4.7 at BL to 1.9/2.0 at M2, and 1.5/1.6 at M12; skin sensitivity NRS improved from 5.5/5.2 at BL to 2.0/2.3 at M2, and 1.5/1.8 at M12; and DLQI improved from 14.4/13.3 at BL to 4.8/5.9 at M3, and 3.5/5.1 at M12. Two RW studies utilizing different methodologies yielded similar findings regarding time course and extent of dupilumab effectiveness in AD across multiple patient-reported outcomes.

**P4.31****IMPROVEMENT IN DISEASE SEVERITY AND QUALITY OF LIFE IN PATIENTS WITH ATOPIC DERMATITIS TREATED WITH DUPILUMAB FOR UP TO 18 MONTHS: REAL-WORLD DATA FROM THE CANADIAN COHORT OF THE PROSE REGISTRY**

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Observational studies can provide information about treatment effectiveness in real-world (RW) clinical practice. PROSE (NCT03428646) is a multicenter, prospective, observational registry in Canada and the USA enrolling patients aged  $\geq 12$  years initiating dupilumab for moderate-to-severe AD per approved prescribing information. To evaluate objective and patient-reported measures of AD severity and quality of life up to 18 months (M) in the Canadian cohort of PROSE. Body Surface Area Affected (BSA), Eczema Area and Severity Index (EASI), Peak Pruritus Numerical Rating Scale (PP-NRS), Patient Oriented Eczema Measure (POEM), and Dermatology Quality of Life Index (DLQI)

were recorded at baseline (BL) and M3, 6, 12, and 18. Data are presented as observed. At the data cut-off (Oct 2020), 67 patients had been enrolled in Canada at 5 sites (54% male, mean age 41 years [SD 15], all  $\geq 18$  years of age) and median exposure was 15M (Q1–Q3: 8–18). Mean (SD) BSA improved from 38.3% (27.7) at BL to 11.1% (20.5) at M3, and 5.3% (8.4) at M18. EASI at BL was 23.1 (15.6), 4.9 (6.6) at M3, and further improved to 2.2 (3.1) at M18. PP-NRS was 6.9 (2.1) at BL and improved to 3.7 (3.1) at M3 and 2.1 (2.6) at M18. POEM improved from 19.3 (5.5) at BL to 7.9 (7.4) at M3, and 6.7 (6.9) at M18. DLQI was 13.9 (6.8) at BL and improved to 7.2 (6.8) at M3, and 2.3 (2.6) at M18. Safety was consistent with the known dupilumab safety profile. In a RW Canadian setting, dupilumab improved signs, symptoms, and quality of life of adults with moderate-to-severe AD as early as M3 with continued improvement over 18M.

**P4.32****DUPILUMAB DRUG SURVIVAL AND ASSOCIATED PREDICTORS IN MODERATE-TO-SEVERE ATOPIC DERMATITIS; LONG-TERM RESULTS FROM THE DAILY PRACTICE BIODAY REGISTRY**

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Long-term data on dupilumab drug survival and associated predictors in patients with moderate-to-severe atopic dermatitis (AD) in daily practice are scarce. To describe the drug survival for dupilumab in AD patients and to identify associated predictors. Data were extracted from the multicenter daily practice BioDay registry (October 2017–December 2020) of patients treated with dupilumab for AD. Drug survival was analysed by Kaplan-Meier survival curves and determinants by using univariate- and multivariate Cox regression analysis. A total of 715 adult AD patients were included with a maximum follow-up of 3.2 years. The 1-, 2- and 3-year overall drug survival of dupilumab was 90.3%, 85.9% and 78.6% respectively. Determinants for shorter drug survival related to ineffectiveness were the use of immunosuppressive therapy at baseline (HR 2.64) and non-responders at week 4 (HR 8.68), while determinants for shorter drug survival related to side effects were the use of immunosuppressive therapy at baseline (HR 2.69), age  $\geq 65$  years (HR 2.94) and Investigator Global Assessment (IGA) of very severe AD (HR 3.51). This study demonstrates a very good overall 1-, 2- and 3-year drug survival of dupilumab. Predictors for dupilumab drug survival showed that patients using immunosuppressive therapy at baseline and the absence of treatment effect at week 4 tend to discontinue treatment due to ineffectiveness more frequently. Using im-

munosuppressive therapy at baseline, older age ( $\geq 65$  years) and IGA very severe AD were determinants for an increased risk for discontinuation due to side effects.

#### P4.33

### FIRST REAL-WORLD EVIDENCE OF UPADACITINIB TREATMENT IN PATIENTS WITH DIFFICULT-TO-TREAT ATOPIC DERMATITIS: RESULTS FROM THE BIODAY REGISTRY

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Upadacitinib showed to be a very effective treatment for moderate-to-severe atopic dermatitis (AD) in clinical trials. At present, no daily practice data are available. To evaluate effectiveness and safety of 16-weeks upadacitinib treatment in patients with moderate-to-severe AD in daily practice. Patients included in the BioDay registry visited the outpatient clinic at baseline, and after 4, 8 and 16 weeks of treatment. Effectiveness was assessed by both clinician- and patient-reported outcome measurements (PROMs) and was stratified by different treatment groups based on past biological and small molecule treatment (dupilumab vs. non-dupilumab failures and baricitinib vs. non-baricitinib failures). Adverse events (AEs) and laboratory results were evaluated. Preliminary results of 43 patients after 8 weeks of upadacitinib treatment showed a significant decrease in mean EASI score and NRS-pruritus (14.0 (SD 8.0-21.2) to 4.6 (SD 1.1-8.1) and from 8.0 (SD 5.8-8.0) to 4.5 (SD 2.0-6.0) respectively). Proportion of patients with EASI $\leq 7$  and NRS-pruritus $\leq 4$  was 57.1% and 48.8% respectively. Data of approximately 60 patients as well as effectiveness outcomes stratified by dupilumab and baricitinib failures will be presented at the ISAD congress. Most frequently reported AEs were acne ( $n=4$ , 9.3%), herpes simplex infections ( $n=3$ , 7.0%), headache and nausea (both  $n=2$ , 4.7%). These preliminary results show that upadacitinib could be an effective treatment for moderate-to-severe AD. Safety analysis showed no new findings.

#### P4.34

### RECALCITRANT ATOPIC DERMATITIS PATIENTS TREATED WITH DUPILUMAB AMONG QATARI POPULATION WITH PROTEOMIC PROFILING BEFORE AND AFTER TREATMENT. A RETROSPECTIVE OBSERVATIONAL STUDY

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Atopic dermatitis is an inflammatory skin disease with an increase incidence and 20% prevalence. The etiology is unknown. Chronic pruritus is the hallmark of the disease. Dupilumab has shown excellent results in managing AD patients with chronic pruritus. This study aims to determine longer effect of dupilumab on AD patients refractory to conventional therapy in terms of SCORAD score, VAS itch score and safety profile. In this cross-sectional study we conducted 56 Qatari patients with AD seen at tertiary dermatology hospital and treated with dupilumab at standard AD

dosing from January 2019 to April 2021. Data were extracted using Hamad medical electronic Cerner System. Treatment length was from 2 months up to 24 months 56 patients were enrolled ( $n=56$ ). 49 patients (88%) were having severe atopic dermatitis (Pre-treatment SCORAD  $> 50$ ) and 6 patients (12%) were moderate cases (Pre-treatment SCORAD 25-50). Average itch score was 10/10. We found that of all patients, 82% showed significant improvement in terms of SCORAD score (from  $> 50$  to  $< 14$ ) and significant decrease of VAS itch score from 10/10 to 1-2. In terms of side effects, 43 patients (77%) did not experience any side effects, However, 13 patients (23%) experienced some side effects with mainly conjunctivitis (61%) which did not require stopping of the treatment in most of the cases. Dupilumab showed significant improvement in managing moderate and severe AD patients with relatively low side effects profile.

#### P4.35

### SUCCESSFUL TREATMENT OF RESISTANT ERYTHRODERMIC ICHTHYOSIS WITH SEVERE ATOPIC DERMATITIS WITH DUPILUMAB AND GUSELKUMAB BIOLOGIC THERAPY

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Among the rare genetic diseases that have limited treatment options is Autosomal recessive congenital ichthyosis (ARCI). They are a group of inherited diseases with defective epidermal barrier resulting in various clinical symptoms and presentations with a range of severity from harlequin ichthyosis to congenital ichthyosiform erythroderma (CIE). Secondary atopic dermatitis (AD) is present in roughly half the ichthyosis patients, which can exacerbate the disease state, which complicate the recalcitrant CIE/AD with unfavorable expectations and side effect. Here, we present our patient who is about a 38-year-old male with severe CIE and AD over the last 30 years. The patients suffered from severe cutaneous inflammation, itch and recurrent fungal and bacterial infections for decades without disease control and intolerable side effects from previous treatments. Dupilumab (300mg q2w) was initially started which partially controlled pruritus, but only the combination of Dupilumab with Guselkumab where the CIE and AD were controlled with significant reduction of inflammation, pruritus and infections. Guselkumab monotherapy was insufficient to treat the severe CIE and AD. Further studies are required to assess the efficacy, safety and tolerability of targeted therapies such as Dupilumab/Guselkumab combination therapy in larger population with severe skin diseases like CIE/AD.

#### P4.36

### EFFICACY OF DUPILUMAB IN SEVERE ATOPIC DERMATITIS USING ADCT SCORE IN ASIAN ARAB POPULATION

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Atopic dermatitis (AD), a predominantly type-2 inflammatory skin disease, affects approximately 2 to 5% of adults, with a high burden of disease. Dupilumab, a fully human monoclonal antibody, is approved for treatment of AD. The recently developed Atopic Dermatitis Control Tool (ADCT) mainly aimed at assessing the control of AD symptoms and itch as early as week 4, and has not been investigated in the Asian Arabic population yet. The aim of this study was to investigate the overall rapid onset effect of dupilumab in severe AD using the new ADCT. 30 patients completed a baseline survey before starting dupilumab and were evaluated here at 4 weeks post-initiation. ADCT evaluates six AD symptoms (0-3 x 6 = maximum 24 points). In addition, severity of itch was also assessed using numeric rating scale (NRS11) ranging from 0 to 10. Overall mean ADCT score at baseline was 17.6 and at 4 weeks was reduced to 4.1. Patients reported a dramatic change in the overall symptoms in the early phase. The paired t-test showed a significant difference in ADCT Score before and after therapy with  $p < 0.0001$ . There was a significant decline in overall severity of symptoms with mean (before=3.1, after=0.9), itching (before=3.2, after=0.7), extent of bother (before=3.2, after=0.8), sleep (before=2.7, after=0.4), impact on daily activities (before=2.5, after=0.6), and mood or emotions (before=2.9, after=0.6). Itch score reduced from 8/10 to 0-3 at week 4. Treatment of adult Asian Arabic patients with severe AD treated with dupilumab showed significant improvement in overall well-being and pruritus, as early as week 4.

## P5. Other

### P5.01

#### PREVALENCE OF ADULT SELF-REPORTED ATOPIC DERMATITIS IN GREECE: RESULTS OF A NATIONWIDE SURVEY

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Atopic dermatitis epidemiology data in Greece are lacking. To estimate the self-reported prevalence of AD and the prevalence of moderate-to-severe AD in the adult population in Greece. A nationwide cross-sectional survey with a structured questionnaire was conducted, between June 2021 and July 2021, using Computer Assisted Telephone Interviewing and Computer Assisted Web Interviewing data collection. Questionnaire consisted of socio-economic factors, medical history, screening questions about AD, and questions about AD severity and quality of life (QoL). Scenarios of self-reported AD definition used were: 1) UKWP criteria (12-month prevalence) 2) UKWP & expert diagnosis (12-month prevalence) 3) UKWP modified, (12-month prevalence) 4) Expert diagnosis (Lifetime prevalence) 5) Expert diagnosis & impaired QoL (Lifetime prevalence). Self-reported moderate-to-severe atopic dermatitis was estimated using the Patient Oriented Eczema Measure (POEM) for all scenarios except the 3rd. More than 3,000 persons were recruited. The 12-month self-reported prevalence 95% confidence intervals (CIs) of adult AD was 2.2% (1.76%, 2.81%), 1.66% (1.26%, 2.17%) and 6.39% (5.57%, 7.32%), for scenarios 1, 2 and 3, respectively. The lifetime prevalence 95% CI of adult AD was 11.4% (10.3%, 12.6%) and 3.73% (3.11%, 4.46%) for scenarios 5 and 6, respectively. At least half of the responders of scenarios 1, 2 and 5 had moderate-to-severe eczema based on POEM. The prevalence of AD in adults in Greece is comparable

to that of other European countries when using the same cross-sectional survey methodology.

### P5.02

#### ONCE-DAILY CRISABOROLE AS A LONG-TERM MAINTENANCE TREATMENT IN PARTICIPANTS WITH MILD-TO-MODERATE ATOPIC DERMATITIS: A 52-WEEK CLINICAL TRIAL

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Crisaborole ointment, 2%, is a nonsteroidal phosphodiesterase 4 inhibitor for the treatment of mild-to-moderate atopic dermatitis (AD). To assess the long-term efficacy and safety of crisaborole QD as maintenance treatment to reduce flares in patients who achieved response with crisaborole BID. In the 52-wk CrisADE CONTROL phase 3 study of patients aged  $\geq 3$  mo with mild-to-moderate AD, 497 patients received crisaborole BID for  $\leq 8$  wk. Those who achieved Investigator's Static Global Assessment (ISGA) success (ISGA score of 0 or 1 with a  $\geq 2$ -grade improvement from baseline [BL]) and  $\geq 50\%$  reduction from BL on the Eczema Area and Severity Index, were considered responders and randomized to crisaborole or vehicle QD. Those who experienced a flare (ISGA  $\geq 2$ ) switched to crisaborole BID for  $\leq 12$  wk; if the flare resolved (ISGA  $\leq 1$ ), patients resumed their assigned treatment. Endpoints included flare-free maintenance until onset of first flare (primary), days without flare, number of flares, and maintenance of pruritus response. Median time of flare-free maintenance was longer in the crisaborole ( $n = 135$ ) vs vehicle ( $n = 135$ ) group (111 vs 30 d;  $p = 0.003$ ), across all ages. The mean number of flare-free days was higher in the crisaborole vs vehicle group (234.0 vs 199.4 d;  $p = 0.035$ ). Mean number of flares was lower for crisaborole vs vehicle (0.95 vs 1.36;  $p = 0.004$ ). No trend was seen in maintenance of pruritus response between groups. Crisaborole QD was effective for long-term maintenance to reduce flares in patients with mild-to-moderate AD.

### P5.03

#### PRELIMINARY RESULT OF GENETIC STUDY ON ATOPIC DERMATITIS IN MADAGASCAR

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European, Japanese and African-American studies have reported that Filaggrin (FLG) mutations are an important risk factor for atopic dermatitis. Among these mutations, R501X and 2282del4 are the most important in Europe. Few studies of black skin FLG mutations were reported. To evaluate the role of FLG in the etio-

logy of atopic dermatitis in Malagasy patients. A case series of Malagasy patients with AD ( $n = 20$ ) and controls ( $n = 10$ ; subjects without past or present history of atopic diseases, nor dry skin, nor familial history of atopy) was collected in the department of Dermatology at the university hospital of Antananarivo, Madagascar. The diagnosis of AD was based on the criteria of United Kingdom Working Party modified. Genomic DNA extraction and purification was performed from blood samples, using the QIAamp<sup>®</sup> DNA Blood Mini (QIAGEN) kit. PCR amplification of the filaggrin gene was performed for R501X and 2282del4 mutations, and then the products digested by restriction enzymes: NlaIII (R501X mutation) and DraIII (2282del4 mutation), before being migrated to electrophoretic gel. The Malagasy patients and controls were genotyped for the two common European FLG mutations (R501X, 2282del4) and no carriers were found. Furthermore, no difference in filaggrin expression was observed in AD patients compared with healthy control subject. Our study shows the rarity of FLG mutations in African population.

#### P5.04

### TREATMENT ADHERENCE IN MALAGASY PATIENTS WITH ATOPIC DERMATITIS

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Atopic Dermatitis (AD) is a chronic inflammatory skin disorder characterized by intense pruritic eczematous lesions. Poor adherence to treatment is a major factor limiting treatment outcomes in patients with AD. To assess the treatment adherence in malagasy patients with AD. A cross-sectional study over a period of one year in children and adult patients with AD seen at the Department of Dermatology at the University Hospital Antananarivo, Madagascar was conducted. The treatment adherence in malagasy patients with AD was assessed using the Morisky Medication Adherence Scale-8 (MMAS-8). 44 children and 21 adults were included. The mean age was respectively  $4.29 \pm 4.13$  years and  $35.28 \pm 16.88$  years. All of our patients receive topical treatment and none of them receive specific oral treatment such as biotherapy or immunosuppressive drugs. Low adherence rate is seen in 61.90% of adult patients whose mean MMAS-8 score was  $2.56 \pm 1.6$ . In children, mean MMAS-8 score was  $5.9 \pm 1.53$  and poor adherence was seen in 43.73%. Adherence level was significantly associated with age, education level and marital status ( $p < 0.05$ ). Low treatment adherence is preponderant in Malagasy patients with AD. No correlation between adherence level and annual income, return appointments, severity of AD, insurance healthcare/medication co-payments was found.

#### P5.05

### ATOPIC DERMATITIS AND PSORIASIS: A CASE OF A PATIENT WITH BOTH CONDITIONS CONTROLLED WITH DUPILUMAB

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Atopic dermatitis (AD) and psoriasis (PS) are inflammatory skin disorders and have different clinical, histological, and immunological characteristics. AD is caused by Th2-cell-dominant immune changes characterized by frequent elevations of total IgE and allergen-specific IgE levels, whereas PS is caused by immune responses induced by Th1 cells and Th17 cells. From an immune mechanism point of view, the two diseases are mutually exclusive, and case of coexistence AD and PS are uncommon. Herein, we report a case of a patient with both AD and PS. A 45-year-old man presented with painful and pruritic, variable-sized, erythe-

matous scaly patches with erosions and crusts on the whole body for 1 year. The patient was diagnosed with PS 10 years ago and had a family history of PS. He was intermittently treated with phototherapy and topical steroids, and herbal medicine was also taken. The patient disappeared during follow-up, but recently the lesion worsened and he re-visited our clinic. Histopathological findings, consistent with PS, include uniform elongation of the rete ridges, thinning of the suprapapillary plate, and Munro's microabscess, but clinical features include eczema with oozing and lichenification. Laboratory findings showed elevated IgE levels to 2683.6 IU/ml. Based upon findings, the patient was diagnosed with coexistence of AD and PS. The patient showed no improvement despite cyclosporine treatment, and the Eczema area and severity index (EASI) was 26.8. After four months of treatment with dupilumab, the lesion gradually improved, and the EASI was measured to be 5.9.

#### P5.06

### PHOTOTHERAPY FOR ATOPIC ECZEMA: A COCHRANE SYSTEMATIC REVIEW

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Phototherapy is used for atopic eczema (AE) when topical treatments are insufficient. To assess the effects of phototherapy for treating AE. We conducted a systematic review with randomised controlled trials up to January 2021. We used standard Cochrane methodological procedures, Risk of Bias 2.0 and GRADE tools. We included 32 trials with 1219 participants (5-83 years, mean 28 years). NB-UVB may improve physician-assessed signs compared to placebo after 12 weeks treatment (MD -9.4, 95%CI -3.62, -15.18; 41 participants; one trial; low-certainty; lower score favourable). The number of participants with moderate to greater improvement may be higher with NB-UVB than placebo after 12 weeks treatment (RR 2.81, 95%CI 1.10, 7.17; 41 participants, one trial; low-certainty). NB-UVB may not affect rates of withdrawal due to adverse events (low-certainty). We are uncertain of NB-UVB effects compared with UVA1, because all trial outcomes were very low-certainty. There may be little to no difference between NB-UVB and PUVA in physician-assessed signs after 6 weeks (64.1% reduction with NB-UVB versus 65.7% PUVA; 10 participants, 20 sides; one trial; low-certainty; lower score favourable). We are uncertain of the effects of UVA1 compared with PUVA. NB-UVB may improve physician-rated signs and patient-reported symptoms and may not affect rates of withdrawal due to adverse events. There may be little to no difference between NB-UVB and PUVA. Information for UVA1 was uncertain due to very low-certainty evidence. More information is needed on phototherapy for treating AE.

## P5.07

**MULTI-ANCESTRY GENOME-WIDE ASSOCIATION STUDY IDENTIFIES ATOPIC DERMATITIS LOCI WITH ANCESTRY SPECIFIC EFFECTS**

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Various efforts have uncovered atopic dermatitis (eczema) risk loci, including 45 reported in Europeans and 35 in mixed ancestries. We present the largest multi-ancestry genome-wide association study to date including individuals of European, Japanese, Latino and African ancestry. A multi-ancestry meta-analysis was performed with individuals of European ( $n = 865,244$ ) and non-European ancestry ( $n = 127,633$ ) using MR-MEGA. Genetic data from all cohorts included variants with a minor allele frequency  $>1\%$  which were imputed to either the HRC or 1000 genomes reference panel. Genome-wide significant variants were replicated in 2,904,664 Europeans, 525,348 Latino and 174,015 African ancestry individuals. We found 89 loci associated with eczema ( $p < 5 \times 10^{-8}$ ) where 63 variants had similar directions of effect across all ancestries investigated. 4 variants were specific to East Asian ancestry with no evidence of association in the other ancestry groups. 2 variants had opposite directions of effect in East Asian ancestry including rs10214273 which maps closely to IL7R, a gene previously implicated in eczema. For African ancestry individuals, 11 variants had no evidence of association and 2 had opposite directions of effect compared to the other ancestry groups. This included rs114059822, an intron variant for CAPZB which hasn't previously been reported for eczema. Our multi-ancestry meta-analysis uncovered 89 eczema loci, as well as variants with specific effects in different ancestries. This study highlights differences in the genetic architecture of eczema between different ancestry groups.

## P5.08

**DESCRIPTION OF SYSTEMIC THERAPIES AND THERAPY SEQUENCES RECORDED BY THE TREATGERMANY ATOPIC DERMATITIS REGISTRY SINCE 2016**

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The TREATgermany registry has been collecting data in Germany since 2016 from patients with moderate to severe atopic dermatitis

(AD) in about 70 dermatological practices and clinics currently. As of 5/2022 more than 1,400 adult patients were included. This presentation focuses on the longitudinal description of the systemic treatment of adult patients. Results for dupilumab, the first biologic approved for AD treatment in Germany (9/2017), as well as other systemic drugs (cyclosporine, glucocorticoids, baricitinib and tralokinumab) will be presented. When a clinic or practice includes a patient into the registry a detailed health and treatment history is taken. Patients undergo a complete dermatological exam and answer a questionnaire. Subsequent visits occur at defined intervals. The dataset for this analysis from 8/2021 contains 1230 patients. 76% ( $n = 932$ ) of those patients received a systemic therapy at least once, whereby dupilumab with 63% ( $n = 769$ ) was the most frequently used. Therapy sequences differed between patients. For example for patients with at least four visits ( $n = 698$ ) 257 different sequences were found. The reasons/expectations of the physician when prescribing a specific systemic therapy regarding effectiveness and tolerability will also be presented. A comprehensive picture of the current medical care for patients with moderate to severe AD can be obtained through the registry. It offers the opportunity to examine systemic therapies with regards to their efficacy and safety and implementation in routine care.

## P5.09

**BLACK RACE INFLUENCES ECZEMA VISIT SATISFACTION THOUGH FACTORS IMPORTANT FOR SHARED DECISION MAKING ARE DIRECTLY WITHIN PATIENT AND PROVIDER CONTROL**

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In shared decision making (SDM), treatment decisions are made using available evidence alongside patient preferences and values. As eczema treatment decisions are often dynamic and longitudinal, the ability to engage in SDM is likely dependent on the HCP-patient relationship. Little is known about factors that influence this relationship to positively facilitate eczema SDM. Determine the factors important for SDM from the patient/caregiver perspective. The National Eczema Association conducted an online 64-question survey January-March 2021 with questions on demographics, SDM experiences and preferences, and factors important for SDM. The 1,313 respondents largely identified as non-Hispanic (90%) and White (67%) followed by Black (13%) and Asian (10%). Among respondents, 74% were satisfied/very satisfied with their most recent eczema care visit. Trust in the HCP, an HCP who listens, and HCP values respondent input were deemed unimportant by 3%, 6%, and 8% (respectively) of respondents. The factor most respondents considered unimportant was for HCP race/ethnicity to match their own (92%). However, Black respondents who reported their HCP had the same race were more satisfied with their recent visit (93% same race vs. 69%), a difference not seen in respondents of other races. While HCP-patient demographics may play an important role in positive eczema SDM, several HCP attributes that matter to most patients (trust, listening, and valuing input) are within HCP control and thus important to address for successful eczema SDM.

## P6. Outcome Measures, Primary Prevention and Diagnosis

### P6.01

#### IMPROVEMENT OF SKIN BARRIER AND SKIN TONE IN SEVERE ATOPIC DERMATITIS AFTER DUPILUMAB TREATMENT

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Dupilumab has been proven to improve skin barrier and post-inflammatory hyperpigmentation on non-lesional areas. Previous studies, however, are only based on subjective visual assessments rather than objective biophysical measurements. We aimed to objectively measure transepidermal water loss (TEWL) and skin tone improvements after dupilumab treatment through bioengineering devices. 19 patients with moderate-to-severe AD were enrolled. Biophysical measurements were conducted in 3 non-lesion skin areas (cheek, forearm and lower abdomen) on a monthly basis. TEWL was measured using a Tewameter®. Skin tones represented by L\* (lightness), a\* (redness) and b\* (yellowness) parameters were measured by the spectrophotometer®; the erythema and melanin index measured by the narrow-band reflectance spectrophotometer® were additionally assessed. Improvement was compared by the Mann-Whitney U Test; Correlation among biophysical parameters was evaluated by the Pearson correlation coefficient.  $p < 0.05$  was considered statistically significant. The L\* and a\* value of the arm and trunk significantly improved after 2 months of dupilumab therapy, and the face 3 months after. Similarly, b\* value of all anatomical regions significantly decreased after 1 month of treatment, and the TEWL did so after 2 months. TEWL positively correlated with erythema index ( $r=0.51$ ,  $p < .05$ ), melanin index ( $r=0.45$ ,  $p < .05$ ) and a\* ( $r=0.50$ ,  $p < .05$ ); negative correlation was observed with L\* ( $r=-0.48$ ,  $p < .05$ ). On top of AD symptom relief, dupilumab objectively improves the skin barrier and skin tone of non-lesional areas.

### P6.02

#### CHANGES IN ALLERGEN SENSITIZATION IN KOREAN ATOPIC DERMATITIS PATIENTS: A 10-YEAR RETROSPECTIVE STUDY BASED ON THE MULTIPLE ALLERGEN SIMULTANEOUS TEST

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Avoiding causative allergens is important for controlling the clinical course of atopic dermatitis. Allergen sensitization is influenced by many factors such as the environment. Although the socioeconomic development, climate, and lifestyle have changed and the prevalence of allergic diseases have increased in Korea over the past few decades, there is little information about changes in common allergens over time. This study was aimed at identifying the trends of the common allergens in atopic dermatitis patients over a 10-year period based on the results of the multiple allergen simultaneous test (MAST). We retrospectively reviewed the medical records of 1,414 atopic dermatitis patients (603 adults and 811 child patients) over a period of 10 years. The serum total immunoglobulin E (IgE) and specific IgE levels to 41 allergens were determined using MAST. House dust and house dust mites were the most prevalent allergens for both adult and child patients during the 10 years period, but the percentage of higher class responses has decreased in recent years. The number of patients sensitized to house dust, cats, and egg white increased while that of patients sensitized to cockroaches, storage mites, beef, and rice decreased for both adults and children. There were no significant changes in the total number of sensitizing allergens over time. The common allergens in atopic dermatitis patients have changed over

time. Based on the findings of this study, physicians and patients should consider changing their strategies for disease prevention and management.

### P6.03

#### BASELINE CHARACTERISTICS OF PATIENTS WITH SEVERE ATOPIC DERMATITIS: A SINGLE-CENTER COHORT STUDY IN KOREA

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The number of patients with severe AD has increased in Korea. Observational studies on baseline characteristics of patients with severe AD in the Korean population are necessary for clinical and health policy decisions. We conducted a retrospective, observational study enrolling adults with severe AD to report baseline characteristics of severe AD. A retrospective chart review for a total of 108 patients with severe AD were done in a single institution. Clinical signs and disease severity were assessed. The results of laboratory studies and medical histories were also recorded. The predilection sites of the disease were the head and trunk than both extremities. Clinical signs were less prominent in the head, and erythema and lichenification were remarkable clinical signs. The mean POEM and pruritus NRS score were  $23.8 \pm 4.6$  and  $8.1 \pm 1.7$ , respectively. The mean DLQI value was  $22.0 \pm 6.5$ . The most frequent abnormal laboratory findings were total IgE (85.2%,  $7243.4 \pm 13298.2$  IU/mL) and eosinophil count (70.4%,  $1146.3 \pm 981.7$  /uL), followed by LDH (48.1%,  $329.1 \pm 90.8$  U/L), MAST (34.3%), and uric acid (25.0%,  $8.0 \pm 1.1$  mg/dL). The most frequent comorbidities were allergic rhinitis (50.8%) and asthma (18.5%). Patients tried various therapy in the baseline, whereas dupilumab was the leading substance as current treatment for severe AD patients (98.1%). This cohort provides an important resource for characterizing the disease burden of severe AD and evaluating the safety and effectiveness of various AD treatments.

### P6.04

#### DUPILUMAB TREATMENT NORMALIZES SKIN BARRIER STRUCTURE AND FUNCTION AND IMPROVES CLINICAL OUTCOMES IN PATIENTS WITH ATOPIC DERMATITIS

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Type 2 inflammatory cytokines IL-4 and IL-13 contribute to skin barrier disruption in atopic dermatitis (AD). We evaluated the effect of dupilumab on skin barrier function, lipid composition, and clinical outcomes in adults and adolescents with moderate-to-severe AD. BALISTAD (NCT04447417) was a 16-week, open-label study. Transepidermal water loss (TEWL) after skin tape stripping (STS) was assessed in lesional skin of 26 AD patients treated with dupilumab and on the skin of 26 healthy volunteers. Lipid composition was assessed by liquid chromatography tandem mass spectrometry. Median TEWL after 5 STS in AD lesions was significantly reduced from baseline starting at Week 2 ( $p < 0.0001$ ) and sustained through Week 16 ( $p < 0.0001$ ). At Week 16, there was no difference in the LS mean TEWL in lesional skin of AD patients vs healthy volunteers' skin ( $p = 0.225$ ). At baseline, the ratio of total C20 EOS ceramides to total C20 NS ceramides in AD lesional skin was significantly lower than in skin of healthy

volunteers ( $p=0.003$ ). At Week 16, the ratio significantly improved in AD lesional skin, showing no difference compared with skin of healthy volunteers<sup>7</sup> ( $p=0.2118$ ). Clinical assessments of AD lesions, itch, sleep, and quality of life significantly improved from baseline ( $p<0.0001$ ). Overall safety was consistent with the known dupilumab safety profile. Dupilumab treatment normalizes skin barrier function in patients with moderate-to-severe AD and is associated with significant improvement in AD signs and symptoms, and quality of life.

### P6.05

#### REAL-WORLD OUTPATIENT PRESCRIPTION PATTERNS FOR ATOPIC DERMATITIS IN CHINA: A CROSS-SECTIONAL STUDY

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Atopic dermatitis (AD) often required combination therapy. Real-world evidence on treatment patterns of Chinese patients with AD is sparse. To investigate the characteristics of prescription patterns for AD. Data from the Hospital Information System in Peking University Shenzhen Hospital from 2018 to 2020 were analyzed, including 3546 outpatient electronic medical records with the diagnosis of AD (ICD-10: L20). Most of the patients received more than one medication for AD (96.4%). Topical corticosteroids (TCSs, 67.3%) was the most common topical medication prescribed followed by topical calcineurin inhibitor (55.3%). Although the patients under 18 years old were more likely prescribed of TCSs than adult patients (78.9% vs. 54.2%,  $p<0.001$ ), the use of higher potency TCSs was increased with age (15.1% vs. 38.2%,  $p<0.001$ ). Antihistamines (56.7%) were the most common systemic therapy used for AD, especially for the younger (59.3% vs. 54.3%,  $p=0.003$ ). Most of these patients were prescribed non-sedating antihistamines (92.7%), even though sedating antihistamines are suggested over non-sedating antihistamines for relief of pruritus in AD according to guidelines. Traditional Chinese medicine, such as compound glycyrrhizin (24.3%), were prescribed for AD even with disproven efficacy. Systemic immunosuppressants or corticosteroids were rarely prescribed (<0.5%, respectively). These findings highlight the current prescribing practices in China outpatients, suggesting that a gap between guidance and practice for the treatment still exists, especially for the systemic therapy of AD.

### P6.06

#### KNOWLEDGE, ATTITUDE AND PRACTICE OF MALAGASY PHYSICIANS REGARDING ATOPIC DERMATITIS

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Atopic dermatitis is a common chronic, pruritic inflammatory dermatosis. The first consultation is usually done by the general practitioners or the pediatricians. To assess the knowledge, attitude and practice of Malagasy physicians regarding atopic dermatitis. This was a descriptive cross-sectional study from 15 March to 15 June, 2021. Anonymous questionnaire survey was completed by physicians working in public and private sectors in Antananarivo and Antsirabe. Among 122 physicians included in this study, 63 and 42 were general practitioners and pediatricians, respectively. The mean age  $\pm$  SD of participants was  $42 \pm 12.56$  years and 60.6% of these were female. The mean years of work experience was 12 years and 6 months. Scores for each parameter found that Malagasy physicians had a moderate level of knowledge (70.8%) with an

approximate attitude (68.56%) and a moderate practice (68.15%) regarding atopic dermatitis. Gender, sector, city of practice and years of experience had no influence on the knowledge, the attitude and practice of physicians regarding atopic dermatitis unlike the service, the function and the number of AD cases seen in consultation. Dermatologists had a high level of knowledge and practice. Assistants in dermatology, residents in dermatology, allergists and pediatricians had a moderate and high level of knowledge and practice. Scores of knowledge and practice had a positive correlation with the number of AD cases seen in consultation. These results justify the importance of continuing medical education in dermatology.

### P6.07

#### ATOPIC DERMATITIS AND RNA IN SKIN SURFACE LIPIDS AMONG ONE-MONTH-OLD INFANTS

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Kao Corporation discovered the existence of analyzable human mRNA in sebum and developed an original analytical technology to comprehensively measure the mRNA. Samples can be collected and analyzed easily and noninvasively with oil-blotting film. The purpose of this study was to explore the possibility of using sebum RNA to diagnose early-stage atopic dermatitis (AD) at one month of age. We evaluated RNA in the sebum of young babies at one month of age. In AD infants at 1 month of age, the expression of inflammation-related genes (IL-4R, IL-7R, S100 family, etc.) increased and the expression of genes related to keratinization and lipid metabolism/synthesis (FLG, IVL, FA2H, ELOVL4, etc.) decreased, indicating that RNA in sebum could capture the AD molecular pathological features as previously reported. The analysis of RNA in sebum at the age of one month is able to capture AD molecular pathological features.

### P6.08

#### A META-ANALYSIS OF VITAMIN D LEVEL AND EFFECTIVENESS OF VITAMIN D SUPPLEMENTATION IN PATIENTS WITH ATOPIC DERMATITIS

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Recent studies have highlighted the role of vitamin D in atopic dermatitis (AD) and that vitamin D supplementation may be beneficial in treating AD. This study aimed to determine the serum vitamin D levels in AD patients and to evaluate the effectiveness of vitamin D supplementation in AD. We included databases of MEDLINE, EMBASE, and Cochrane up to May 2015. Based on the available data on the serum 25-hydroxyvitamin D (25(OH)D) level and quantified data assessing severity using the Scoring Atopic Dermatitis (SCORAD) index or Eczema Area and Severity Index (EASI) score, we included observational studies and randomized controlled trials. The serum 25(OH)D level was lower in the AD patients of all age groups (standardized mean difference = -2.03ng/mL; 95% confidence interval (CI) = -2.52 to -0.78), and mainly lower in the pediatric AD patients (standardized mean difference = -3.03 ng/mL; 95% CI = -4.76 to -1.29), when compared with healthy control groups. Additionally, it was confirmed that the SCORAD index and EASI score both decreased after taking vitamin D supplementation (standardized mean difference = -5.85; 95% CI = -7.66 to -4.05). In this meta-analysis, serum vitamin D

levels were lower in patients with atopic dermatitis, and we found that vitamin D can be used as adjunctive treatment.

### P6.09

#### DUPIUMAB DEMONSTRATES CONSISTENT EFFICACY ACROSS RACIAL SUBGROUPS IN PEDIATRIC PATIENTS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS

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Most clinical atopic dermatitis (AD) studies enroll a higher proportion of White patients, despite clinical presentation and susceptibility variation across racial subgroups. To report the efficacy and safety of dupilumab treatment across racial subgroups in pediatric populations. We report data from patients with moderate-to-severe AD who participated in a randomized, placebo-controlled, phase 3 study: LIBERTY AD PRESCHOOL (6 months to 5 years; NCT03346434 part B); dupilumab 200/300mg every 4 weeks (q4w) +TCS ( $n=83$ ) or placebo +TCS ( $n=79$ ). LIBERTY AD PEDS (6–11 years; NCT03345914); pooled dupilumab +TCS (100/200mg q2w +TCS [ $n=122$ ]; 300mg q4w +TCS [ $n=120$ ]) or placebo + TCS ( $n=120$ ). LIBERTY AD ADOL (12–17 years; NCT03054428); pooled dupilumab (200/300mg q2w [ $n=82$ ]; 300mg q4w [ $n=83$ ]) or placebo ( $n=85$ ). Data are assessed in each racial subgroup: White (dupilumab:  $n=341$ , placebo:  $n=175$ ), Black or African American (dupilumab:  $n=69$ , placebo:  $n=53$ ), Asian (dupilumab:  $n=40$ , placebo:  $n=26$ ) and Other (dupilumab:  $n=35$ , placebo:  $n=25$ ). At Week 16, significant ( $p < 0.0001$ ) percent change improvements in EASI and SCORAD score were seen in dupilumab vs placebo treated patients in the White, Black or African American, and Asian subgroups. The proportion of patients with TEAEs were relatively similar across all racial subgroups. Pooled analysis from dupilumab clinical trials in pediatric patients with moderate-to-severe AD demonstrates consistent efficacy in observed racial subgroups. Overall safety was consistent with the known dupilumab safety profile.

### P6.10

#### SYMPTOM MONITORING WITH PATIENT-REPORTED OUTCOME MEASURES: RESULTS OF THE ECZEMA MONITORING ONLINE RANDOMISED CONTROLLED TRIAL

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Patient-reported outcome measures (PROMs) in the form of online questionnaires, are often used in eczema clinical trials. However, completing PROMs regularly may prompt enhanced self-management of eczema and increase standard topical treatment use, which can lead to improvements in outcomes over time. This is concerning as regular symptom monitoring may constitute an unplanned intervention, which can mask the treatment effect and make it difficult to identify changes in the eczema resulting from the treatment under investigation. To evaluate the effect of regular patient-reported symptom monitoring on eczema severity, using PROMs. Parents/carers of children with eczema and young people and adults with eczema were recruited, mainly via social media.

Data collection occurred online, using electronic PROMs. In this non-treatment intervention trial weekly PROMs (intervention) were compared with PROMs sent only at the primary outcome timepoint of 8 weeks (control). The primary outcome was change in eczema severity, assessed by the POEM score. A total of 296 participants from 16 countries and from a range of ethnicities took part in the study, including: white (78%), Asian (11.8%), mixed background (4.7%), Black (4%) and another ethnic group (1.3%). The majority of participants had moderate (43%) or severe (44%) eczema, followed by mild eczema (13%). Statistical analyses are ongoing and results will be available in September 2022. Findings of this study will inform the design of future eczema RCTs on the impact of regular PROM collection on trial outcomes.

### P6.11

#### SUBOPTIMAL CONTROL OF ATOPIC DERMATITIS IN YOUNG CHILDREN IN CANADA: RESULTS FROM THE EPI-CARE SURVEY

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Atopic dermatitis (AD) affects ~15% of children aged 0.5–5 years in Canada, but data on disease severity and control are scarce. To report data on flares and AD-related hospitalizations from the EPI-CARE survey in Canadian children aged 0.5–5 years. EPI-CARE - a cross-sectional, web-based, caregiver/self-report survey of children aged 0.5–17 years - was conducted in 2018–2019 in 18 countries. Children aged 0.5–5 years had “diagnosed AD” based on ISAAC criteria, caregiver-report of a physician diagnosis, and an itchy rash affecting the cheeks/forehead and elbow–wrist/knee–ankle. Caregivers assessed their child's AD severity over the past week as clear, mild, moderate, or severe. We report frequency and duration of flares (increased itching/redness and/or new/spreading lesions) in the past month and AD-related hospitalizations in the past year. Among 51 children aged 0.5–5 years, 65%, 30% and 4% had clear/mild, moderate and severe AD, respectively. Most patients with clear/mild AD (81%) had  $\geq 1$  flare during the past month, while many patients with moderate/severe AD (53%) had  $\geq 2$  flares. Average flare duration was longer for those with moderate/severe vs clear/mild AD. Approximately 30% of patients with moderate/severe AD had an AD-related hospitalization in the past year. Many of the pediatric patients with moderate/severe AD had suboptimal disease control, which increases the burden on quality of life. AD treatments with a favorable risk–benefit profile may help to address this important unmet medical need.

## P6.12

**FILAGGRIN LOSS-OF-FUNCTION (LOF) MUTATIONS ARE ASSOCIATED WITH PERSISTENCE OF EGG AND MILK ALLERGY**

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Filaggrin LOF mutations play a major role in the etiology of eczema and associated allergic airway diseases. However, their contribution to the development and persistence of food allergies is still controversial. We tested for association of FLG LOF mutations with allergic reactions to diverse foods and investigated their potential effect on the persistence of early food allergies. We recruited 890 children with challenge-proven food allergy for the German Genetics of Food Allergy Study (GOFA). Longitudinal data were available for 684 children. All children were clinically characterized, including their allergic responses to specific foods, and genotyped for the four most common LOF mutations in FLG; R501X, 2282del4, R2447X, and S3247X. Associations between FLG mutations and food allergies were analyzed by logistic regression using the German Multicenter Allergy Study cohort as control population. FLG mutations were associated with allergies to diverse foods including hen's egg (HE), cow's milk (CM), peanut, hazelnut, fish, soy, cashew, walnut, and sesame with similar risk estimates. Effects remained significant after adjusting for the eczema status. Interestingly, we found a strong association between FLG mutations and persistent allergy to HE and CM (OR<sub>HE</sub>=2.6 and OR<sub>CM</sub>=3.8). Using the gold standard for food allergy diagnosis, we demonstrate that FLG LOF mutations confer a risk of any food allergy independent of eczema. They predispose to the persistence of HE and CM allergy and should be considered in the assessment of tolerance development.

## P6.13

**EPIDEMIOLOGY OF PEDIATRIC ATOPIC DERMATITIS IN A COHORT OF CHILDREN IN GREENLAND**

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The epidemiology of atopic dermatitis (AD) varies between races and geographical regions. AD in Greenland has been sparsely investigated. This study examined the point and period prevalence and associated risk factors of AD among children in Greenland. 839 children aged 0-7 were recruited in daycare institutions in three towns of Greenland. Parents completed a questionnaire including questions on AD and related risk factors. The diagnosis of AD was determined by self-reported answers using the United Kingdom Working Party's (UKWP) criteria along with a clinical assessment by a physician trained in dermatology. The point and period prevalence of AD was 28% and 34.5% according to physician diagnosis and assessment. In the fully adjusted multivariate model, parental atopic disposition was a significant risk factor for AD, maternal atopy OR 1.51 (95% CI 1.06-2.15); paternal atopy OR 2.1 (95% CI 1.47-3.0). In the adjusted multivariate model, children of Inuit descent and of mothers with high educational level had increased risk of AD, OR 1.6 (95% CI 1.04-2.53) and OR 1.52 (95% CI 1.15-2.2), respectively. The prevalence of AD in children in Greenland is high and children of Inuit descent and of high socioeconomic status appear to have increased risk of AD.

## P6.14

**EPIDEMIOLOGY AND BURDEN OF ATOPIC DERMATITIS IN PEDIATRICS: A CROSS-SECTIONAL STUDY IN CHINA**

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We aimed to estimate the prevalence, severity, and burden of pediatric atopic dermatitis (AD) in China. EPI-CARE China was a cross-sectional online survey of general pediatric populations (aged 6 mo–17 y) between February–April 2021 in China. AD prevalence in the preceding year was based on both International Study of Asthma and Allergies in Childhood criteria and self-/parent-report of physician confirmation of ever having had AD. Severity (mild, moderate, severe) was assessed by Patient Global Assessment in the preceding week. Outcomes included atopic comorbidities and itch/skin pain/sleep disturbance in the past 24 hours (numeric rating scale [NRS]: 0–10 [no symptoms–worst symptoms]), stratified by age group (aged ≤5 y, 6–11 y, 12–17 y). Among 7148 responders in China, AD prevalence was 3.2% (≤5 y [n = 2502]: 3.8%; 6–11 y [n = 2374]: 4.1%; 12–17 y [n = 2272]: 1.7%). Of these, 59.1% (≤5 y: 66.1%; 6–11 y: 60.1%; 12–17 y: 39.4%), 38.8% (≤5 y: 33.9%; 6–11 y: 38.0%; 12–17 y: 53.1%), and 2.0% (≤5 y: 0.0%; 6–11 y: 1.9%; 12–17 y: 7.5%) had mild, moderate, and severe AD, respectively. Overall, 90.5% patients reported ≥1 atopic comorbidity (≤5 y: 85.4%; 6–11 y: 92.7%; 12–17 y: 97.6%). The mean (SD) itch, skin pain, and sleep disturbance NRS were 5.9 (2.4) (≤5 y: 5.6 [2.4]; 6–11 y: 6.3 [2.3]; 12–17 y: 5.8 [2.7]), 5.6 (2.6) (≤5 y: 5.5 [2.5]; 6–11 y: 5.6 [2.5]; 12–17 y: 5.6 [2.9]), and 5.9 (2.3) (≤5 y: 5.5 [2.4]; 6–11 y: 6.1 [2.2]; 12–17 y: 6.1 [2.4]), respectively. These results demonstrate substantial unmet need in Chinese pediatric AD patients.

## P6.15

**PREVENTIVE AND THERAPEUTIC EFFECTS OF PROBIOTIC SUPPLEMENTATION IN INFANT ATOPIC DERMATITIS: AN UP-TO-DATE META-ANALYSIS**

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Prevalence of atopic dermatitis (AD) is rapidly rising. Despite the large research body investigating the effect of probiotic administration on the incidence and severity of AD, available data have contradictory results. To explore whether the intake of probiotics decreases the incidence of AD and secondly, to determine effectiveness of probiotic supplementation as a therapeutic tool for AD. PubMed, Scopus and EMBASE were systematically queried to collect data. This review was carried out in accordance with the PRISMA guidelines and Meta-Analyses. Out of 853 publications, 75 papers were included in the meta-analysis. There were 43 papers on probiotics in the prevention of AD comprising 8,754 participants, 32 papers in the treatment of AD including 2,021 children. A lower incidence of AD of 22% was found in the probiotic group (RR:0.78 95%CI:0.64–0.94). The decrease of incidence was 49% (RR:0.51 95%CI:0.39–0.66) when probiotics were administered to pregnant and breastfeeding mothers, while it was 27% (RR:0.73 95%CI: 0.63 – 0.86) when they were taken by pregnant mothers and infants. Significant differences in SCORAD favoring probiotics were observed (MD:-3.18 95%CI:-4.66--1.70), but DLQI remained unchanged. *L.rhamnosus* was the most documented strain, but it turned out to be ineffective in reducing SCORAD (Mean difference -1.85 95%CI: -4.61-0.90). Conversely, *L.paracasei* and *L.sakei* demonstrated a significant decrease of SCORAD. Probiotics are effective in the prevention of AD. Breastfeeding mothers' intake represents a major expressive measure which may become a novel preventive strategy.

### P6.16

#### BENEFICIAL EFFECTS OF PROBIOTIC SUPPLEMENTATION IN ADULTS WITH ATOPIC DERMATITIS: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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Atopic dermatitis (AD) is a frequent chronic relapsing type-2 inflammatory disease in adults as well. Despite the large research body investigating the effect of probiotic administration on the incidence and severity of AD in adults, available data have contradictory results. To explore whether the intake of probiotics decreases the incidence of adult AD and, secondly, to determine effectiveness of probiotic supplementation as a therapeutic tool for adult AD. PubMed, Scopus and EMBASE were systematically queried to collect data. This review was carried out in accordance with the PRISMA guidelines and Meta-Analyses. Systematic literature search retrieved 426 potentially relevant articles; 13 papers were selected for full reading. Finally, 9 papers comprising 400 subjects (217 receiving probiotics and 183 receiving placebo) met inclusion criteria. Probiotic intervention reduced severity of adult AD patients, as measured by SCORAD and as compared to placebo (RR:-5.93 95%CI:-8.43 – -3.43, I<sup>2</sup>=96%). In the subgroup analysis by probiotic strains, *Lactobacillus salivarius* presented with the major size of effect (RR:-9.79 95%CI:-13.04 – -6.54, I<sup>2</sup>=97%, three studies) followed by *Lactobacillus acidophilus* (RR:-5.77 95%CI:-10.82 – -0.72, I<sup>2</sup>=0%, two studies) and *Lactobacillus plantarum* (RR:-3.76 95%CI: -6.36 – -1.16, I<sup>2</sup>=0%, two studies). The meta-

analysis estimated that this intervention did significantly improve DLQI index (RR:-1.15 95%CI:-1.91 – -0.39, I<sup>2</sup>=75%). Probiotic intervention reduced severity of adult AD patients. This is yet the first meta-analysis about use of probiotics in adult AD.

## P7. Quality of Life and Comorbidities

### P7.01

#### EPIDEMIOLOGY OF ECZEMAS IN CHILDHOOD IN KINSHASA

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Atopic dermatitis, also known as atopic eczema, is a chronic relapsing inflammatory skin disease characterized by pruritus, xerosis, and a close association with IgE-mediated sensitization to inhalant allergens and foods. Over 60% of children with atopic dermatitis may develop allergic rhinitis or asthma. The aim of this work is to describe the epidemiological and clinical aspects of eczema in patients under 18 years. Retrospective and multicentric study for patients under 18 years seen in the department of dermatology for eczema in three private hospitals in Kinshasa: Clinique Bondeko, Centre Hospitalier Akram and Victoria Medical Center. Our study was conducted over a period of 01 January 2020 to 31 December 2021. In these three hospitals, 400 patients aged 0-18 years had consulted an outpatient for all kinds of skin diseases, including 55 suffering from eczema a frequency of 13,75%. The average age was 8.3 years and 30% of cases had infection of lesions, the age range of 6-11 is the most affected and a history of atopy was found in more than half the cases. Eczema is prevalent in childhood because it represents 14% of dermatoses in general practice of dermatology in private hospital.

### P7.02

#### ATOPIC DERMATITIS SYMPTOMS AND SATISFACTION OF THE TREATMENT FROM PATIENT'S PERSPECTIVE

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Atopic dermatitis (AD) is chronic and relapsing disease, which strongly impacts quality of life of the patients. Knowing about patients' unmet needs helps improve treatment outcomes. To find out what symptoms of AD patients struggle most with and to what extent our treatment meets their needs. 101 AD patients responded to the questionnaire, which was designed to assess the most important symptoms of AD from the patients' point of view and the treatment efficacy in the patients' opinion. The study group was dominated by women (82%), including mothers of children with AD. The mean duration of AD was 8.23 years. 53.8% of respondents were treated only locally, 4.4% only systemically. The most burdensome factor was pruritus (86.1%) then followed by dry skin (77,2%) and the appearance of the skin (74,3%), skin pain (36,6%), the extent of the lesions (25,2%), sleep disturbances (24,8%). According to the (70,3%) of respondents the most burdensome factor associated with AD stayed under control. 47.5% of respondents were satisfied of their treatment, however 75% of AD patients were not asked by their doctors about the biggest problem related to the disease. 33% of respondents indicated that the side effects of treatment were worse than the disease itself. Asking patients about the most bothersome clinical symptoms seems to be a good way to improve treatment outcomes.



## P7.03

**ASSOCIATIONS BETWEEN ATOPIC DERMATITIS AND RISK OF RENAL CANCER**

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Atopic dermatitis (AD) is a common chronic inflammatory skin disease characterized by severe itching. It is not well known whether the risk of malignant cancer actually increases in patients with AD. To determine the risk of renal cancer in AD patients We conducted a nationwide population-based study. A total of 3,867,147 people met the enrollment criteria. The study population was classified into three groups based on AD severity, and the risk of renal cancer was calculated for each group. After adjusting for age, sex, body mass index, smoking, alcohol intake, exercise, diabetes mellitus, hypertension, and dyslipidemia, the AD group showed a significantly increased risk of overall cancer (hazard ratio: 1.06). After adjusting for confounding factors, the severe AD group showed a significantly increased risk of developing renal cancer (hazard ratio: 1.53, 95% confidence interval: 1.21-1.94). This result suggests potential associations between AD and increased risk of renal cancer. Further studies are needed to elucidate the pathogenesis in which AD increased the risk of renal cancer.

## P7.04

**GENERALIZED ECZEMA HERPETICUM IN AN ATOPIC DERMATITIS PATIENT BELATEDLY DIAGNOSED WITH MYCOSIS FUNGOIDES**

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A 45-year-old female presented with 38.2°C fever and whole body eczema accompanied by oozing and foul odor. She had a history of more than 10 years of atopic dermatitis (AD) and was taking herbal medicine for 9 months for treatment. During the treatment, she lost 20kg of weight by carbohydrate and protein restriction diet, and eczema continuously deteriorated. Laboratory findings revealed leukocytosis, elevated C-reactive protein level of 14.83mg/dL, procalcitonin level of 1.44ng/mL, and total IgE level was 335.9IU/mL. *Staphylococcus aureus* and streptococcus dysgalactiae grew in both skin and blood culture. At first, a flare-up of AD was presumed to be the cause. However, skin biopsy specimen from the leg revealed intraepithelial vesicles containing multinucleated giant cells, which was consistent with herpes viral infection. In addition, there was a history of blisters on her lip 2 weeks earlier. Based on clinical and histopathological findings, she was diagnosed with generalized eczema herpeticum (EH) with secondary infection resulting in sepsis. The patient was treated with intravenous acyclovir and antibiotics. However, pruritic and lichenified plaques worsened during the 2 months of follow-up. Skin biopsy was performed again, and mycosis fungoides (MF) was diagnosed. Generalized EH is rare, however, the impaired barrier function due to AD and MF lead to dissemination. Although the exact association has not been revealed, cases of MF with AD have been reported in the last decade. Herein, we report a case of generalized EH in a patient with AD, and belatedly diagnosed MF.

## P7.05

**INCREASED RISK OF DEMENTIA IN PATIENTS WITH ATOPIC DERMATITIS: A NATIONWIDE POPULATION-BASED COHORT STUDY**

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Atopic dermatitis (AD) is a common chronic pruritic inflammatory cutaneous disease, which is associated with a neuroinflammation. To date, study determining the risk of neurodegenerative disease including Alzheimer's disease and vascular dementia in AD is scarce. We aimed to comprehensively analyze the incidence and risk factors of dementia in AD patients. Using the nationwide healthcare dataset from the National Health Insurance Service, a total of 2,681,993 participants with AD were included and followed. We examined the incidence and risk factors for all-cause dementia, Alzheimer's disease, and vascular dementia. The effects of presence or absence of AD on incidence of dementia subtypes and risk factors of dementia were also determined. The cumulative incidence probability of all-cause dementia, Alzheimer's disease, or vascular dementia at 8 years was 50, 39, and 7 per 1000 person-years in patients with AD, respectively. The increased adjusted odds of all-cause dementia (hazard ratio [HR], 1.072; 95% confidence interval [CI] 1.026-1.120), and Alzheimer's disease (HR, 1.051; 95% CI, 1.000-1.104) was observed in patients with AD. The effect of presence or absence of AD diagnosis on the development of dementia and Alzheimer's dementia varies with the age and presence or absence of diabetes mellitus diagnosis (all P for interaction, <0.05, respectively). Our results showed the increased odds of all-cause dementia and Alzheimer's disease in patients with AD. Providing the proper management of modifiable risk factors may be important for preventing dementia in patients with AD.

## P7.06

**ALLERGIC COMORBIDITIES OF KOREAN PATIENTS WITH ATOPIC DERMATITIS: A NATIONWIDE CROSS-SECTIONAL STUDY**

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Atopic dermatitis (AD) begins in early life and gradually progresses to food allergy, asthma, and allergic rhinitis (AR) in the context of atopic march. The relationships between AD and allergic comorbidities have been studied in previous literatures. However, few enrolled all age groups and studies with small cohorts may not have been representative of entire populations. We sought associations between AD and allergic diseases in patients of all ages by reference to insurance claims data. A cross-sectional study design was used to analyze the risk of prevalence of asthma, allergic conjunctivitis (AC), and AR in patients with AD using the Korean National Health Insurance Research Database for 2015. Patients with AD were individuals who visited physicians on more than two occasions with ICD-10 code for AD [L20] and graded by severity. Severe AD was defined as AD for which systemic corticosteroids or immunosuppressants were prescribed for > 3 months. The prevalence of asthma, AC, and AR in patients with AD were 13.9%, 25.0%, and 84.4%, respectively. AD was significantly associated with higher odds of asthma (odds ratio [OR] 2.63, 95% confidence interval [CI] 2.61-2.66), AC (OR 4.03, 95% CI 4.00-4.06), and AR (OR 4.89, 95% CI 4.86-4.92). In subgroups

stratified according to AD severity, the ORs for asthma (6.55 in severe AD vs. 2.62 in mild-to-moderate AD group), AC (4.71 vs. 4.03), and AR (11.02 vs. 4.88) increased with increasing severity of eczema. We found that the prevalence of asthma, AC, and AR increased in Korean patients with AD, particularly severe AD.

### P7.07

#### MEASUREMENT PROPERTIES OF QUALITY-OF-LIFE SKIN- OR DISEASE-SPECIFIC PATIENT-REPORTED OUTCOME MEASURES FOR CHILDREN AND ADULTS WITH ECZEMA: AN UPDATED SYSTEMATIC REVIEW

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A systematic review regarding the measurement properties of patient-reported outcome measures (PROMs) in children and adults with eczema was published in 2015 and updated three years ago. We now aimed to systematically assess the measurement properties of recently published development and validation studies regarding quality-of-life (QoL) skin- or disease-specific PROMs using the COnsensus-based Standards for the selection of health Measurement Instruments (COSMIN) guidelines and integrate these findings with those from the 2019 update. A systematic literature search was conducted in PubMed and EMBASE. The methodological quality of the studies identified through the literature search was assessed with the COSMIN Risk of Bias checklist. The adequacy of the included PROMs was judged using updated quality criteria and the quality of evidence of the summarized results was graded. The new evidence was integrated with the results from the 2019 update. Finally, PROMs were placed in three different recommendation categories (A-C) based on all evidence. We identified 11 studies fulfilling our inclusion criteria. Two PROMs could now be placed in category A. Three further new PROMs could be identified and classified in category B. Only the DLQI still fulfilled the criteria for category C and should not be recommended for use. All other PROMs have the opportunity to be recommended, but need further validation. Currently, two PROMs for QoL can be recommended for us. Many PROMs need further validation.

### P7.08

#### PREDICTING THE PATIENT-BURDEN OF CHRONIC PRURITUS USING PATIENTS' DESCRIPTIONS OF ITCH IN ADULTS

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Patients with chronic itch complain of pruritus in their own way. However, these subjective expressions are often not recognized by physicians. This study aims to investigate the relationship between various itching expressions and the patient-burden of chronic pruritus and examine the mediation effect of sleep disturbance and sexual dysfunction on the patient's quality of life predicted by various itch descriptions. Exploratory and confirmatory factor analyses were applied to identify a factor structure measured by 11 itching expressions. Then, we analyzed the differences in the degree of sleep disturbance, sexual dysfunction, and quality-of-life deterioration associated with itching factors using a structural equation modeling method. We were able to classify the 11 itch expressions into two groups: (1) sensory itching (i.e., stinging, stabbing, burning, painful, formication, throbbing and cold) that is linked with expressions of one's itch pattern in some way; and (2) affective itching (i.e., annoying, unbearable, worrisome, and warm) that patients complained of mental pain or emotional distress. We found that affective itching affects patients' low quality of life either directly or indirectly through sleep disturbance. We can get clues about the patient's sleep disturbance or poor quality of life through the patients' itching descriptions.

### P7.09

#### FLARE-UP OF SYSTEMATIC LUPUS ERYTHEMATOSUS AND ITS ASSOCIATION WITH ATOPIC DERMATITIS: TWO CASE REPORTS

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Various triggers may result in flare-up of SLE, including drugs and tapering of medication. Also, SLE and atopic dermatitis (AD) share similar immune dysfunction, suggesting that overproduction of inflammatory mediators may have a role in the increased risk of SLE in patients with AD. Case 1, A 32-year-old woman presented with multiple erythematous to violaceous patches on face and ulcers of nose and scalp for 3 weeks. She was diagnosed with SLE 3 years ago, and the dose of prednisolone had been tapered for 10 months. Punch biopsy revealed vasculitic ulcer associated with SLE. The skin lesions resolved after 7 months of treatment with oral prednisolone 30mg/day, hydroxychloroquine, belimumab, intralesional polydeoxyribonucleotide and hyaluronic acid injections. Case 2, A 28-year-old woman presented with multiple erythematous to brownish macules on face. She was diagnosed with atopic dermatitis (AD) 20 years ago. Punch biopsy of the face revealed discoid lupus erythematosus (DLE). Under diagnosis with concomitant AD and DLE, intralesional triamcinolone and hyaluronic acid injections were started. Cutaneous lupus lesions improved after two years of injection. Herein, we report two cases of SLE successfully treated with intralesional injections (ILIs) of polydeoxyribonucleotide and hyaluronic acid.

### P7.10

#### CUTANEOUS T-CELL LYMPHOMA FOUND IN PATIENTS WITH ATOPIC DERMATITIS REFRACTORY TO DUPILUMAB

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Cutaneous T-cell lymphoma (CTCL) is the most common form of primary cutaneous lymphoma, which appears in various forms. Especially in the patch stage, CTCL is often misdiagnosed as severe atopic dermatitis because its clinical feature shares a lot in morphologic characteristics. Among 351 patients who were regularly administered with dupilumab every two weeks, we recommended a biopsy for patients who did not achieve EASI 50 at 16 weeks of administration, and a biopsy was performed on the patients who agreed. Of the 10 patients who agreed to the biopsy, monoclonality on T cell receptor (TCR) gene rearrangement was found in 8 patients. Except for two patients diagnosed with poikilodermic MF, all patients showed MF with eczematous patch. Multi-site TCR monoclonality was confirmed in all patients with definite diagnosis, but histological findings showing eczematous pattern was found in at least one site in 6 patients (75%). In pathogenesis, CTCL progression is caused by an increase in T-helper 2 cell pathway. This increase in Th2 pathway also occurs in AD. It is thought that it will appear more similar in severe AD, making it difficult to distinguish the 2 diseases. Given these similarities in pathogenesis, in addition to the possibility of misdiagnosis, consideration should also be given to the possibility that systemic inflammation caused by AD may have led to the progression to cutaneous lymphoma.

### P7.11

#### DUPILUMAB TREATMENT IMPROVES HEALTH-RELATED QUALITY OF LIFE IN CHILDREN AGED 6 MONTHS TO 5 YEARS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS AND THEIR CAREGIVERS

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Previous studies showed that dupilumab substantially improved AD-associated HRQoL with an acceptable safety profile in adults, adolescents, and children aged >6 years. In LIBERTY AD PRE-SCHOOL (NCT03346434), children aged 6 months to 5 years with moderate-to-severe AD were randomized to subcutaneous dupilumab every 4 weeks ( $\geq 5$  to  $<15$ kg: 200mg /  $\geq 15$  to  $<30$ kg: 300mg) or placebo, for 16 weeks with concomitant low-potency topical corticosteroids. 162 patients were randomized to dupilumab ( $n = 83$ ) or placebo ( $n = 79$ ). Reported HRQoL measures include patient-reported Children's Dermatology Life Quality Index in patients aged  $\geq 4$  years (CDLQI), caregiver-reported Infants' Dermatology Quality of Life Index in patients aged  $<4$  years (IDQoL), and Dermatitis Family Impact (DFI). Baseline values for CDLQI, IDQoL, and DFI were comparable in the dupilumab and placebo groups. Dupilumab vs placebo treatment improved CDLQI from baseline to Week 16 (LS mean percentage change [ $\pm$ SE]:  $-53.4$  [9.6] vs  $-13.6$  [10.3];  $p < 0.0001$ ). Dupilumab vs placebo treatment improved IDQoL from baseline to Week 16 (LS mean percentage change [ $\pm$ SE]:  $-60.8$  [7.2] vs  $-6.3$  [6.7];  $p < 0.0001$ ). Caregivers

of patients treated with dupilumab vs placebo reported significant improvement in DFI score from baseline to Week 16 (LS mean percentage change [ $\pm$ SE]:  $-59.5$  [4.8] vs  $-13.7$  [5.0];  $p < 0.0001$ ). Overall safety was consistent with the known dupilumab safety profile. Dupilumab treatment for 16 weeks significantly improves CDLQI and IDQoL in patients with moderate-to-severe AD aged 6 months to 5 years and DFI score in their caregivers.

### P7.12

#### IMPACT OF THE COVID-19 PANDEMIC ON ADULT PATIENTS WITH ATOPIC DERMATITIS

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Atopic dermatitis (AD) is a chronic, inflammatory, itchy dermatosis with periods of remissions and exacerbations. Social isolation and lockdown measures may cause increased stress which in turn, may affect the skin condition of AD patients. We aimed to investigate the impact of the COVID-19 pandemic on the course of AD and the mental health of adult patients with AD. The study was based on an anonymous online questionnaire. A total of 91 adult AD patients participated in this survey. The study population consisted of 77 (84.6%) female and 14 (15.4%) male patients. The average age of patients was 28.3 years. Fifty-four respondents out of 91 (59.3%) noticed a worsening in the course of AD, 7 (7.7%) reported improvement whereas 30 (33.0%) assessed the activity of AD without changes. Patients with worsened AD most often indicated worsening itching of the skin (92.6% of 54). Only 54 (59.3%) patients continued treatment as directed by the attending physician. Of those that did not, 13 (14.3%) took or applied fewer medications, and 24 (26.4%) stopped taking or applying medications altogether. Of all respondents, 60 (65.9%) believed that their mental health had deteriorated and 11 (12.1%) patients developed suicidal thoughts during the COVID-19 pandemic. The results concluded that the COVID-19 pandemic had a negative impact on the course of AD among adult patients. Forced life changes, increased stress, and poor adherence to treatment may have contributed to it. Increased stress may have also worsened the mental health of AD patients, which in turn may have caused an AD flare-up.

### P7.13

#### HEALTH-RELATED QUALITY OF LIFE IMPROVEMENTS WITH ABROCITINIB BY CLINICAL RESPONSE STATUS IN PATIENTS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS

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Abrocitinib, an oral JAK-1 inhibitor demonstrated substantial improvement in health-related quality of life (HRQoL) in patients with moderate-to-severe AD. To examine the HRQoL improvements with abrocitinib by clinical response status. This post hoc analysis of the JADE COMPARE (NCT03720470) study included patients receiving once-daily oral abrocitinib 200 mg or 100 mg, biweekly subcutaneous dupilumab 300 mg, or placebo (pbo). EuroQol 5-dimension 5-level (EQ-5D-5L) health state index score at week (wk) 12 was assessed by clinical response status at wk 16

based on EASI-90 or IGA 0/1 with  $\geq 2$ -point improvement from baseline. EQ-5D-5L health state index scores among EASI-90 responders were 0.917 (abrocitinib 200 mg;  $p = 0.0123$  vs pbo), 0.924 (abrocitinib 100 mg;  $p = 0.0077$  vs pbo), 0.867 (dupilumab), and 0.828 (pbo). Both abrocitinib 200 mg (difference, 0.050; 95% CI: 0.015-0.084) and abrocitinib 100 mg (0.057; 0.020-0.094) were associated with higher utility scores than dupilumab. Among EASI-90 nonresponders, utility scores were 0.843 (abrocitinib 200 mg;  $p = 0.0031$  vs pbo), 0.813 (abrocitinib 100 mg), 0.838 (dupilumab), and 0.777 (pbo). Similar trends for improvement in index scores were observed among IGA 0/1 responders and nonresponders who received abrocitinib 200 mg, abrocitinib 100 mg, dupilumab, and pbo.  $p$ -values were not controlled for multiplicity. Abrocitinib resulted in significantly greater improvements in HRQoL compared with pbo in patients with moderate-to-severe AD, regardless of clinical response status.

#### P7.14

### ASSOCIATION BETWEEN PRURIGO NODULARIS AND INATTENTION AND HYPERACTIVITY/IMPULSIVITY IN PEDIATRIC PATIENTS WITH ATOPIC DERMATITIS

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Prurigo nodularis is a characteristic skin finding after repeated scratching due to itch which is the most distressing problem in atopic dermatitis (AD) patients. But, contributing psychosomatic factors of prurigo nodularis in AD patients are not well elucidated. The aim of this study is to investigate the association between the development of prurigo nodularis and the severity of AD. In addition, we investigate the association the inattention and hyperactivity and prurigo nodularis in pediatric AD patients. Thirty-five pediatric patients diagnosed with AD were enrolled (mean age: 7.9 years). We classified the patients into 2 groups: prurigo and non-prurigo. We evaluated the severity of AD with Eczema Area and Severity Index (EASI) score. The degree of inattention and hyperactivity/impulsivity of the patients was investigated by parents using the DSM-V criteria questionnaire for attention deficit/hyperactivity disorder. Among 35 patients, 19 patients belonged to the prurigo group, while 16 patients belonged to the non-prurigo group. The prurigo group had a significant likelihood of hyperactivity/impulsivity than non-prurigo group (4.4 vs. 2.6,  $p < 0.05$ ). There were no significant differences in the mean age, EASI score, itch numerical rating scale, total score of inattention and hyperactivity/impulsivity, and inattention score between two groups. This study highlights the relationship between hyperactivity/impulsivity in patients with AD and the occurrence of prurigo nodularis, regardless of the severity of AD.

#### P7.15

### SLEEP CHARACTERISTICS OBTAINED FROM OVERNIGHT POLYSOMNOGRAPHY IN ADULTS WITH ATOPIC DERMATITIS: RESULTS FROM A POPULATION-BASED COHORT STUDY

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Studies investigating sleep disturbances in adults with atopic dermatitis (AD) are limited, and only few investigations have used objective measurements of sleep such as polysomnography (PSG). We aimed to investigate sleep characteristics as measured with PSG in adults with AD from the general population. Data from 1183 participants from the population-based Study of Health in Pomerania (SHIP) Trend-0 (aged 20-81 years; 46.2% female) were analyzed. AD was diagnosed by physicians in a dermatological examination. An overnight laboratory-based PSG was conducted, and the subjective sleep quality was assessed in a questionnaire. Descriptive data on selected sleep parameters are presented. The prevalence of physician-diagnosed AD was 4.0% ( $n = 46$ ). The overall sleep quality in the past month was rated as good by 65.2% of the participants with AD and by 71.8% of the participants without AD. Regarding PSG measures, participants with AD did not differ from those without with respect to total sleep time (374.8 vs. 373.9 min), sleep latency (15.7 vs. 15.6 min), wake after sleep onset (57.5 vs. 61.2 min), REM latency (151.8 vs. 143.3 min) and sleep efficacy (82.4 vs. 81.3%). The present study is among the first to analyze PSG parameters in adults with AD from the general population. We could not substantiate previous findings demonstrating poor sleep quality in individuals with AD. A major limitation is the lack of data on AD severity, which might be a crucial outcome. Larger-scaled longitudinal studies considering disease severity are required.

#### P7.16

### ASSOCIATION BETWEEN METABOLIC SYNDROME AND ATOPIC DISEASES INCLUDING ATOPIC DERMATITIS, ALLERGIC RHINITIS AND ASTHMA: A CROSS SECTIONAL STUDY FROM SOUTH KOREA

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Atopic dermatitis, allergic rhinitis and asthma are typical atopic diseases which share same pathogenesis of immunoglobulin E mediated immune response resulting in allergic inflammation on skin and respiratory system. Although the association between metabolic syndrome and various inflammatory disorders has been elucidated recently, the association between metabolic syndrome and atopic diseases including atopic dermatitis, allergic rhinitis and asthma remains unclear. This study investigated the association between metabolic syndrome and three representative atopic diseases including atopic dermatitis, allergic rhinitis and asthma. This study used population-based, cross-sectional data from the Korean National Health and Nutrition Examination Survey from 2019 to 2020. A total of 6352, 2390, 1489 patients with allergic rhinitis, atopic dermatitis and asthma were included respectively. Multiple logistic regression analysis was performed to identify the association between each of those three atopic diseases and metabolic syndrome. After adjusting confounding factors, allergic rhinitis was significantly associated with metabolic syndrome (odds ratio [OR]: 1.214, 95% confidence interval [CI]: 1.116 - 1.321). On the contrary, there were no significant association between metabolic syndrome and atopic dermatitis and asthma (OR: 1.078,

95% CI: 0.874 - 1.314; OR: 0.83, 95% CI: 0.45-1.529, respectively). The significant association between metabolic syndrome and allergic rhinitis was observed. However, there were no association between metabolic syndrome and atopic dermatitis or asthma.

#### P7.17

### FREQUENCY OF CONTACT ALLERGY TO HOUSE DUST MITES IN CHILDREN WITH ATOPIC DERMATITIS

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Contact allergy (CA) in patients with atopic dermatitis (AD) have an impact on the course of AD. Patients with AD are often unaware of a concomitant CA. There's an increase in CA also in the youngest. Frequency of contact allergy to house dust mite (HDM) in children with AD in terms of selected demographic factors - age, gender, place of residence, showing the relationship between the severity of AD and the coexistence of CA to HDM. Patients were divided into 3 groups. The study involved 85 children with AD up to the age of 5, in whom no elevated total IgE concentration was found and HDM IgE allergy was excluded. Comparative group I consisted of healthy children in the same age group, without a history of atopy ( $n = 25$ ). Comparative group II included children with AD ( $>5$ age) who had an elevated concentration of tot. IgE and/or sIgE against HDM ( $n = 37$ ) CA to HDM was significantly more frequent in the study group than in the comparative group I. CA to HDM was more frequent in patients from the comparative group than in the study group. CA to HDM was significantly more frequent in comparative group II than in group I. The frequency of CA to HDM in children doesn't depend on selected demographic factors such as sex, age, and place of residence. A statistically significant correlation was found between the occurrence of CA to HDM and the severity of the disease assessed using the SCORAD scale. This relationship was found both in the study group and in the II comparative group. CA to HDM in children with AD affects the severity of the disease. Patch tests with HDM should be recommended in all children with AD.

#### P7.18

### QUALITY OF LIFE IN CHILDREN WITH ATOPIC DERMATITIS SEEN IN THE DEPARTMENT OF DERMATOLOGY AT THE UNIVERSITY HOSPITAL, ANTANANARIVO MADAGASCAR

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The quality of life in the Malagasy children with atopic dermatitis is not well established. To assess the quality of life of Malagasy child patients with atopic dermatitis. A cross-sectional study, for 12 months, was conducted in the department of Dermatology at the university hospital of Antananarivo, Madagascar. Children aged from newborn to 16 years, who presented confirmed diagnosis of AD based on the criteria of United Kingdom Working Party modified, were included. The severity of AD was assessed by the dermatologist using the scoring atopic dermatitis (SCORAD). Patient's quality of life was assessed by two questionnaires according to age: Infants' Dermatitis Quality of Life questionnaire (IDQOL) for children under 5 years and Children's Dermatology Life Quality Index (CDLQI) questionnaire for children between 5 and 16 years. Quality of life of parents was assessed by Dermatitis Family Impact (DFI) questionnaire. Among 62 children included in

this study, 41 were under 5 years and 21 were aged between 5 and 16 years old. The mean  $\pm$  SD score of the IDQOL was  $11,32 \pm 3,80$  in infants (0-4 years) and  $10,95 \pm 3,77$  for CDLQI in children (5-16 years). The mean score of DFI was  $10.6 \pm 4.6$ . Disease severity was associated with the impairment of children's QoL. The greater the severity of AD, the more significant the impact was on family quality of life. Our study highlights the impact of AD on the lives of children and their families.

#### P7.20

### SLEEP DISTURBANCES IN CHILDREN WITH ATOPIC DERMATITIS: A SCOPING REVIEW

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Sleep impairments in children with atopic dermatitis (AD) are particularly concerning due to increased risk of short stature, metabolic syndrome and neurocognitive dysfunction. This study aims to elucidate the specific types of sleep disturbances in pediatric AD patients and their underlying mechanisms. A scoping literature review was performed to characterize the types of sleep disturbance in children (less than 18 years of age) with AD. A total of 30 papers met inclusion criteria. Two types of sleep disturbances were found to be more prevalent in pediatric AD patients in comparison to controls. One category of sleep disturbances was related to loss of sleep (increased frequency or duration of awakenings, increased sleep fragmentation, delayed sleep onset, decreased total sleep duration, and decreased sleep efficiency). Another category of sleep disturbances was associated with unusual behaviors demonstrated during sleep (restlessness/limb movement/scratching, sleep-disordered breathing including OSA and snoring, nightmares, nocturnal enuresis and nocturnal hyperhidrosis). Some mechanisms underlying these sleep disturbances include pruritus, sleep anxiety and increased proinflammatory markers induced by sleep loss. We summarize numerous types of sleep disturbances in children with AD which are associated to multiple negative health outcomes and provide recommendations which aim to reduce such sleep disturbances. Future research pertaining to the pathophysiology and management of these sleep disturbances is needed to improve the health and quality of life of children with AD.

#### P7.21

### THE IMPACT OF TRALOKINUMAB ON QUALITY OF LIFE AND SCHOOL IN PATIENTS AGED 12-17 WITH ATOPIC DERMATITIS: RESULTS FROM THE PHASE 3 ECZTRA 6 TRIAL

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AD has a substantial impact on QoL and school in adolescents. To examine the impact of tralokinumab on AD-related QoL in school. Adolescents with moderate-to-severe AD ( $n = 289$ ) received tralokinumab 150 or 300mg or PBO Q2W. QoL and impact on school was measured by CDLQI, a 10-item questionnaire assessing patient/caregiver-reported AD impact. Change and proportion of patients with  $\geq 6$  point reduction (minimal important difference) from BL to wk16 in total CDLQI was evaluated via linear mixed model for repeated measures and Cochran-Mantel-Haenszel test, respectively. Individual CDLQI domains were evaluated with Pearson chi-square test. Adjusted mean change from BL in total CDLQI at wk16 was greater with tralokinumab 150mg (-6.1,  $p < 0.05$ ) and 300mg (-6.7,  $p < 0.01$ ) vs PBO (-4.1); more patients had  $\geq 6$  point reduction (31.0% [ $p < 0.05$ ], 39.5% [ $p < 0.001$ ] vs 15.9%). Association between treatment and school/holiday item was observed at wk16 (150/300mg vs PBO,  $p < 0.05/0.01$ ). At wk16, AD had “not at all” affected school/holiday over the past 7 days in 54.2/60.0% vs 38.2% patients in 150/300mg vs PBO, respectively, while it had “very much” affected this item in 3.4/1.5% vs 17.6%. Corresponding BL data were 18.9/29.8% vs 18.0% for “not at all” affected and 22.1/25.5% vs 27.0% for “very much” affected. Trends for improvement with tralokinumab at wk16 were seen in other CDLQI domains. Tralokinumab improved QoL in adolescents with moderate-to-severe AD; benefits were observed in school/holiday and across multiple domains, with largest improvements seen in the 300mg group.

#### P7.22

### PEDIATRIC ATOPIC DERMATITIS IS ASSOCIATED WITH A NEGATIVE IMPACT ON CANADIAN CAREGIVERS AND FAMILIES

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Atopic Dermatitis (AD) affects ~15% of children/adolescents aged 0.5–17 years in Canada. To report caregiver/family impact data from pediatric patients aged 0.5–17 years in the EPI-CARE survey in Canada. EPI-CARE — a cross-sectional, web-based, caregiver/self-report survey of children/adolescents aged 0.5–17 years — was conducted in 2018–2019 in 18 countries. Children/adolescents had “diagnosed AD” based on the ISAAC criteria, caregiver/self-report of a physician diagnosis, and (for those aged <6 years) an itchy rash affecting the cheeks/forehead and elbow–wrist/knee–ankle. Caregivers/adolescents assessed AD severity over the past week as clear, mild, moderate, or severe. We report Dermatitis Family Impact (DFI) scores (scale: 0–30); hours

of AD-related care in the past week; and AD-related workdays missed in the past 4 weeks for caregivers/families of pediatric patients with diagnosed AD in Canada. Of 240 children/adolescents, 62%, 31% and 7% had clear/mild, moderate and severe AD, respectively. Caregiver/family impact (mean  $\pm$  SD) generally increased for clear/mild vs moderate vs severe AD: DFI ( $7 \pm 8$  vs  $10 \pm 7$  vs  $17 \pm 8$ ; all  $p < 0.05$ ); AD care hours ( $3 \pm 9$  vs  $6 \pm 7$  vs  $5 \pm 4$ ;  $p < 0.05$  for moderate vs clear/mild); and workdays missed ( $2 \pm 2$  vs  $3 \pm 4$  vs  $4 \pm 4$ ;  $p < 0.05$  for moderate and severe vs clear/mild). The impact of pediatric AD on families' quality of life and the number of caregiver workdays missed for AD-related reasons increased with AD severity. Physicians should consider the impact of AD on families/caregivers when evaluating therapeutic options.

#### P7.23

### ADULT ATOPIC DERMATITIS IN THE DUTCH GENERAL POPULATION: PREVALENCE, SEVERITY, AND ASSOCIATED LIFESTYLE FACTORS, MENTAL DISORDERS AND LONELINESS

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A large epidemiological study on atopic dermatitis (AD) is lacking in the Netherlands. To evaluate the prevalence and severity of AD, and associated lifestyle factors, mental disorders and loneliness, in adults in the Dutch general population. We conducted a cross-sectional study within the Lifelines Cohort Study by sending the AD questionnaire to 135,950 adults in 2020. Data on lifestyle factors and mental disorders were extracted from the baseline (2006–2013), and loneliness from the second assessment (2014–2019). Binary logistic regression analyses were used. 56 896 subjects were included. The lifetime prevalence of physician-diagnosed AD was 9.3%; the point prevalence was 3.3%, with 70.7% reporting moderate-to-severe disease. Moderate-to-severe AD was associated with >15 smoking pack-years, >2 alcoholic drinks per day, chronic stress, and obesity. AD showed positive associations with self-reported chronic fatigue syndrome, burn-out, depression, social phobia, panic disorder, attention deficit hyperactivity disorder, and eating disorder in lifetime. The positive association with loneliness was found. These observed associations were stronger in the moderate-to-severe than mild AD. The majority of AD patients experience moderate-to-severe disease. Associations are found with several lifestyle factors, mental disorders, and loneliness. Advice regarding lifestyle and more awareness of mental disorders and loneliness appear warranted in AD patients.

#### P7.24

### DUPILUMAB HAS A PROFOUND AND SUSTAINED EFFECT ON SPECIFIC IGE LEVELS OF SEVERAL FOOD ALLERGENS IN ADULT PATIENTS WITH ATOPIC DERMATITIS

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Dupilumab is effective for the treatment of atopic dermatitis (AD) but may also exert an effect on concomitant food allergy. To evaluate the effect of dupilumab on food specific IgE (sIgE) levels and patient-reported food allergic symptoms in AD patients with concomitant food allergy. Adult AD patients treated with dupilumab with a suggestive clinical history of

food allergy (for peanut, hazelnut, almond, cashew nut, walnut, kiwi, or apple), and a corresponding positive sIgE ( $\geq 0.35$  kU/L) at the start of treatment, were included. Linear mixed models were used to model the development of sIgE values over time. Patient-reported symptoms were reassessed during dupilumab treatment. A total of 125 patients were included. An estimated sustained percentage decrease of sIgE levels was observed for all food allergens during dupilumab treatment, with a decrease of 53.0% (95%CI:46.3-59.7) to 62.9% (95%CI:57.0-68.8) after one year and 80.5% (95%CI:68.9-92.1) to 86.9% (95%CI:78.7-95.2) after three years of treatment. After three years, the lowest median sIgE levels were observed for almond (0.4, 95%CI:0.2-0.6), while hazelnut had the highest median sIgE levels (3.0, 95%CI:2.1-4.3). A total of 82.5% (33/40) of the patients, who accidentally ingested foods during treatment reported a decrease in severity of food allergic symptoms. Dupilumab treatment in adult AD patients with concomitant food allergy resulted in a profound and sustained decrease in sIgE levels for several food allergens and less severe food allergic reactions after accidental ingestion in a subgroup of patients.

#### P7.25

### BIOMARKERS ASSOCIATED WITH THE DEVELOPMENT OF COMORBIDITIES IN PATIENTS WITH ATOPIC DERMATITIS: A SYSTEMATIC REVIEW

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The significant burden of atopic dermatitis (AD) includes an increased risk of allergic and non-allergic comorbid diseases. Predictive biomarkers could allow for early and targeted interventions in AD patients at highest risk of developing comorbidities. To provide a comprehensive catalogue of biomarkers associated with the development of comorbidities in patients with AD. Seven electronic databases were searched, from database inception to September 2021, for studies investigating the association between a biomarker and the development of comorbidities (asthma, food allergy, allergic rhinoconjunctivitis, other allergic conditions, cutaneous viral infection and others). Risk of bias was assessed using QUIPS. PRISMA guidelines were followed. PROSPERO registration:42020193294. 56 articles evaluating 146 candidate biomarkers met the inclusion criteria. Included studies and biomarkers were highly heterogeneous, and associated with predominately moderate-to-high risk of bias across multiple domains. Promising biomarkers include specific-IgE (sIgE) and skin prick tests predicting the development of asthma, and genetic polymorphisms predicting eczema herpeticum. FLG mutations appear to have a limited role in predicting comorbidity development, however the combination of skin barrier defects (FLG mutations) and aberrant immunological phenotypes (elevated sIgE) demonstrated statistically significant associations with asthma/wheezing in 3 of 4 early life cohorts. High-quality studies of biomarkers predicting the development of comorbidities in people with AD are urgently needed.

#### P7.26

### ALLERGIC CONTACT DERMATITIS IN PATIENTS WITH ATOPIC DERMATITIS

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Allergic contact dermatitis constitutes a common phenomenon affecting nearly 40% of adults and 20% of children in Poland. This term refers to altered immunological reactivity to certain allergens, which make the immunological system more prone to initiate inflammatory reaction. Patch testing remains gold standard diagnostic technic in allergic contact dermatitis. Atopic dermatitis (AD), similarly, constitutes one of the most common dermatologic diseases. It is still a contentious issue, whether patients with AD might have higher risk of developing allergic contact dermatitis. Dermoscopic pattern of contact allergy of allergic contact dermatitis in patients with AD has not been established. Indication of particular haptens that might with high probability provoke additional inflammatory reaction in patients with AD, allow for an improvement of management with exacerbation of the disease. We would like to characterize the profile of allergic contact dermatitis in patients suffering from AD. Moreover, the study aims at finding indicative features of dermoscopic patterns of contact allergy AD. In our study we would like to compare results of patch tests in patients with allergic contact dermatitis with or without coexisting atopic dermatitis. Haptens will be selected according to the expanded version of the Polish Standard Series. Dermoscopic patterns of contact allergy will be assessed. Dermoscopy may be a useful diagnostic tool to differentiate AD from allergic contact dermatitis.

## P8. Technology and AD

#### P8.01

### A MOBILE APPLICATION – COULD IT HELP WITH THE PATIENTS' EDUCATION AND MANAGEMENT OF ATOPIC DERMATITIS?

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Patient education is a fundamental pillar of successful treatment of atopic dermatitis (AD). However, patients with AD still seek additional sources of information about the disease. A mobile application could answer the patients' needs and enhance their quality of life. To evaluate the level of education about baseline therapy amongst patients with AD and to assess the need for a mobile application that could help control the course of disease and reach desired treatment outcomes. 286 respondents completed a questionnaire about emollient therapy and bathing. Afterwards, in a separate survey, 183 respondents expressed opinion about an application for patients with AD. For statistical comparison a chi – square test was used with significance level of 0,05. The study is approved by the Independent Bioethics Committee for Scientific Research at Medical University of Gdansk. 52,38% adults and 68,73% parents proved to know the principles of baseline therapy ( $p < 0,05$ ). 75,56% adults and 74,53% parents seek extra education in emollient therapy ( $p >= 0,05$ ). 70,00% and 74,54%, respectively, need explanation of bathing rules ( $p >= 0,05$ ). 76,92% of respondents expressed a need for a mobile application. The key features of the application should be a reminder to take a medicine and a possibility to track the time of steroids usage. Adult patients with AD and caregivers of children with AD have mediocre level of education about baseline therapy in AD. Both groups express a strong

need for a mobile application that could help control the course of disease and reach desired treatment outcomes.

### **P8.02 DEVELOPMENT OF PSYCHOEDUCATIONAL INSTRUMENTS ON ATOPIC DERMATITIS FOR CHILDREN**

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Health-related psychoeducational instruments have been intensively researched and have shown positive results, including health promotion and education, maintaining motivation and, consequently, strengthening patients' adherence to treatment. To develop psychoeducational tools (book and game) for pediatric patients with AD aged between five and twelve years old, articulating knowledge in the areas of medicine, psychology, education and graphic design. Content Validity Study. It is a process to validate an instrument that was composed of two distinct parts. The first step involves the development of the instrument and the second step consisted of selecting 20 specialists from different areas of knowledge to participate as evaluators of the instruments. Initially the instruments were developed, including: a 60-page interactive book for children, with questions about the steps of the treatment of AD and a board game developed for teenagers with 60 cards that address different aspects of the disease, including personal experiences and knowledge about the disease and treatment. The result of the experts' evaluation (5 pediatric dermatologists, 5 psychologists, 5 educators and 5 graphic designers) was positive regarding the content covered (90%), motivation (100%) and possible use of books and games in health services (90%). The objective of developing psychoeducational instruments (book and game) about AD has been completed and will be evaluated then distributed to the AD population.

### **P8.03 PRE-VISIT ONLINE PAEDIATRIC ATOPIC DERMATITIS QUESTIONNAIRE – A FEASIBILITY STUDY**

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The use of structured questionnaires is common in patients with atopic dermatitis. Traditionally this is done by paper-based questionnaires in clinic. Since the SARS-CoV-2 pandemic, many regard the shift from paper to digital forms as inevitable in order to reduce risk of transmission, improve efficiency and sustainability in the way we work. This study aims to examine the feasibility and acceptability of pre-visit digital questionnaires in paediatric dermatology clinics. Text message invitations to complete online questionnaires were sent to all patients due to attend paediatric dermatology clinic at Nottingham University Hospitals. 1,218 responses were received between September 2021 and March 2022. 338 patients were reported to have eczema as their main skin complaint (71 new patients, 267 follow-ups). Amongst these, 113 were <4 years old, 136 were between 4-12 years old and 89 were aged 13 or above. The average patient reported eczema severity was recorded as 12.6+/-7.8 SD using the Patient Oriented Eczema Measure(POEM) questionnaire. Most forms were filled in by parents and required <5min to complete. 97.5% reported that they found the online questionnaire easier to use compared to the paper format. Most participants and clinicians also reported that they felt the online form enhanced their experience and consultation in clinic. We feel that digital pre-visit online questionnaires are an acceptable method to gather information from parents of children with atopic dermatitis. Further work is required to assess the accuracy and clinical usefulness of the data.

### **P8.04 A SYSTEMATIC REVIEW OF ELECTRONIC HEALTH TOOLS FOR ATOPIC DERMATITIS**

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Atopic dermatitis (AD) education empowers patients and their caregivers with knowledge and is critical to successful management. AD education is often delivered by health care providers to individual patients/families or to groups but barriers to access leave some AD sufferers without this critical component of AD management. Electronic health (e-Health) tools for AD could bridge this gap. 1. Identify current e-Health tools for AD; 2. For each e-Health tool, summarize and assess: a. Objective/purpose, b. Informational content, c. Effect on knowledge about AD, d. Validity, and e. Delivery and feasibility. A systematic review has been performed to evaluate all available E-health tools for children with AD, parents of the children with AD, adults with AD, and health care professionals working in the related fields using Medline, EMBASE, Cochrane, CINAHL, PsycINFO, and Google Scholar. Data collection elements include e-Health tool features (platform, purpose, content, delivery) and target audience factors (AD disease course, type and duration of treatment, severity, quality of life impact). We will assess the validity, feasibility, and effect on knowledge about AD for each tool. Results will be stratified by the target audience. Data analysis is ongoing and will be presented. By identifying gaps that exist in the content of currently available e-Health tools, future work can address the identified unmet needs.

### **P9. The Canadian Experience (outreach/ research)**

#### **P9.01 MULTICENTER CANADIAN CASE SERIES OF PEDIATRIC PATIENTS WITH MODERATE TO SEVERE ATOPIC DERMATITIS TREATED WITH OFF-LABEL DUPILUMAB**

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Even though Dupilumab, the first FDA- and Health Canada-approved treatment for severe AD, is currently approved for moderate-to-severe Atopic Dermatitis (AD) in patients ≥ 6 years of age, there is sparse information on this regard since there is limited practical experience among providers. To describe real-



world dupilumab effectiveness and safety in patients younger than 12 years old with moderate-to-severe Atopic Dermatitis (AD). Inclusion Criteria Patients  $\leq 12$  years old at baseline (at the time when dupilumab was started) currently receiving or who received dupilumab for AD Exclusion Criteria Patients aged  $> 12$  years old at baseline Patients included in other research studies. IRB was approved (REB21-0575). A multicenter retrospective cohort study of 6 Canadian centers included 39 pediatric patients (25 males; 14 females) with moderate-to-severe (3) and severe (34) AD. Patients' mean age was 5.5 (range 2-12). Dupilumab's mean loading dose was 459 mg (range: 100-600 mg). The most common maintenance dosage used was 300 mg q4w in 22 (58%) cases. Improvement  $> 50\%$  BSA was seen in 24 (42%). Eight patients developed conjunctivitis, which resolved with topical treatment, 3 had injection site reactions. Data collection is ongoing in 1 center. Conclusions: This study reports the real-world Canadian experience and supports the evidence for dupilumab as an effective systemic therapy and a favorable risk-benefit profile for children  $> 6$  years old. It also provides information for dupilumab use in children  $< 6$  years old.

### P9.02

#### COMPARING FAMILY PHYSICIAN AND DERMATOLOGIST TOPICAL CORTICOSTEROID PRESCRIPTIONS: A POPULATION-BASED STUDY

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Prescribing a sufficient amount and adequate potency of topical corticosteroids (TCS) is essential for treating inflammatory skin diseases. To quantify differences between family physician and dermatologist TCS prescriptions for patients treated for inflammatory skin diseases. This population-based cohort study included 69,335 Ontario Drug Benefit recipients in Ontario, Canada (January 2014 to December 2019) prescribed  $\geq 1$  TCS by a dermatologist at consultation and  $\geq 1$  TCS by a family physician in the year prior to the dermatologist consultation. We used linear mixed-effect models to calculate mean differences (MD) between the amount (grams, g) and potency (1, Super Potent to 7, Weak) of TCS prescribed at dermatologist consultation and (1) the most recent family physician TCS prescription amount; (2) the highest family physician TCS prescription amount; and (3) the highest potency family physician TCS prescription in the previous year. Dermatologist prescriptions (112.7g  $\pm$  110.6) were greater in amount than the most recent (73.1g  $\pm$  63.1; MD 38.4g; 95% CI 33.3, 43.4) and highest (84.0g  $\pm$  75.4; MD 27.8g; 95% CI 22.8, 32.7) family physician prescription amounts. Dermatologists prescribed somewhat more potent TCS (3.3  $\pm$  1.8 vs 4.1  $\pm$  1.9, MD -0.7, 95% CI -0.8, -0.6). For people with the same condition treated by a family physician followed by a dermatologist, dermatologists prescribed higher amounts and potencies of TCS. Further research is needed to assess if larger TCS prescriptions in primary care improve patient outcomes.

### P9.03

#### DISEASE AND FAMILY BURDEN OF MODERATE-TO-SEVERE ATOPIC DERMATITIS IN CANADIAN PATIENTS AGED LESS THAN 12 YEARS IN A REAL-WORLD SETTING

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Real-world studies can provide important information about disease characteristics and quality of life in children with moderate-to-severe atopic dermatitis (AD). To assess disease characteristics of moderate-to-severe AD in children in Canada. PEDISTAD (NCT03687359) is an ongoing, international, observational study in children aged less than 12 years with moderate-to-severe AD, inadequately controlled by topical therapies. This analysis of the subpopulation in Canada assessed baseline disease characteristics by age group; all analyses are descriptive. Of 103 children (0- $< 2$  y, n = 16; 2- $< 6$  y, n = 39; 6-12 y, n = 48), 64.1% had comorbidities, most commonly food allergy (50.5%), asthma (33.0%), and allergic rhinitis (18.4%). 82.5% received non-systemic therapy, mainly topical corticosteroids (68.9%), and 32.0% received systemic therapy. Mean (SD) baseline scores were: EASI 13.9 (9.5), BSA affected 21.9% (16.2%), POEM 15.7 (6.8), CDLIQI 10.4 (6.8), IDQOL 9.6 (5.9), and DFI 10.9 (7.0). Mean (SD) pruritus NRS scores were 4.6 (2.8) for worst itch during previous night, 3.2 (2.6) for worst itch during current day, and 5.7 (2.7) for worst scratching during previous 24 hrs. Baseline disease characteristics of children enrolled in PEDISTAD in Canada reflect a multidimensional AD disease burden despite standard treatment. The high burden and relatively low proportion receiving systemic therapies in this real-world study suggests a major unmet need for effective therapies with demonstrated safety for moderate-to-severe AD in children  $< 12$  years.

### P9.04

#### HEALTH-RELATED QUALITY OF LIFE IN A CANADIAN ATOPIC DERMATITIS COHORT

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Adult patients (n = 182) ages 16 to 78 with a confirmed diagnosis of atopic dermatitis (AD) as per Hanifin and Rajka criteria were consented at the McGill University Health Centre of Excellence for Atopic Dermatitis to the Dermatitis BioBank longitudinal cohort. We aimed here to identify host and treatment factors that contribute to health-related quality of life (HRQL) and disease. At baseline, we collected data on demographics, comorbidities,

and treatment. White (53.8%) women (57.1%) predominated this cohort, with 17.0% reporting adult-onset AD and 41.2% diagnosed before the age of 2. 30.2% missed work or school because of AD; for 17.0% at least three times in the last year. Comorbid asthma (43.4%), allergic rhinitis (58.2%), food intolerance (38.5%), and anxiety or depression (52.2%) were common. 78.0% were born in Canada; 63.2% had completed a university degree. Spearman's correlations were calculated to explore HRQL outcomes as assessed by: history of remission with clear skin in the past year (33.0%), use of systemic treatments at baseline (31.9%), and self-reported depression or anxiety secondary to AD (35.2%). No correlations of fair strength or better were found between HRQL and ethnicity, and no correlations were seen between HRQL and foreign birth or sex. However, patients with anxiety or depression secondary to their AD more often reported missing work or school in the last year ( $p=0.431$ ,  $p<0.001$ ). This cohort is unique in its large size and diversity, providing an opportunity to explore the determinants of disease outcome in tertiary care AD patients.

### P9.05

#### CHARACTERIZATION OF ADULT-ONSET ATOPIC DERMATITIS PATIENTS IN A CANADIAN COHORT

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A recent meta-analysis of 25 studies across 16 countries found 26.1% (95% CI 16.5-37.2) of adult patients with atopic dermatitis (AD) had adult-onset disease; notably, up to 1 in 2 among US patients. We aimed to characterize adult-onset AD in the Dermatitis BioBank (DBB) longitudinal cohort ( $n=182$  Hanifin & Rajka diagnosed, median EASI 15.2), in Montreal, QC, Canada. Along with POEM & DLQI we assessed AD impact as follows: history of remission with clear skin in the past year (28%), self-reported depression/anxiety secondary to AD (28%). Spearman's correlations were used to compare adult-onset AD to the full DBB cohort. 13.7% ( $n=25$ ) reported AD onset after 20 years old; 3.8% after 50. Ethnicities were: 36% white, 28% Asian, and 16% Black. 68% were born in Canada, consistent with the overall cohort. Adult-onset patients were mostly male (60%). 68% had a university degree and 36% missed work or school because of AD in the last year; for 16%, at least three times. Comorbid asthma (24%), allergic rhinitis (48%), food intolerance (36%), and anxiety/depression (40%) were common. Adult-onset AD patients were more likely to be male ( $p=0.205$ ,  $p=0.008$ ) and reported less asthma ( $p=-0.175$ ,  $p=0.022$ ) and animal allergies ( $p=-0.260$ ,  $p<0.001$ ). Here, we found a lower proportion of adult-onset AD than previously reported. As our cohort is biased to moderate-to-severe AD, a selection bias may exist for 'traditional' childhood-onset AD. Adult-onset AD is understudied and may be pathophysiologically distinct from classical AD; further characterization of adult-onset AD is necessary.

## P10. Therapeutic Patient Education

### P10.01

#### ARE PATIENTS SATISFIED WITH THEIR DERMATOLOGIC CARE? AN ANALYSIS OF SOCIAL MEDIA POSTS REGARDING PATIENT SATISFACTION WITH ATOPIC DERMATITIS CARE

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Discrepancies between patient and provider expectations for atopic dermatitis (AD) management reduce satisfaction with care. Patients may use social media for support; the content within this domain is understudied. This study aims to characterize the sentiment, engagement, and common themes present in social media regarding satisfaction with AD care. Reddit and Twitter posts published between 01 January 2022 - 31 January 2022 which referenced 'atopic dermatitis/eczema' and 'dermatologist' were extracted. These posts were assigned a sentiment of positive, negative, or neutral, an engagement score calculated by adding likes and replies, and a common theme. 979 posts were extracted, of which, 119 referenced satisfaction with AD care. Neutral sentiment ( $n=49$ , 41.2%) was more common than negative ( $n=29$ ; 24.4%) or positive ( $n=41$ ; 34.5%) sentiment. Sentiment frequencies differed significantly ( $p<0.05$ ) between Reddit and Twitter (29.7% vs. 40.0%; 51.6% vs. 29.1%; 18.8% vs. 30.9% for positive, neutral, and negative posts between Reddit and Twitter, respectively). Mean engagement score (MES) was significantly higher in Reddit compared to Twitter (14.16 vs. 5.33;  $p<0.05$ ). Themes in posts included "Bedside Manner" ( $n=18$ ); "Cost" ( $n=6$ ); "Dermatologic Expertise" ( $n=19$ ); "Dermatologist Recommendation" ( $n=63$ ), and "Scheduling" ( $n=13$ ). The high engagement in Reddit and bimodal 'positive' or 'negative' sentiment distribution in Twitter suggests that online education efforts from dermatologists may be useful to increase patient knowledge and reduce online disagreement regarding AD.

### P10.02

#### A RANDOMIZED CONTROLLED PHASE 2 TRIAL COMPARING THE EFFECTS OF CRISABOROLE 2% OINTMENT TO BETAMETHASONE VALERATE 0.1% CREAM ON SKIN STRUCTURE IN PARTICIPANTS WITH ATOPIC DERMATITIS

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The first-choice drug treatment for mild-to-moderate eczema is currently a topical corticosteroid (TCS). Whilst TCS are effective at treating eczema, they can cause unwanted skin changes, including atrophy, if used inappropriately. To compare the adverse effects of the TCS betamethasone valerate 0.1% cream (BMV) to a non-steroidal anti-inflammatory treatment, crisaborole 2% ointment (CRB). An observer-blind randomized within-subject controlled trial in atopic dermatitis (AD) patients (NCT04194814). Participants underwent 4-weeks twice-daily treatment with CRB on one forearm and BMV on the other (left/right randomized, clear of eczema signs). The biophysical properties of the skin were assessed on days 1, 15, 29 of treatment and again on day 57. The change in epidermal thickness measured by optical coherence tomography (OCT) was the primary outcome. 37 participants received the first dose, of which 33 completed the study. Pathologic epidermal thinning at day 29 was significantly greater ( $p<0.0001$ ) at sites treated with BMV (-31.66; 95% CI -35.31, -28.01 $\mu$ m) compared to CRB (-13.76; -17.42, -10.10 $\mu$ m). From a panel of exploratory biomarkers derived from OCT images and Fourier-transform infrared spectra, superficial plexus depth and stratum corneum carboxylate levels had the greatest ability to

discriminate the effects of the TCS treatment ( $p < 0.0001$ ). CRB treatment displayed a superior safety profile, with less than half the epidermal thinning (43%) caused by BMV treatment, making it more suitable for longer-term treatment strategies.

### P10.03

#### EFFECTIVENESS OF A NURSE-LED ONE-TO-ONE EDUCATION PROGRAM IN ADDITION TO STANDARD CARE IN CHILDREN WITH ATOPIC DERMATITIS: A MULTICENTER RANDOMIZED CONTROL TRIAL

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Therapeutic patient education (TPE) is recommended for children with atopic dermatitis (AD) but no consensus has been reached on the optimal tailoring of delivery. While repeated multi-disciplinary group education sessions in a hospital setting were found to be effective, this type of intervention is both resource and time consuming. To assess the benefits of additional, well-structured, one-hour nurse-led individual TPE intervention for children with AD and their families compared to standard care alone. Children with moderate to severe AD and their parents were randomised to receive a one-hour nurse-led education session in addition to standard care versus standard care alone. The primary outcome was the area under the curve (AUC) of the SCORAD from baseline to week 24. 175 patients were randomised in 11 centers and 153 were analysed (full analysis set). Mean (SD) age: 4.47 years (4.57). At week 24, the AUCs of the SCORAD were not significantly different between the 2 groups ( $p = 0.4$ ). Secondary outcomes including patient reported severity and quality of life (AUCs of the POEM and IDLQI/CDLQI) were not significantly different between the 2 groups. Only topical steroid phobia assessed by the TOPICOP score was significantly decreased in the intervention group compared to the standard care group. This study showed no additional effectiveness in terms of long-term control severity between a one-hour nurse-led education intervention in children with AD treated with standard care despite a reduction in fears of using topical steroids.

## P11. Late-breaking

### P11.01

#### CLINICAL MANIFESTATIONS OF PATIENTS WITH FACIAL DERMATITIS AND HIGH SERUM TOTAL IGE

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The significance of IgE sensitization in facial dermatitis is yet to be elucidated. To describe and compare the characteristics of facial dermatitis in patients showing high total serum IgE with the patients with lower total serum IgE. A retrospective review of clinical manifestations and objective measurements in patients with facial dermatitis and various levels of total serum IgE. Patients with a total serum IgE level above 100 IU/mL were defined as the study group, and those with less than 100 were defined as the control group. Among the patients with facial dermatitis, about 63% showed elevation in total IgE. In comparison with the control group ( $n = 31$ ), the study group ( $n = 53$ ) was more frequently diagnosed with atopic dermatitis (43.4% vs 6.5%), less frequently diagnosed with contact dermatitis (32.1% vs 74.2%), and showed more frequent involvement in periorbital area (19.6% vs 3.2%,  $p < 0.05$ ) and higher mechanical threshold in Von Frey filament test ( $16.13 \pm 2.6$  vs  $14.13 \pm 3.7$ ,  $p = 0.005$ ). Patients with elevated IgE were commonly sensitized to house dust mite, house dust, cat dander, and shrimp in multiple allergen stimulation tests (MAST). The prevalence of positive reactions to one or more allergens in patch tests was higher in the control group (92% vs 65%). The most frequent sensitizers in patch tests were cobalt (II) chloride hexahydrate and potassium dichromate. The serum IgE level measurement and sequential multiple allergen stimulation tests and patch tests should be performed in patients with facial dermatitis for appropriate allergen avoidance.

### P11.02

#### RISK OF CONGESTIVE HEART FAILURE IN PATIENTS WITH ATOPIC DERMATITIS: A NATIONWIDE POPULATION-BASED COHORT STUDY

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Congestive heart failure (CHF) is an end stage of various cardiovascular diseases which is characterized by reduced cardiac output. Although increasing evidence supports an association between atopic eczema and cardiovascular disease, few studies have examined the association between AD and CHF. To investigate the impact of AD on the risk of CHF and whether its risk varied with increasing AD severity. A retrospective population-based cohort study was conducted from 2009 to 2018, using the nationwide database of Korea. People who underwent a nationwide health checkup in 2009 were enrolled. The primary endpoint was the diagnosis of CHF. The risk of CHF was compared in people who were and were not diagnosed with AD. The cohort included 4,078,471 individuals. In the 4,018,281 people without AD, 203,404 were diagnosed with CHF during the follow-up period (incidence: 6.23 per 1000 person-years). The risk of CHF was significantly higher in people with a previous diagnosis of AD (HR: 1.33; 95% CI: 1.30–1.36;  $p < 0.001$ ), while the incidence of CHF was 8.64 per 1000 person-years (4,191 CHF among 60,190 AD patients). After adjusting for covariates, AD was associated with a 25.7% increased risk of CHF (adjusted HR: 1.26; 95% CI: 1.23–1.28,  $p < 0.0001$ ). A higher risk of CHF was observed in the moderate-to-severe AD group compared with the mild AD group. This cohort study found that AD was associated with a significantly increased risk of heart failure after adjusting for various covariates. For better management of AD, clinicians should properly consider these conditions.

## P11.03

**HOW AND WHAT ADVERSE EVENTS ARE REPORTED AND CAPTURED IN RANDOMISED CONTROL TRIALS (RCTS) OF EMOLLIENTS IN THE TREATMENT OF ECZEMA?**

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Emollients are universally recommended for atopic dermatitis/eczema but knowledge of the frequency and nature of adverse effects associated with their use is limited. To determine how well adverse events are reported in randomised controlled trials (RCTs) which included a leave-on emollient as treatment for eczema. Medline was searched from inception (1946) to May 2022. Inclusion criteria: RCTs of emollients as a leave-on treatment in adults or children with atopic dermatitis/eczema. Exclusion criteria: non-RCTs; patients with other diagnoses included; use of emollient other than as leave-on treatment (i.e. bath additives or soap substitutes, or as preventative); not published in English; not in humans. The references of eligible papers were reviewed for any additional, relevant research. Data were extracted into an Excel spreadsheet and analysed descriptively. An assessment of study quality was carried out using the JBI tool for RCTs. **Results:** From 369 potential papers, 35 papers were included (exclusions: 330 after initial screening; 11 after reading in full; 7 added from references of eligible papers). 89% reported collecting data on adverse events but the methods used were poorly reported (64% unclear). 11% used patient questionnaires/diaries. Adverse reporting in trials which include emollients in patients with atopic dermatitis/eczema are poorly reported. Future research should clearly report how and what adverse events were captured, and collection and reporting should be standardised across studies.

## P11.04

**THE GLOBAL ATOPIC DERMATITIS ATLAS: MAPPING THE GLOBAL BURDEN OF AD AND MORE**

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Atopic dermatitis (AD) is a highly prevalent, chronic skin disease in children and adults. It ranks 15th among all non-fatal diseases using Global Burden of Disease data (disability-adjusted life years) and first among all skin diseases, making AD an important public health problem worldwide. To develop and maintain the Global Atopic Dermatitis Atlas (GADA), filling gaps in the epidemiological data, developing research tools, conducting original fieldwork and providing recommendations for governments, policy-makers, health professionals and patient organizations based on best evidence. Based on the Global Psoriasis Atlas, GADA was initiated by the International League of Dermatological Societies (ILDS), together with the International Society for Atopic Dermatitis (ISAD), the International Eczema Council (IEC), the European Taskforce for AD (ETFAD) and the International Alliance of Dermatology Patient Organizations (GlobalSkin). The GADA project will have three initial phases: 1) a systematic review of the current epidemiological data on AD burden; 2) international consensus work to improve and standardise epidemiological study designs; and 3) developing research tools for fieldwork. We plan to conduct epidemiological surveys with the developed, standardised methodology, focusing on geographical areas with lack of data. We have published the first GADA report on our website [www.atopicdermatitisatlas.org](http://www.atopicdermatitisatlas.org), and will publish our future work in scientific papers and on our website. We intend that GADA will grow and serve as a global resource for all stakeholders dealing with AD.

## P11.05

**ASSOCIATION BETWEEN THE SEVERITY OF ATOPIC DERMATITIS AND THE QUALITY OF SLEEP**

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**Introduction:** Sleep disorders along with pruritus are indicators of severity in atopic dermatitis (AD) and directly impact the quality of life and emotional well-being of patients and their families. **Objective:** The first aim of this study was to evaluate the association between the severity of atopic dermatitis, the alteration in sleep quality and its impact on quality of life. **Methods:** This was an observational case series with prospective and cross-sectional chart review conducted in the AD clinic of the Medical Specialties Unit from May to September 2020. 138 patients aged 13 to 88 years were evaluated, including 62 patients with mild, moderate and severe AD. Pruritus, CDLQI, DLQI, and sleep quality using the Pittsburgh Index were assessed by EASI, POEM, and NRS. **ITCH. Results:** 62 patients were included, 61% ( $n=38$ ) were women and 39% ( $n=24$ ) men, the average age was 33.14. By EASI, moderate cases were 45% ( $n=28$ ), followed by mild 32% ( $n=20$ ) and severe 23% (14). While evaluating sleep quality with the Pittsburgh index, 74% ( $n=46$ ) slept poorly and 26% well. Associating severity by EASI and poor sleep quality, 80% ( $n=16$ ) were mild, moderate 68% ( $n=19$ ) and severe 79% ( $n=11$ ), without association ( $p=0.699$ ). In patients who slept poorly ( $n=46$ ), the POEM evaluation was: mild 67% ( $n=4$ ), moderate 64% ( $n=21$ ), severe 100% ( $n=13$ ) and very serious 78% ( $n=7$ ), without significant association ( $p=0.066$ ). A deterioration in sleep quality regardless of severity was observed, being more frequent

in patients with moderate to severe AD, being associated with a poor quality of life.

### P11.06

#### UNTARGETED LIPIDOMIC ANALYSIS OF STRATUM CORNEUM LIPIDS FROM EARLY-ONSET PEDIATRIC ATOPIC DERMATITIS HIGHLIGHTS NOVEL CERAMIDE METABOLIC DEFECTS IN LESIONAL SKIN

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Untargeted lipidomics (Q Exactive HF OrbiTrap) is a quick new technology that, as RNA-Seq or proteomics, allows comprehensive comparison of diseased vs healthy tissues but has yet to be described for skin. We extracted lipids from tape strips of lesional atopic dermatitis/AD-L and nonlesional/NL skin from 31 AD patients (0.2-17.3 yrs old, mean 7 yrs; 51% female; 58% White) and 14 age- and site-matched healthy controls (C). PCA plots showed distinct separation between AD-L and C skin, regardless of sex or age. 637 distinct ceramide species were detected in AD and 616 in C skin, with 291 decreased in AD-L vs. C and 242 reduced in AD-L vs NL skin. Total normalized signal response of ceramides decreased 84% in AD-L and 51% in NL skin vs C ( $p < 0.001$ ). Most ceramide classes decreased by  $>80\%$  in AD-L vs C skin (EO by 88-93%; ODS/ADS 91%; NP 90%; NH 87%; NSD 83%; OH/AH 83%; and OSD/ASD 82%). We found a new ceramide class (m), overall decreased in AD-L by 81%. A few species were increased in EOSD, OH/AH, OSD/ASD, NDS, NH, NP, and NS classes. Ceramide changes in NL skin were all in AD-L. Decreased AD-L ceramides correlated with SCORAD and EASI scores (Spearman  $r = -0.4$  to  $-0.57$ ,  $p < 0.001$ ); m-ceramides with EASI and Pruritus ADQ scores ( $r = -0.43$  and  $r = -0.44$ ,  $p < 0.01$ ). Increases of NDS in AD-L correlated with EASI ( $r = 0.48$ ,  $p < 0.01$ ); and NH, NP, and NS with Itch VAS ( $r = 0.73$  to  $0.93$ , all  $p < 0.05$ ). The capture of known AD lipid patterns but discovery of changes in new lipid species suggests the value of untargeted lipidomics for understanding skin disorders and in clinical trials.

### P11.07

#### USE OF DUPILUMAB FOR ATOPIC DERMATITIS IN PATIENTS WITH IDIOPATHIC NEPHROTIC SYNDROME: A REPORT OF TWO CASES

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Atopic dermatitis (AD) has been historically associated with idiopathic nephrotic syndrome (INS), from landmark case reports to large population-based studies. Pathogenesis of AD and INS show immunopathological similarities, with THL/Th2 dysfunction and an increase in IL-4 and IL-13 activity. Dupilumab is a monoclonal antibody that inhibits IL-4Ra signaling. There are no prospective studies evaluating the effects of dupilumab in patients with both AD and INS. Therefore, we report two cases of AD treatment with dupilumab in patients with INS. Case 1. A 20-year-old woman with a history of asthma, diagnosis of INS at the age of 13 and of AD at the age of 16. She had severe AD with SCORAD of 74.3 despite standard treatment when dupilumab was prescribed. After two months of therapy, she reported significant improvement in symptoms and had a SCORAD of 13.2. At 15 months, her SCORAD was 4.1. Case 2. A 15-year-old boy with a history of

asthma, allergic rhinitis, diagnosis of INS at the age of 2 and of AD at the age of 12. He had severe AD with a SCORAD of 47.1 despite standard treatment when dupilumab was prescribed. After 1 month of therapy, symptoms were relieved, and he had a SCORAD of 37.6. Both patients had no INS relapses or experienced any adverse effects. In conclusion, the use of dupilumab for AD in two patients with INS was well-tolerated and effective, with a significant improvement in AD lesions. This is in accordance with similar experiences published elsewhere. Therefore, dupilumab might be an effective and safe treatment for AD patients with INS.

### P11.08

#### CLINICAL AND DEMOGRAPHIC PROFILE OF ADOLESCENT AND ADULT ATOPIC DERMATITIS AND HAND DERMATITIS PATIENTS IN A TERTIARY DERMATOLOGY CLINIC IN LAGOS, NIGERIA

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Atopic dermatitis (AD) is a common chronic inflammatory dermatosis worldwide and is more prevalent in children. However, it may persist into adulthood in up to 25% of people with childhood AD and some develop new-onset adult AD. Hand dermatitis (HD) has also been linked to AD and atopy. To assess the clinical and demographic profile of adolescent and adult patients with AD and HD seen in a dermatology clinic in Lagos, Nigeria. This retrospective hospital-based observational study of the clinic records of a tertiary dermatology clinic in Lagos, Nigeria analysed the demographic and clinical profile of adolescent and adult patients diagnosed with AD and HD from 2016 to 2021. Clinical severity and patient distress (PD) scores were documented. Data was analysed with Microsoft excel and SPSS version 24. A total of 292 patients were diagnosed with AD (clinic prevalence 7.7%). The mean age was  $29.6 \pm 15.5$  years; 60.2%F, 39.8%M. Childhood AD history was present in 174 (59.5%), allergic rhinitis or asthma in 141 (48.3%) and Hand dermatitis in 68 (23.3%). The baseline PD score was  $7.14 \pm 2.26$ . The main treatment modalities were emollients (100%), topical corticosteroids (88.4%) and keratolytics (72.4%) while 38 (13.0%) required systemic immunosuppressive therapy (corticosteroids or methotrexate) for severe AD. AD is a common dermatological presentation in Nigerian adolescents and adults and most patients had childhood AD. Many adult-onset AD patients also had a history of asthma or allergic rhinitis. Hand dermatitis is a common presentation of atopy. AD causes significant distress in patients.

### P11.09

#### PATIENT PRIORITISATION OF ITEMS FOR THE NEW PATIENT-REPORTED IMPACT OF DERMATOLOGICAL DISEASES (PRIDD) MEASURE: A DELPHI STUDY

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People living with atopic dermatitis (AD) experience poor quality of life, but existing measures do not fully capture this. The Global Research on the Impact of Dermatological Diseases project is developing PRIDD, a new measure of the impact of dermatological conditions on the patient's life, in collaboration with patients. To

seek consensus from patients on the most important impacts of AD and explore patterns in demographics and impact areas. The Delphi study consisted of two rounds. Adults ( $\geq 18$  years) with a dermatological condition were recruited through the International Alliance of Dermatology Patient Organizations' membership network. The survey was available in six languages. Quantitative data were collected using Likert-type ranking scales and analysed against a priori consensus criteria. Qualitative data were collected using free-text responses and a Framework analysis conducted. 208 people with AD from 34 countries participated. The results produced a list of the top 20 impacts on AD patients, with the greatest proportion being psychological. Further subgroup analyses are underway. Results identified what AD patients consider as the most important issues impacting their lives. Data support previous evidence that AD patients experience profound psychological impacts and require psychological support. The results can inform policy and clinical practice by identifying research questions and initiatives that are of most benefit to AD patients.

### P11.10

#### THE IMPACT OF EDUCATION IN INDIGENOUS LANGUAGES ON ATOPIC DERMATITIS AND FACTORS DETERMINING SEVERITY OF ATOPIC DERMATITIS (AD) IN NIGERIAN CHILDREN – WHERE WE ARE

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Presently, there are no digital educational materials made by Nigerians in either English or indigenous language to educate on AD. This study set out to provide digital educational materials in English and Indigenous languages and to compare their impact on AD management. To assess the impact of education in indigenous languages on the outcome and QoL in AD. Patients with atopic dermatitis 16 years and below who can speak (or their primary caregiver) both English and any of the three main indigenous languages or pidgin English are being recruited from schools and outpatient clinics. SCORAD, ViGA, IDLQI/CDLQI, and skin hydration were measured at baseline and 4 weeks later. Educational materials were given in form of video and pamphlet in either English or indigenous language. 14 participants have been recruited from the schools so far (out of 740 students examined) with AD prevalence of 1.9% & 3 from the clinic. 9 participants have completed the 4 weeks assessment. Mean (SD) SCORAD at baseline was 17.82 (7.17) and 6.06 (4.05) -  $p=0.02$ . Mean (SD) pretest respectively of those educated in English and Indigenous language was 4.75 (2.5) and 4.25 (0.5),  $p=0.6$  while the mean (SD) of the post test was 10.4 (1.7) and 9.6 (3.4),  $p=0.6$ . Mean (SD) hydration at baseline and 4 weeks later was 71.9 (9.6) and 50 (13.8) respectively,  $p=0.0006$ . Educational materials contributed to improvement in AD outcome with no difference in whether the education was provided in English or indigenous language. This may be because of the level of education of the caregivers.

### P11.11

#### COGNITIVE DYSFUNCTION IN PATIENTS WITH ATOPIC DERMATITIS USING THE MONTREAL COGNITIVE ASSESSMENT (MOCA) BY A NEUROPSYCHIATRIST

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Atopic dermatitis (AD) is a chronic inflammatory disease, but it is unknown if the cognitive function is affected in AD and how it can be found in both by the physician and by the patient himself. To evaluate cognitive function in patients with AD using the MoCA test applied by a neuropsychiatrist. *Method:* Observational and prospective patients with AD between 17 and 76 years of age. Forty-six patients participated in this study (33 women and 13 men). All were evaluated using the MoCA test, which assesses different superior mental functions (executive, visuospatial, language, attention, memory, calculus, abstraction, and orientation tasks), which are rated from 0 to 30 points being considered normal equal to or greater than 26. Forty-six patients, 33F and 13M with AD were reviewed; of the 46 patients evaluated through the Montreal Cognitive Assessment (MoCA) test, only 18 of them rated with normal parameters  $\geq 26$ , and the remaining 28 obtained scores lower than 26. Of the patients who rated with less than 26 points, we can divide them into two groups: 1) those who had a score of less than 20 (3/28 patients), and 2) those who had between 20 and 25 points (25/28 patients). The first group; score of less than 20 had a deficiency in the following task: 1) executive, 2) attention, 3) language, 4) delayed recall, and more evident affectation in language. In the second group, 25 patients were most clearly affected in the visuospatial tasks. Patients with AD present cognitive dysfunction according to the clinical neuropsychiatrist evaluation and the application of MoCA.

### P11.12

#### COMPARATIVE ASSESSMENT OF THE EFFECT OF FREQUENTLY USED LOCALLY PREPARED EMOLLIENTS ON SKIN HYDRATION AND PH IN ATOPIC DERMATITIS IN NIGERIA (CAEFULESAD): STUDY PROTOCOL FOR A RANDOMIZED CONTROLLED TRIAL

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Effective management of atopic dermatitis (AD) in Sub-Saharan Africa is challenged with unavailability of cost-effective moisturizers in a resource limited scenarios frequently experienced in the African setting. Imported/commercially-prepared moisturizers are expensive though Vaseline (petroleum jelly) still enjoys frequent usage. Incidentally, there are locally prepared products for skin hydration which are usually recommended though scientific evidence of their efficacy is anecdotal. *Objective:* To assess and compare the effects of four very frequently used moisturizers/oils (Vaseline, shea butter, coconut oil and palm kernel oil) in our environment on skin hydration and PH. The study will be a single center, investigator blind, randomized, split-body (concurrent bilateral or within-patient) comparison of Vaseline with Shea butter and Palm kernel oil with Coconut oil on 304 (152 in each group) consenting newly or previously diagnosed patients with AD between age 1 year and 30 years in Ibadan. Baseline clinical assessment of skin for dryness, roughness and flaking will be documented on test sites (specific points on upper arm and forearm, thigh and leg bilaterally) with measurements of skin hydration and PH taken. Repeat measurements will be obtained a week after application of products. *Outcome measures:* Change in skin hydration status; % change in skin PH from baseline; Patient acceptability of the products. The study will establish efficacy of local moisturizer as

alternatives in patients with AD. The findings may generate further recommendations on the preparation of these local products.

### P11.13

#### INCIDENCE AND CLINICAL MANIFESTATIONS OF ATOPIC DERMATITIS IN MEXICAN ADULTS

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Atopic dermatitis was previously considered to be a diagnosis mostly of the pediatric population. However, in recent years a gradual increase in cases diagnosed during adulthood has been demonstrated, but what are the clinical manifestations of atopic dermatitis in adults? Report the incidence and clinical manifestations of atopic dermatitis in Mexican adult patients of the Medical Specialties Unit of SEDENA, CDMX 22 patients were recruited in outpatient consultation from April to June 2022. The age range went from 18 to 65 years, they were evaluated by a dermatologist, making the diagnosis of atopic dermatitis and the severity evaluation was made using EASI and POEM scales. 63% ( $n = 14$ ) of the 22 patients included, were women and 37% ( $n = 8$ ) men, the mean age of presentation was 32.5 years. Regarding occupation, 41% ( $n = 9$ ) were students, followed by 36% ( $n = 8$ ) who were housewives. 31% ( $n = 7$ ) of the patients reported symptoms onset during adulthood, while the remaining 69% ( $n = 15$ ) reported eczema lesions in childhood. The most affected body segment were the upper extremities in 54% ( $n = 12$ ), followed by lower extremities in 41% ( $n = 9$ ). The site of greatest involvement of the upper extremity was the hands. The average EASI obtained was 5.3, the POEM score obtained was 13.93. Atopic dermatitis in adults has distinctive clinical characteristics. The symptoms should guide the diagnosis, as well as the elementary lesion rather than the topography. In adults it will always be important to rule out other concomitant diseases.

### P11.14

#### EXPERIENCE OF CHILDREN AND ADULT PATIENTS WITH ATOPIC DERMATITIS TREATED WITH DUPILUMAB

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Atopic dermatitis (AD) is a chronic inflammatory skin disease that imposes great morbidity to the patients. Dupilumab, a monoclonal antibody that blunts the IL-4 and IL-13 signaling pathways, is approved to treat patients with moderate to severe AD. The objective of our study is to investigate the drug's efficacy and adverse effects profile in patients being treated with dupilumab for moderate to severe AD. We collected data from the medical records of patients with moderate to severe AD of the Irmandade Santa Casa de Misericórdia de Porto Alegre Hospital. We found 14 patients with clinical diagnosis of AD treated with dupilumab between 2020 and 2021. Descriptive statistical analysis was performed in Microsoft Excel. We found 14 patients, 8 men and 6 women, with average age for starting dupilumab therapy being 22 (between 6 and 38 years old). Circa 85% of patients began AD symptoms in early childhood and only 2 of them started it during the teenage years. Thirteen patients obtained significant improvement after one dose of dupilumab and maintained sustained response for the six following months; one patient had poor

initial improvement followed by worsening, so the treatment was switched to baricitinib. The side effect of conjunctivitis was found in one patient. The majority of patients had been treated with methotrexate (78%). Among the comorbidities, asthma was the most prevalent (57%). In conformity with literature, our patients in use of dupilumab obtained good responses, testifying its efficacy and few side effects.

### P11.15

#### ASSESSMENT OF MICROCIRCULATION IN PATIENTS WITH ATOPIC DERMATITIS

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Atopic dermatitis (AD) is a recurrent, chronic, inflammatory skin disease associated with severe itching. The number of people suffering from AD is relatively high. The disease has clear negative social and economic impacts and its treatment remains a challenge. The pathogenesis of the disease is complex. In recent years, the coexistence of other diseases, including diseases of the cardiovascular system, has attracted particular attention. Endothelial dysfunction is one of the earliest vascular manifestations in the pathogenesis of the cardiovascular disease. The study aims to analyze the assessment of skin microcirculation in patients with atopic dermatitis in the Polish population. The study included 11 patients with AD, at least 18 years of age (the study group), and 11 people matched without cardiovascular disease with an adverse allergic history (control group). Five parameters HS (Hypoxia Sensitivity), HRindex (%), IRmax (%), HRmax (%) and IRindex (%) were assessed during the examination of the cutaneous microcirculation of the forearm using the FMSF (Flow Mediated Skin Fluorescence) method. The mean results of HS, HRindex, IRmax, HRmax, IRindex in patients with atopic dermatitis were 67.66; 10.56; 13.37; 18.25; 10.023 as compared to the control group 104.12; 12.54; 16.74; 19.29; 12.77. All five parameters were lower in AD patients compared to controls. Understanding the relationships between the above diseases will allow for early detection, monitoring, and implementation of appropriate prophylaxis, facilitating therapeutic decisions and treatment.

### P11.16

#### A NOVEL DRUG SUBSTANCE WITH STRONG SAFETY PROFILE AND MULTIPLE BIOACTIVE COMPOUNDS TO TARGET THE MULTIPLE CAUSES OF ATOPIC DERMATITIS

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Atopic dermatitis (AD), the most common form of eczema, is an inflammatory skin disease. (1,2) *Staphylococcus aureus* bacteria and its highly infectious, difficult to kill MRSA drug resistant variant (*S. aureus* and MRSA) make AD worse, preventing healing. (3) Show the novel drug substance with multiple bioactive compounds (NDS) targets the multiple problems of AD, specifically inflammation and associated itch of AD, and, *S. aureus* and MRSA that exacerbate AD, preventing healing. Additionally show the potential for NDS's significant safety profile. Folin-Ciocalteu test (FC) used to evaluate NDS antioxidant activity as this is a direct indicator of anti-inflammatory activity. Anti-bacterial activity evaluated with Minimum Inhibitory Concentration (MIC) test, Zone of Inhibition (ZoI) test and Time Kill (TK) test. Sa-

fety profile used the Partition Coefficient Skin Penetration Test (LogP) with intact and superficially wounded cadaver skin. FC test demonstrated very high antioxidant activity tying the NDS to anti-inflammatory and anti-pruritic capability for AD. MIC test, ZoI test and TK test showed the NDS is highly effective in killing *S. aureus* and multi drug resistant (MDR) MRSA showing NDS potential effectiveness in eliminating the bacterial causes of AD. LogP tests showed NDS did not penetrate through the skin in an appreciable amount, and any systemic absorption of NDS to be negligible. NDS is a promising potent and safe therapeutic for AD. NDS is currently in Phase 2a clinical trial, which at time of this writing is 50% complete.

### P11.17

#### COMBINED TARGETING OF LXR AND NF-KB AS A TREATMENT OF ATOPIC DERMATITIS

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Skin gene expression is highly regulated by major modulatory nuclear factors: the anti-inflammatory LXR and the pro-inflammatory NF-κB. Re-establishing skin homeostasis gene expression is essential for reducing AD severity triggered by *Staphylococcus aureus*. However, the standard topical and new biological treatments do not improve skin AD biomarkers in all patients and can produce adverse effects, poor adherence, and higher medical costs. Therefore, it is necessary to find new effective therapeutic agents to improve AD lesional skin through multiple approaches. To evaluate the effect of targeting LXR and NF-κB on *S. aureus* and biomarkers of skin immunity in AD. **Methods and Results:** A transcriptomic meta- and enrichment analysis was performed, revealing the gene expression alterations associated with LXR and NF-κB modulation in lesional AD compared with non-atopic skin. Histological analysis of AD skin treated with an LXR agonist (VTP38543) showed no differences in p-65 NF-κB activation, tight junction, or Langerhans cells after treatment. The combined treatment with an LXR agonist (T0901317) and an NF-κB antagonist

(JSH-23) on *in vitro* 2D and full-thickness AD models reveals an increased antimicrobial effect against *S. aureus*. Besides, it decreased inflammatory AD biomarkers, improved tight junctions, and reestablished antimicrobial peptide expression. The combined treatment reduced transepidermal water loss in the full-thickness AD model. The combined treatment may be more effective than an LXR agonist alone in ameliorating *S. aureus* colonization and alterations of AD skin.

### P11.18

#### UTILIZING TWO LARGE GLOBAL DATASETS TO UNDERSTAND THE ASSOCIATION OF ENVIRONMENTAL MICROBES AND ATOPIC DERMATITIS

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Exposure to environmental microbes in farms and household dust may protect against allergic disease. We sought to examine the association between environmental microbes and atopic dermatitis at a global scale. Data from 227,959 children and 54 centers in the International Study of Asthma and Allergies in Childhood within 400 kilometers of the Earth Microbiome Project sampling sites were included. The primary association of interest was between the presence of AD symptoms and the Shannon diversity index of environmental microbes. A mixed-effect logistic regression model adjusted for sex, age, and national income was used to assess the association between the health outcomes and microbial diversity. At a global scale, a higher animal-related microbial diversity was associated with a decreased risk of lifetime AD prevalence (Odds ratio (OR): 0.71, 95% CI: 0.58 – 0.88). Examination of current disease severity showed that a higher soil-related microbial diversity was associated with a decreased risk of moderate to severe AD symptoms (OR: 0.63, 95% CI: 0.49 – 0.81). Results for plant-related microbial diversity showed a similar trend: 0.88 (95% CI: 0.77 – 1.02) and 1.01 (95% CI: 0.78 – 1.32) for lifetime AD symptoms and current moderate to severe AD symptoms respectively. Globally, elevated animal- and soil-related microbial diversity was found to be protective against lifetime AD and current moderate to severe AD symptoms respectively. More data that enhance the precise pairing of allergy and microbial data are needed for future investigations.



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