Efficacy and safety of tildrakizumab for the treatment of moderate-to-severe plaque psoriasis of the scalp: A multicenter, randomized, double-blind, placebo-controlled, Phase 3b study

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Background: Scalp psoriasis is common and difficult to treat.

Objective: To evaluate efficacy and safety of tildrakizumab for the treatment of scalp psoriasis.

Methods: In this Phase 3b, randomized, double-blind, placebo (PBO)-controlled study (NCT03897088), patients with moderate-to-severe plaque psoriasis affecting the scalp (Investigator Global Assessment modified [IGA mod] 2011 [scalp] ≥3, Psoriasis Scalp Severity Index [PSSI] ≥12, ≥30% scalp surface area affected) received tildrakizumab 100 mg or PBO at W0 and W4. The primary endpoint was IGA mod 2011 (scalp) score of "clear" or "almost clear" with ≥2-point reduction from baseline at W16 (IGA mod 2011 [scalp] response). Key secondary endpoints were PSSI 90 response at W12 and W16 and IGA mod 2011 (scalp) response at W12. Safety was assessed from adverse events.

Results: Of patients treated with tildrakizumab (n = 89) vs PBO (n = 82), 49.4% vs 7.3% achieved IGA mod 2011 (scalp) response at W16 (primary endpoint) and 46.1% vs 4.9% at W12; 60.7% vs 4.9% achieved PSSI 90 response at W16 and 48.3% vs 2.4% at W12 (all $P < .00001$). No serious treatment-related adverse events occurred.

Limitations: Only short-term data are presented.

Conclusion: Tildrakizumab was efficacious for the treatment of scalp psoriasis with no new safety signals. (J Am Acad Dermatol 2024;91:91-9.)

Key words: efficacy; itch; psoriasis; safety; scalp; tildrakizumab.

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IRB approval status: The study protocol and all amendments were approved by the applicable Independent Ethics Committee or Institutional Review Board for each study site.

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INTRODUCTION

Approximately 40% to 90% of patients with psoriasis have scalp involvement.[1-4] Scalp psoriasis is associated with significant erythema, scaling, and pruritus and can be psychologically and socially distressing.[4-8] Topical therapy, typically the first line of psoriasis treatment,[5] is challenging on the scalp because of the presence of hair.[5,6] The joint American Academy of Dermatology—National Psoriasis Foundation guidelines endorse use of biologics in patients with scalp psoriasis.[9] The International Psoriasis Council similarly recognizes these patients as candidates for systemic therapy, including biologics.[10] Systemic treatment for scalp psoriasis has been investigated in clinical trials as prespecified endpoints or subgroup analyses with encouraging results; however, dedicated placebo (PBO)-controlled studies on the treatment of scalp psoriasis are limited.

CAPSULE SUMMARY

- This study demonstrates the efficacy and safety of tildrakizumab, an anti—interleukin-23 p19 antibody approved for the treatment of adults with moderate-to-severe plaque psoriasis, in patients with moderate-to-severe scalp psoriasis.
- The results confirm the efficacy of tildrakizumab in patients with plaque psoriasis affecting difficult-to-treat areas such as the scalp.

Tildrakizumab is an anti—interleukin-23 p19 monoclonal antibody approved for the treatment of adults with moderate-to-severe plaque psoriasis. The pivotal Phase 3 trials reSURFACE 1 (NCT01722331) and reSURFACE 2 (NCT01729754) did not evaluate efficacy of tildrakizumab for scalp psoriasis.[11,12] Effectiveness of tildrakizumab in patients with moderate-to-severe plaque psoriasis with scalp involvement was assessed as part of a 52-week interim analysis of the prospective, multicenter, noninterventional TILOT study; the majority achieved improvements in scalp psoriasis, with no new safety concerns reported.[13]

This report describes results from the Week 16 primary analysis of a Phase 3b study evaluating efficacy and safety of tildrakizumab for the treatment of moderate-to-severe plaque psoriasis affecting the scalp.

METHODS

Study design and population

This is the Week 16 primary analysis of a 52-week, multicenter, randomized, double-blind, PBO-controlled Phase 3b study (NCT03897088). Eligible patients were ≥18 years of age with a clinical diagnosis of chronic plaque psoriasis for ≥6 months, were candidates for systemic therapy without active or untreated latent tuberculosis, and had moderate-to-severe plaque psoriasis of the scalp and whole body at screening and baseline. Moderate-to-severe plaque psoriasis of the scalp was defined as Investigator Global Assessment modified 2011 of the scalp (IGA mod 2011 [scalp]) score of ≥3, Psoriasis Scalp Severity Index (PSSI) score of ≥12, and ≥30% of scalp surface area (SSA) affected.[14] Moderate-to-severe plaque psoriasis of the whole body was defined as IGA mod 2011 of the whole body at least moderate in severity (score of ≥3 on a 5-point scale), Psoriasis Area and Severity Index score of ≥12, and ≥10% body surface area (BSA) involvement.[14] Patients with predominantly nonplaque psoriasis, clinically significant laboratory abnormalities, infection or history of recurrent infection, history of malignancy (excluding successfully treated basal cell carcinoma, squamous cell carcinoma of the skin in situ, squamous cell carcinoma of the skin with no evidence of recurrence within 5 years, or carcinoma in situ of the cervix that had been adequately treated), or any previous use of tildrakizumab or other interleukin-23/T helper 17 pathway inhibitors were excluded. Prior use of tumor necrosis factor (TNF)-α inhibitors (capped at 40%) with a 12-week washout period was allowed.

Ethics statements

The study protocol and all amendments (Supplementary Material, available via Mendeley at https://data.mendeley.com/datasets/zh7bx2my7f/1) were approved by the Independent Ethics Committee or Institutional Review Board for each study site. The study was conducted in accordance with the principles of the Declaration of Helsinki. All patients provided written informed consent before beginning the study.

Treatment

The study consisted of 3 parts (Supplementary Fig 1, available via Mendeley at https://data.mendeley.com/datasets/zh7bx2my7f/1). In Part 1 (Week 0 to 16; double-blind, PBO-controlled phase), reported herein, patients were randomized 1:1 to receive tildrakizumab 100 mg or PBO administered by subcutaneous injection at Weeks 0 and 4; no concomitant psoriasis treatment was allowed. Parts 2 and 3

Abbreviations used:

AE:	adverse event
BSA:	body surface area
DLQI:	Dermatology Life Quality Index
IGA mod 2011:	Investigator Global Assessment modified 2011
ITT:	intention-to-treat
LSM:	least-squares mean
mITT:	modified intention-to-treat
NRS:	numeric rating scale
PBO:	placebo
PSSI:	Psoriasis Scalp Severity Index
PSSI 90/100:	≥90%/100% improvement from baseline PSSI score
SAE:	serious AE
SD:	standard deviation
SSA:	scalp surface area
TEAE:	treatment-emergent adverse event
TIL:	tildrakizumab
TNF:	tumor necrosis factor

are described in Supplementary Material, available via Mendeley at https://data.mendeley.com/datasets/zh7bx2my7f/1.

Assessments

The 5-point IGA mod 2011 scale was used to assess the scalp and whole body separately at screening, baseline, and Weeks 1, 4, 8, 12, and 16 (details in Supplementary Material, available via Mendeley at https://data.mendeley.com/datasets/zh7bx2my7f/1).[14] The PSSI and SSA were assessed at screening, baseline, and Weeks 1, 4, 8, 12, and 16. The scalp itch—numeric rating scale (NRS)—a self-administrated single-item questionnaire with an 11-point scale (0, no itch to 10, worst itch imaginable)—was assessed at baseline and Weeks 1, 4, 8, 12, and 16. The Dermatology Life Quality Index (DLQI) questionnaire was administered to patients at baseline and Weeks 8 and 16.

Safety and tolerability were assessed from adverse events (AEs), physical examinations, electrocardiogram results, vital signs, laboratory test results (hematology, biochemistry, and urinalysis), and the Columbia-Suicide Severity Rating Scale through Week 16.

Endpoints

The primary efficacy endpoint was IGA mod 2011 (scalp) response at Week 16. The study protocol was amended after enrollment began to adopt this as the primary efficacy endpoint in response to a recommendation from the US Food and Drug Administration (Amendment 01). A second amendment modified the description of "almost clear" (1) for scaling from "no to minimal focal scaling" to "no scaling" in response to a recommendation from the Food and Drug Administration (Amendment 02). As a result, IGA mod 2011 (scalp) response was defined as a score of "clear" with a ≥2-point reduction from baseline for patients enrolled under Amendment 01 and as a score of "clear" or "almost clear" with a ≥2-point reduction from baseline for patients enrolled under Amendments 02 and 03 (Supplementary Material and Tables I-III, available via Mendeley at https://data.mendeley.com/datasets/zh7bx2my7f/1).

Key secondary efficacy endpoints were PSSI 90 response (≥90% improvement from baseline PSSI score) at Weeks 12 and 16 and IGA mod 2011 (scalp) response at Week 12. Other secondary efficacy endpoints included PSSI 100 response (100% improvement from baseline PSSI score) at Week 16; ≥4-point reduction in scalp itch—NRS at Week 16; percent change in PSSI scores at Weeks 4, 8, 12, and 16; and SSA involvement at Week 16. Mean change from baseline in DLQI total score at Week 16 was an exploratory endpoint. Safety was evaluated from frequency of AEs and other assessment results through Week 16.

Statistical analysis

The sample size was calculated to provide ≥80% power to detect a difference between tildrakizumab and PBO treatment using 2-sided hypothesis tests with an alpha (α) of 0.0025 for the primary and all key secondary endpoints under the relevant assumptions for each hypothesis test; this significance level was used to reduce the need for duplicate studies as a single Phase 3 study was planned.

Primary and key secondary efficacy endpoints were analyzed using a Cochran-Mantel-Haenszel test stratified by body weight (≤90 kg vs >90 kg) and prior exposure to TNF-α inhibitors in the modified intention-to-treat (mITT) population. The mITT population, including all patients randomized after Amendment 01 who were dispensed study treatment, was used for primary and key secondary analyses because patients enrolled before Amendment 01 did not have a baseline IGA mod 2011 (scalp) assessment. Missing data were imputed using nonresponder imputation. The efficacy analysis adopted a step-down sequential testing approach. The primary endpoint was tested at α = 0.0025. If significant, the key secondary endpoints were tested sequentially at α = 0.0025 in the following order: PSSI 90 response at Week 16, IGA mod 2011 (scalp) response at Week 12, and PSSI 90 response at Week 12.

All other secondary and exploratory endpoints were analyzed in the ITT population, including all randomized patients who were dispensed study

treatment. Percent change in PSSI scores through Week 16 and SSA involvement were analyzed using a mixed model for repeated measures including fixed effects for treatment, visit, treatment-by-visit interaction, prior use of TNF-α inhibitors (yes/no), and baseline body weight (≤90 kg or >90 kg), with baseline value as a covariate, using the observed cases (OC) method. Mean change from baseline in DLQI was reported using the OC method. PSSI 100 and scalp itch−NRS responses at Week 16 were analyzed using a Cochran-Mantel-Haenszel test stratified by body weight (≤90 kg vs >90 kg) and prior exposure to TNF-α inhibitors, with missing data imputed using nonresponder imputation. There was no multiplicity control for these endpoints, and the reported *P* values are nominal.

Safety analyses were performed in all randomized patients who received ≥1 dose of study treatment (safety population).

RESULTS

Patients

From May 8, 2019, to January 13, 2021, 231 patients enrolled (ITT population); 171 were included in the mITT population (tildrakizumab 100 mg, n = 89; PBO, n = 82; Fig 1). The mITT patients were predominantly male (66% and 54%) and White (80% and 78%), with mean age of 44 and 45 years in the tildrakizumab and PBO treatment arms, respectively. Baseline characteristics and disease severity were similar in the ITT population (Table I).

Efficacy

Significantly more patients receiving tildrakizumab 100 mg vs PBO achieved the primary endpoint of IGA mod 2011 (scalp) response at Week 16 (49.4% vs 7.3%; response rate treatment difference [95% confidence interval (CI)]: 40% [28.2%, 51.8%]; $P < .00001$; Fig 2). The response rate was greater in patients treated with tildrakizumab vs PBO starting at Week 4 and increased over time up to Week 16 in tildrakizumab-treated patients. The treatment effect was consistent in subgroups of patients based on the stratification factors, prior TNF-α inhibitor use (yes/no) and body weight (≤90 kg/>90 kg; Supplementary Table IV, available via Mendeley at https://data.mendeley.com/datasets/zh7bx2my7f/1).

Tildrakizumab was also superior to PBO for all key secondary endpoints (Fig 2). The PSSI 90 response rate for tildrakizumab vs PBO was 60.7% vs 4.9% at Week 16 (response rate treatment difference [95% CI]: 55.8% [44.7%, 67.0%]) and 48.3% vs 2.4% at Week 12 (response rate treatment difference [95% CI]: 45.9% [35.0%, 56.8%]; both $P < .00001$). The IGA mod 2011 (scalp) response rate at Week 12 was 46.1% vs 4.9% in patients treated with tildrakizumab vs PBO (response rate treatment difference [95% CI]: 39.0% [27.6%, 50.4%]; $P < .00001$).

A higher proportion of patients achieved PSSI 100 response with tildrakizumab 100 mg vs PBO at Week 16 (37.6% vs 2.6%; response rate treatment difference [95% CI]: 35% [25.8%, 44.2%]; nominal $P < .00001$; Table II). Mean ± standard deviation (SD) percentage change in PSSI at Week 16 was greater in patients treated with tildrakizumab vs PBO (−79.8% ± 30.4 vs −21.8% ± 35.6; least-squares mean [LSM] treatment difference [95% CI]: −57.5% [−66.2, −48.8]; nominal $P < .00001$; Table II). Mean ± SD percentage change in SSA at Week 16 was greater in patients treated with tildrakizumab vs PBO (−76.4% ± 35.2 vs −15.2% ± 31.5; LSM treatment difference [95% CI]: −61.2% [−70.0, −52.3]; nominal $P < .00001$; Table II). A higher proportion of patients achieved a 4-point decrease in scalp itch−NRS following treatment with tildrakizumab 100 mg vs PBO at Week 16 (54.5% vs 14.7%; response rate treatment difference [95% CI]: 39.8% [28.0%, 51.6%]; nominal $P < .00001$; Table II). The mean ± SD DLQI score decreased from 14.5 ± 7.7 at baseline to 4.8 ± 5.6 at Week 16 in tildrakizumab-treated patients and from 15.3 ± 7.0 to 12.6 ± 8.3 at Week 16 in PBO-treated patients (mean absolute change: −9.6 vs −2.7; Table II).

Treatment-emergent AEs (TEAEs) were reported in 35.0% of patients treated with tildrakizumab 100 mg and 21.1% of PBO-treated patients (Table III); the most frequent TEAEs were viral upper respiratory tract infection, nasopharyngitis, and hypertension with tildrakizumab 100 mg and headache and diarrhea with PBO. There was a single serious AE (SAE) of sciatica in the tildrakizumab 100 mg treatment arm, which was of moderate intensity and was not considered related to treatment. Among patients receiving tildrakizumab, 4 experienced a drug-related TEAE (viral upper respiratory tract infection, hypertrichosis, pruritic rash, and increased blood creatine phosphokinase). There were no discontinuations due to AEs or any deaths reported through Week 16.

DISCUSSION

In this primary analysis of a randomized, double-blind, PBO-controlled, Phase 3b clinical study, tildrakizumab was superior to PBO for the treatment of moderate-to-severe plaque psoriasis of the scalp. The primary and all key secondary efficacy endpoints were met; tildrakizumab was significantly more effective vs PBO based on 2 scalp-specific measures, the IGA mod 2011 (scalp) and PSSI 90 response. By Week 16, patients with moderate-to-

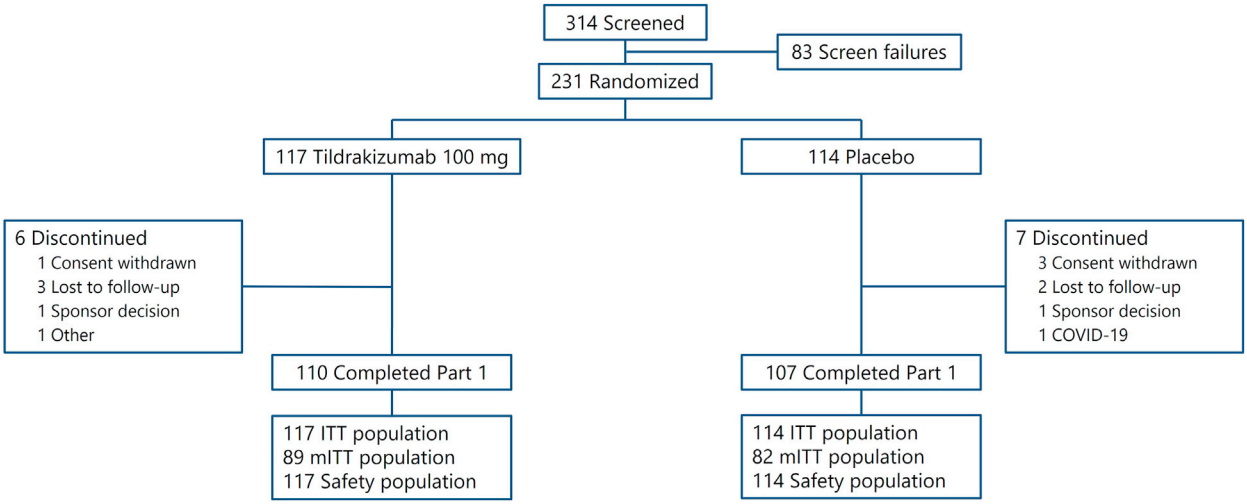

Fig 1. Patient disposition. *COVID-19*, Coronavirus disease 2019; *ITT*, intention-to-treat; *mITT*, modified intention-to-treat.

Table I. Baseline characteristics and disease severity

	mITT population		ITT/safety population*	
	TIL 100 mg (*n* = 89)	PBO (*n* = 82)	TIL 100 mg (*n* = 117)	PBO (*n* = 114)
Age, years, mean ± SD	44.2 ± 15.1	45.4 ± 12.9	45.6 ± 15.3	44.8 ± 13.0
Sex, male, *n* (%)	59 (66.3)	44 (53.7)	71 (60.7)	63 (55.3)
Race, *n* (%)				
White	71 (79.8)	64 (78.0)	92 (78.6)	90 (78.9)
Black or African American	9 (10.1)	5 (6.1)	10 (8.5)	9 (7.9)
Asian	4 (4.5)	7 (8.5)	8 (6.8)	9 (7.9)
Native Hawaiian or Other Pacific Islander	3 (3.4)	2 (2.4)	3 (2.6)	2 (1.8)
American Indian or Alaskan Native	2 (2.2)	1 (1.2)	4 (3.4)	1 (0.9)
Other	0	3 (3.7)	0	3 (2.6)
Ethnicity, not Hispanic or Latino, *n* (%)	58 (65.2)	53 (64.6)	75 (64.1)	69 (60.5)
Weight, kg, mean ± SD	88.3 ± 20.9	90.1 ± 21.7	88.4 ± 21.4	89.6 ± 22.5
BMI, kg/m^2, mean ± SD	30.3 ± 6.2	31.4 ± 6.9	30.8 ± 6.9	31.4 ± 7.0
Prior use of TNF-α inhibitors, yes, *n* (%)	9 (10.1)	7 (8.5)	15 (12.8)	15 (13.2)
IGA mod 2011 (scalp), *n* (%)				
3	75 (84.3)	64 (78.0)	NA	NA
4	13 (14.6)	15 (18.3)	NA	NA
Missing	1 (1.1)	3 (3.7)	NA	NA
PSSI, mean ± SD	33.8 ± 15.1	31.7 ± 15.8	34.5 ± 15.2	32.9 ± 15.5
SSA, mean ± SD	58.8 ± 24.7	55.5 ± 22.9	60.3 ± 24.9	56.5 ± 22.7
Scalp itch—NRS score, mean ± SD	7.0 ± 2.4	7.2 ± 2.4	7.1 ± 2.3	7.4 ± 2.3
IGA mod 2011 (whole body), *n* (%)				
3	77 (86.5)	69 (84.1)	NA	NA
4	11 (12.4)	10 (12.2)	NA	NA
Missing	1 (1.1)	3 (3.7)	NA	NA
PASI, mean ± SD	19.3 ± 6.7	18.3 ± 7.9	18.9 ± 6.5	18.5 ± 7.6
BSA, mean ± SD	24.3 ± 13.8	22.8 ± 14.5	23.3 ± 14.0	22.5 ± 13.7

BMI, Body mass index; *BSA*, body surface area; *IGA mod 2011 (scalp)/(whole body)*, Investigator Global Assessment modified 2011 of the scalp/whole body; *ITT*, intention-to-treat; *mITT*, modified intention-to-treat; *NA*, not available; *NRS*, numeric rating scale; *PASI*, Psoriasis Area and Severity Index; *PBO*, placebo; *PSSI*, Psoriasis Scalp Severity Index; *SD*, standard deviation; *SSA*, scalp surface area; *TIL*, tildrakizumab; *TNF*, tumor necrosis factor.

*IGA mod 2011 (scalp) and IGA mod 2011 (whole body) were not assessed in patients enrolled before protocol Amendment 01 and are not reported in the ITT/safety population.

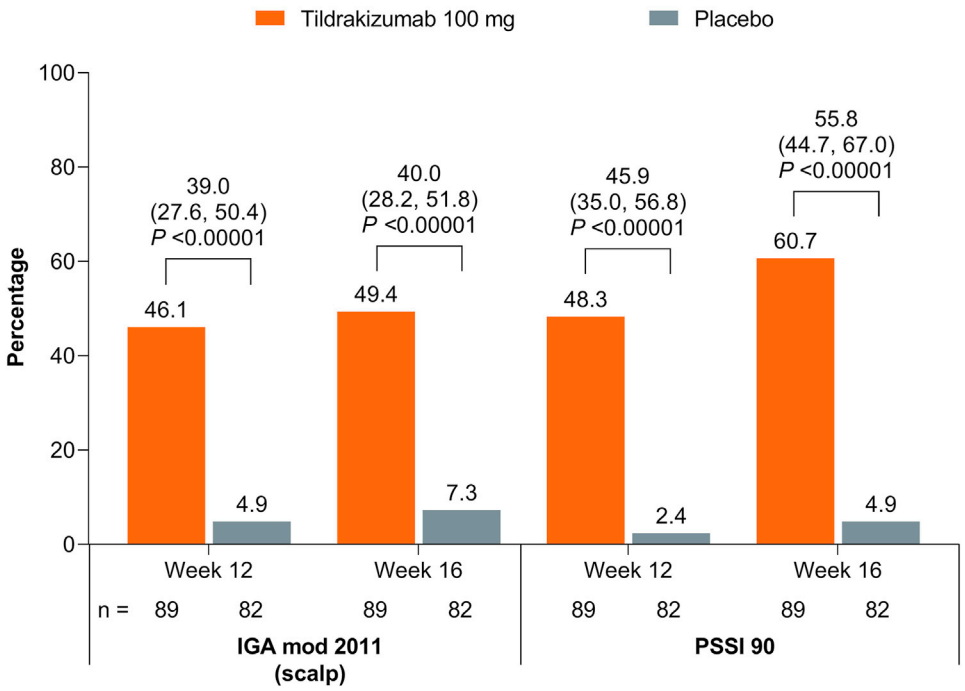

Fig 2. Primary and key secondary efficacy endpoints. Primary and key secondary efficacy endpoints were analyzed in the mITT population with NRI. The *P* value was less than the prespecified alpha (α) level of 0.0025 at each step of the step-down sequential testing approach; therefore, the primary and key secondary endpoints were all statistically significant. Treatment difference and 95% confidence interval are shown. *IGA mod 2011 (scalp)*, Investigator Global Assessment modified 2011 of the scalp; *mITT*, modified intention-to-treat; *NRI*, nonresponder imputation; *PSSI 90*, ≥90% improvement from baseline in Psoriasis Scalp Severity Index score.

severe scalp psoriasis receiving tildrakizumab also reported improvements in scalp itch—one of the most burdensome symptoms of psoriasis[15]—and quality of life. AEs were consistent with the known safety profile of tildrakizumab, and no new safety signals were detected.

To date, 2 trials evaluating efficacy and safety of biologics for the treatment of scalp psoriasis are published. Etanercept was efficacious in a randomized, PBO-controlled trial for the treatment of patients with moderate-to-severe plaque psoriasis with scalp involvement through Week 24.[16] Secukinumab was superior to PBO in a Phase 3b study, SCALP (NCT02267135), in patients with moderate-to-severe scalp psoriasis (PSSI ≥12; ≥30% of SSA affected). In SCALP, higher proportions of patients treated with secukinumab vs PBO achieved PSSI 90 (52.9% vs 2.0%) and IGA mod 2011 (scalp) 0 (clear) or 1 (almost clear; 56.9% vs 5.9%) responses at Week 12.[17] Most evidence favoring biologic treatment of scalp psoriasis is from subgroup analyses of patients with scalp involvement in Phase 3 trials (guselkumab, VOYAGE 1 and VOYAGE 2[18]; ixekizumab, UNCOVER-1, UNCOVER-2, and UNCOVER-3[19]; bimekizumab, BE SURE, and BE VIVID[20,21]). Scalp psoriasis was also evaluated in the Phase 2 trial of risankizumab and Phase 3 trials of bimekizumab (BE READY)[22-24] and brodalumab (AMAGINE-1).[25] All of these studies reported encouraging results[16-25]; however, methodological differences—including inconsistencies in enrollment criteria, baseline scalp severity assessment, concomitant medications allowed during the study, assessment tools, and time points—confound direct comparisons.

No new safety signals were reported in published studies of biologics for the treatment of scalp psoriasis[16,17]; however, the majority of analyses did not examine safety specifically in patients with scalp involvement, precluding definitive conclusions. In dedicated studies, 3 patients receiving etanercept experienced SAEs by Week 24[16] and 2 patients discontinued secukinumab treatment due to AEs.[17] In contrast, only 1 SAE and no AEs leading to treatment discontinuation were reported in patients with scalp psoriasis treated with tildrakizumab.

The chief strength of our study is it was a primary study specifically designed to rigorously evaluate efficacy and safety of tildrakizumab in patients with

Table II. Other secondary and exploratory endpoints at Week 16

	Week 16	
	TIL 100 mg (*n* = 117)	**PBO (*n* = 114)**
≥4-point reduction in scalp itch—NRS score, %[*]	54.5	14.7
Response rate difference, TIL vs PBO, %	39.8	
95% CI	(28.0, 51.6)	
P value	$P < .00001$	
PSSI 100, %	37.6	2.6
Response rate difference, TIL vs PBO, %	35.0	
95% CI	(25.8, 44.2)	
P value	$P < .00001$	
SSA % change from baseline, mean ± SD[†]	−76.4 ± 35.2	−15.2 ± 31.5
LSM treatment difference	−61.2	
95% CI	(−70.0, −52.3)	
P value	$P < .00001$	
DLQI change from baseline, mean ± SD[‡]	−9.6 ± 7.1	−2.7 ± 7.4
	TIL 100 mg	**PBO**
PSSI % change from baseline by visit, mean ± SD[§]		
Week 4	−43.2 ± 35.2	−13.0 ± 28.4
P value	$P < .00001$	
Week 8	−67.9 ± 35.8	−23.0 ± 34.2
P value	$P < .00001$	
Week 12	−75.8 ± 32.5	−21.0 ± 34.8
P value	$P < .00001$	
Week 16	−79.8 ± 30.4	−21.8 ± 35.6
P value	$P < .00001$	

All data were analyzed in the ITT population. For the percentages of patients achieving PSSI 100 and ≥4-point reduction in scalp itch—NRS (in patients with a baseline score ≥4), missing data were handled using NRI. Change in PSSI and SSA scores by visit were analyzed using a mixed model for repeated measures, including values from all time points. Scalp itch—NRS and PSSI 100 responses were analyzed by using the Cochran-Mantel-Haenszel test.

CI, Confidence interval; *DLQI*, Dermatology Life Quality Index; *ITT*, intention-to-treat; *LSM*, least-squares mean; *NRI*, nonresponder imputation; *NRS*, numeric rating scale; *PBO*, placebo; *PSSI*, Psoriasis Scalp Severity Index; *PSSI 100*, 100% improvement from baseline in PSSI score; *SD*, standard deviation; *SSA*, scalp surface area; *TIL*, tildrakizumab.

[*]TIL 100 mg: *n* = 101; PBO: *n* = 102.

[†]At Week 16, TIL 100 mg: *n* = 110; PBO: *n* = 107.

[‡]For change from baseline at Week 16, TIL 100 mg: *n* = 105; PBO: *n* = 103.

[§]At Week 4, TIL 100 mg: *n* = 115; PBO: *n* = 111. At Week 8, TIL 100 mg: *n* = 110; PBO: *n* = 111. At Week 12, TIL 100 mg: *n* = 107; PBO: *n* = 109. At Week 16, TIL 100 mg: *n* = 110; PBO: *n* = 107.

scalp psoriasis. The IGA mod 2011 (scalp) provides clinically meaningful, mutually exclusive, and non-comparative descriptors. It was also updated to increase stringency; patients could not have any scaling to achieve IGA mod 2011 (scalp) response as analyzed. The use of $\alpha = 0.0025$ as opposed to the customary $\alpha = 0.05$ makes the results particularly robust, and the efficacy analysis adopted a step-down sequential testing approach to control Type 1 error for multiple comparisons. Finally, this study evaluated improvements in patients' quality of life and scalp itch, which were not specifically addressed in the majority of published studies of scalp psoriasis treated with biologics.

The current analysis has limitations. Although patients with exclusively scalp psoriasis and minimal BSA involvement are eligible for systemic therapy,[9,10] only patients with BSA involvement ≥10% were included in this study. The study population also lacked racial diversity as 78.9% were White. These aspects may limit generalizability of the results to other populations. Lastly, the current analysis ends

Table III. Summary of adverse events through week 16

n, %	Week 16	
	TIL 100 mg (*n* = 117)	PBO (*n* = 114)
Any TEAE	41 (35.0)	24 (21.1)
Treatment-related TEAEs	4 (3.4)	7 (6.1)
Deaths	0	0
SAEs	1 (0.9)	0
Treatment-related SAEs	0	0
TEAE leading to discontinuation	0	0
AEs of special interest	3 (2.6)	2 (1.8)
Injection site reaction	0	1 (0.9)
NMSC	2 (1.7)	0
Treatment-related hypersensitivity reactions	1 (0.9)	1 (0.9)
AEs of clinical interest	0	0
COVID-19—related TEAEs	2 (1.7)	0
Most frequent AEs*		
Preferred term*		
Headache	1 (0.9)	4 (3.5)
Hypertension	3 (2.6)	1 (0.9)
Nasopharyngitis	3 (2.6)	1 (0.9)
Viral URTI	3 (2.6)	1 (0.9)
Diarrhea	2 (1.7)	3 (2.6)
Blood triglycerides increased	0	2 (1.8)
Cough	0	2 (1.8)
Pruritus	1 (0.9)	2 (1.8)
Basal cell carcinoma	2 (1.7)	0
Bronchitis	2 (1.7)	0
Sinusitis	2 (1.7)	0
Seasonal allergy	2 (1.7)	1 (0.9)
Seborrheic dermatitis	2 (1.7)	0

AE, Adverse event; *COVID-19*, coronavirus disease 2019; *NMSC*, nonmelanoma skin cancer; *PBO*, placebo; *SAE*, serious adverse event; *TEAE*, treatment-emergent adverse event; *TIL*, tildrakizumab; *URTI*, upper respiratory tract infection.
*≥1% of patients in either treatment arm.

at Week 16. Analysis of efficacy and safety of tildrakizumab for the treatment of moderate-to-severe scalp psoriasis through Week 72 in Parts 2 and 3 of this study is ongoing.

CONCLUSIONS

Tildrakizumab 100 mg is efficacious and improves patient-reported scalp itch and quality of life compared with PBO, with no new safety signals, in patients with moderate-to-severe psoriasis affecting the scalp.

Conflicts of interest

KG has received grants and/or honoraria as a consultant, investigator, and/or speaker for Abbott, AbbVie, Amgen, Anacor, Boehringer Ingelheim, Celgene Corporation, Eli Lilly, Janssen, LEO Pharma, Merck, Novartis, Regeneron Pharmaceuticals, Sandoz, Sanofi-Aventis, Schering-Plough, Sun Pharma, UCB, and Wyeth Pharmaceuticals, and has been on an advisory board for AbbVie, Amgen, Boehringer Ingelheim, Eli Lilly, Janssen, and LEO Pharma. LS has been a consultant, paid investigator, advisory board member and/or speaker for AbbVie, Amgen, Anacor, Ascend, Astellas Pharma, AstraZeneca, Blaze Bioscience, Boehringer Ingelheim, Botanix, Bristol-Myers Squibb, Celgene Corporation, Connect Biopharmaceuticals Australia, Dermira, Eli Lilly, Enkang Pharmaceuticals, Equillium Inc., Evelo Biosciences, Genesis Care, Galderma, Genentech, GSK, Hexima, InCyte, InflaRx GmbH, Invion, Janssen, Kiniksa Pharmaceuticals, KoBioLabs, LEO Pharma, LG Chem, Lipidio Pharma, Mayne Pharma, MedImmune, Merck, Merck-Serono, Nektar Therapeutics, Novartis, Olix Pharmaceuticals, Otsuka, Pfizer, Phosphagenics Limited, Photon MD, Principia, Regeneron Pharmaceuticals, Ribon, Samumed, Sanofi, SHR, Sun Pharma, Takeda, UCB, and Zai Lab. JB has received research funds for the Psoriasis Treatment Center from AbbVie, Amgen, Arcutis Biotherapeutics, Boehringer Ingelheim, Bristol-Myers Squibb, Celgene Corporation, Corrona LLC, Dermavant Sciences, Dermira, Eli Lilly, Glenmark Pharmaceuticals Ltd, Janssen Biotech, Kadmon Corporation, LEO Pharma, LTD, Lycera Corp, Menlo Therapeutics, Novartis, Ortho Dermatologics, Pfizer, Regeneron Pharmaceuticals, Sun Pharma, Taro Pharmaceutical Industries Ltd, and UCB; is or has been a consultant for AbbVie, Amgen, Bristol-Myers Squibb, Celgene Corporation, Eli Lilly, Janssen Biotech, Novartis, Sun Pharma, and UCB; and is or has been a speaker for AbbVie, Celgene Corporation, Eli Lilly, Janssen Biotech, and Novartis. TN is an employee of Sun Pharmaceutical Industries Limited, Goregaon (E), Mumbai, India. MK is an employee of Sun Pharma Advanced Research Company Limited. MC and SLY are employees of Sun Pharmaceutical Industries, Inc. IK is a former employee of Sun Pharmaceutical Industries, Inc., and a current employee of Formation Bio. HLS has served as a clinical investigator for AbbVie, Amgen, Boehringer Ingelheim, Bristol-Myers Squibb, Dermavant Sciences, Eli Lilly, Janssen, LEO Pharma, Novartis, Sun Pharma, and UCB.

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