Received: 15 January 2018 | Revised: 5 February 2018 | Accepted: 8 February 2018

DOI: 10.1111/cod.12988

WILEY CONTACT DERMATITIS

LETTER TO THE EDITOR

The effect of treatment with anti-interleukin-17 in patients with allergic contact dermatitis

To the Editor

Allergic contact dermatitis (ACD) is generally accepted as being mainly a T helper 1-mediated disease.[1] However, in positive patch test reactions in both mice and nickel-allergic individuals, interleukin (IL)-17 levels have been found to be elevated,[2–5] suggesting that IL-17 may play a role in contact allergy. Secukinumab is a fully recombinant human monoclonal antibody that selectively binds and inhibits IL-17A, so we considered whether blocking IL-17A could improve ACD. The primary objective of this phase II study was to determine the effect of anti-IL-17 treatment in patients with moderate-to-severe ACD (ClinicalTrials.gov, ID NCT02778711). Patients with ACD were treated with 300 mg of secukinumab at weeks 0, 1, 2, 3, 4 and 8. Clinical progress was monitored at weeks 0, 2, 4, 8, 12 and 16 with the Physician Global Assessment (PGA) (range 0-4), the Patient Global Assessment (PaGA) (range 0-5), and the Dermatology Life Quality Index (DLQI), and by photography of the skin. Biopsies from the skin involved were taken at weeks 0, 2 and 4.

The plan was to include 10 patients, but, because of recruitment difficulties, only 7 patients were invited to participate; of these, 2 men and 2 women with a mean age of 68.5 years (range 55-82 years) were included in the study. Of these patients, only 3 completed the study, as 1 patient withdrew her consent at week 8 because of lack of effect. Table 1 shows the patient characteristics. Overall, there was minor or no clinical improvement in eczema following treatment with secukinumab from baseline to the end of the trial (Table 1 and Figure S1). At week 12 as compared with baseline, only 1 of the 4 patients had a minor reduction in PGA score and the other 3 patients had an increase or no change in PGA score (Table 1). Improvement in quality of life was seen in 2 of the 4 patients, but, in both of them, there was a minimal reduction in DLQI score, and only 1 of these patients experienced a decrease in eczema activity at week 12 (Table 1). For haematoxylin and eosin-stained biopsies, no differences in the level of inflammation before and after administration of secukinumab were observed, and the histology was generally dominated by epithelial spongiosis and inflammation with eosinophils. A flare-up of eczema was seen in 1 case, so prednisolone was administered to this patient in week 12. This patient and 1 other patient applied potent topical corticosteroid because of a lack of improvement in their eczema, from week 2 in 1 case and from week 8 in the other. There were no severe adverse events. One patient experienced vertigo, and 1 patient suffered onset of psoriasis during the trial.

To our knowledge, this is the first clinical trial to study the effect of anti-IL-17 on ACD in humans.[6] The hypothesis was based on a study by Larsen et al,[3] which showed that IL-17 was expressed in experimentally induced eczematous reactions in patients with allergic contact allergy. Also, previous studies have described the presence of IL-17 in ACD.[7,8] Elsewhere, we have found a slight effect of secukinumab in a standardized design with patch testing in nickel-allergic patients; however, in this study, histology before and after treatment with secukinumab was unchanged (manuscript submitted). Limitations include the difficulty in enrolling the desired number of patients, which means that, effectively, not much more than anecdotal evidence has been obtained. Furthermore, the study was designed as a pilot study with no controls. Also, it is uncertain whether higher or more frequently administered doses could have influenced the results. In conclusion, we found no effect of secukinumab in patients with ACD; however, the results should be considered as preliminary, owing to the small number of patients.

Conflict of interest

T.T. has served as investigator for Novartis and LEO Pharma. C.Z. has consulting relationships with and/or is an investigator and/or received grants or honoraria from Eli Lilly and Company, Janssen Cilag, Novartis Pharmaceutical Corp., AbbVie, Takeda, Amgen, MSD, LEO Pharmaceuticals, Boehringer-Ingelheim, Almirall, and Regeneron. L.S. has been a paid speaker for Pfizer, AbbVie, Eli Lilly, Novartis, and LEO Pharma, and has been a consultant for or has served on Advisory Boards with Pfizer, AbbVie, Janssen Cilag, Novartis, Eli Lilly, LEO Pharma, Almirall, and Sanofi. She has served as an investigator for Pfizer, AbbVie, Eli Lilly, Novartis, Amgen, Regeneron, Boehringer-Ingelheim, and LEO Pharma, and has received research and educational grants from Pfizer, AbbVie, Novartis, Sanofi, Janssen Cilag, and LEO Pharma. The other authors declare no potential conflict of interests.

ORCID

Tanja Todberg http://orcid.org/0000-0002-4713-8985

© 2018 John Wiley & Sons A/S. Published by John Wiley & Sons Ltd

TABLE 1 Characteristics of patients and Physician Global Assessment (PGA), Patient Global Assessment (PaGA) and Dermatology Life Quality Index (DLQI) scores at baseline (before treatment with secukinumab) and at week 12 (with the last dose of secukinumab having been administered at week 8)

Patient no.	Age (y)/sex	Duration of eczema (y)	Contact allergy	Previous treatments	PGA (range 0-4)		PaGA (range 0-5)		DLQI (range 0-30)	
					Baseline	Week 12	Baseline	Week 12	Baseline	Week 12
1	66/F	9	Sesquiterpene lactone mix, fragrance mix, textile dye mix, methyldibromo glutaronitrile	Topical/systemic steroids, azathioprine	3	4[a]	5	5[a]	6	12[a]
2	71/M	10	Colophonium, formaldehyde, iodopropynylbutyl carbamate, Bronopol, methyldibromo glutaronitrile	Topical/systemic steroids, cyclosporine, mycophenolate, azathioprine	4	4	5	4	3	4
3	55/F	21	Sesquiterpene lactone mix, fragrance mix, *Evernia prunastri*, trimethylbenzenepropanol, palladium	Topical/systemic steroids, methotrexate	3	2	5	2	16	3
4	82/M	37	Sesquiterpene lactone mix, fragrance mix, *Evernia prunastri*, colophonium, thiuram mix, chromium, cobalt, methyldibromo glutaronitrile	Topical/systemic steroids, methotrexate, mycophenolate, azathioprine	3	3	4	5	14	13

F, female, M, male.

[a] For patient no. 1, responses from week 8 are carried forwards, owing to early termination.

Tanja Todberg[1]
Claus Zachariae[1]
Dorrit Krustrup[2]
Lone Skov[1]
[1]*Department of Dermatology and Allergy, Herlev and Gentofte Hospital, University of Copenhagen, Hellerup, Denmark*
[2]*Department of Pathology, Herlev and Gentofte Hospital, University of Copenhagen, Herlev, Denmark*
Email: tanja.todberg@regionh.dk
DOI 10.1111/cod.12988

REFERENCES

1. Cavani A. Immune regulatory mechanisms in allergic contact dermatitis and contact sensitization. In: Blaser, K, ed. *T Cell Regulation in Allergy, Asthma and Atopic Skin Diseases*. Vol 94. Basel, Switzerland: Karger; 2008:93-100.
2. Pennino D, Eyerich K, Scarponi C, et al. IL-17 amplifies human contact hypersensitivity by licensing hapten nonspecific Th1 cells to kill autologous keratinocytes. *J Immunol*. 2010;184:4880-4888.
3. Larsen JM, Bonefeld CM, Poulsen SS, Geisler C, Skov L. IL-23 and T(H)17-mediated inflammation in human allergic contact dermatitis. *J Allergy Clin Immunol*. 2009;123:486-492.
4. Rubin IMC, Dabelsteen S, Nielsen MM, et al. Repeated exposure to hair dye induces regulatory T cells in mice. *Br J Dermatol*. 2010;163:992-998.
5. Nakae S, Komiyama Y, Nambu A, et al. Antigen-specific T cell sensitization is impaired in IL-17-deficient mice, causing suppression of allergic cellular and humoral responses. *Immunity*. 2002;17:375-387.
6. Hamann D, Zirwas M. Successful patch testing of a patient receiving anti-interleukin-17 therapy with secukinumab: a case report. *Contact Dermatitis*. 2017;76:378-379.
7. Dyring-Andersen B, Skov L, Løvendorf MB, et al. CD4(+) T cells producing interleukin (IL)-17, IL-22 and interferon-γ are major effector T cells in nickel allergy. *Contact Dermatitis*. 2013;68:339-347.
8. Schmidt JD, Ahlström MG, Johansen JD, et al. Rapid allergen-induced interleukin-17 and interferon-γ secretion by skin-resident memory CD8+ T cells. *Contact Dermatitis*. 2017;76:218-227.

SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.