# A phase 2a randomized, placebo-controlled study to evaluate the efficacy and safety of the oral Janus kinase inhibitors ritlecitinib and brepocitinib in alopecia areata: 24-week results

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***Background:*** Alopecia areata (AA) is an autoimmune form of hair loss with limited treatments.

***Objective:*** To evaluate the efficacy and safety of the Janus kinase inhibitors ritlecitinib and brepocitinib in patients who have AA with ≥ 50% scalp hair loss.

***Methods:*** Patients were randomized to once-daily ritlecitinib, brepocitinib, or placebo. The primary efficacy endpoint was a 24-week change from baseline in the Severity of Alopecia Tool (SALT) score. The key secondary efficacy endpoint was the proportion of patients achieving 30% improvement in SALT score ($SALT_{30}$).

***Results:*** The ritlecitinib, brepocitinib, and placebo groups included 48, 47, and 47 patients, respectively. At week 24, least-squares mean difference from placebo in SALT score change from baseline was 31.1 (95% confidence interval [CI], 18.8-43.5) for ritlecitinib and 49.2 (95% CI, 36.6-61.7) for brepocitinib ($P < .0001$ for both comparisons with placebo). $SALT_{30}$ was achieved by 50% (90% CI, 38%-62%) of patients receiving ritlecitinib, 64% (90% CI, 51%-75%) receiving brepocitinib, and 2% (90% CI, 0%-9%) receiving placebo. Two patients experienced a serious adverse event (rhabdomyolysis) in the brepocitinib group only.

***Limitations:*** Only a single-dosage regimen of each study drug was included.

***Conclusion:*** Treatment with ritlecitinib or brepocitinib for 24 weeks was efficacious and generally well tolerated. (J Am Acad Dermatol 2021;85:379-87.)

***Key words:*** alopecia areata; brepocitinib; efficacy; Janus kinase inhibitor; phase 2; ritlecitinib; safety.

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Funding sources: The study was funded by Pfizer. Pfizer designed the study in consultation with all authors and Pfizer collected the data. All authors had full access to the data and participated in data analysis and interpretation and in writing the report. The corresponding author had final responsibility for the decision to submit for publication.

IRB approval status: The ethics committee or institutional review board at each participating center approved the study protocol and all patients provided written informed consent.

Presented at the 27th Congress of the European Academy of Dermatology and Venereology (EADV), September 12-16, 2018, Paris, France, and at the 2018 Alopecia Areata Research Summit, December 4-5, 2018, New York, NY.

Accepted for publication March 10, 2021.

Reprints not available from the authors.

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Published online March 20, 2021.

0190-9622



https://doi.org/10.1016/j.jaad.2021.03.050

## INTRODUCTION

Alopecia areata (AA) is an autoimmune disease characterized by hair loss, with an estimated global incidence of 0.6%-3.8% and a prevalence of 0.1%-0.2%.[1] It affects adults and children, males and females, with no significant differences across ethnicities.[2,3] Approximately 50% of patients present acutely with 1 or more circular patches of scalp hair loss and recover within 1 year without treatment; however, many patients subsequently relapse.[3,4] Approximately 50% of patients have chronic relapsing, remitting disease persisting more than 12 months and approximately 10%-35% ultimately experience complete loss of scalp hair (alopecia totalis [AT]) or complete loss of scalp and body hair (alopecia universalis [AU]).[3-7]

**CAPSULE SUMMARY**

- Results from published open-label clinical trials of Janus kinase inhibitors in patients with alopecia areata suggest that they can reverse hair loss.
- Treatment with ritlecitinib and brepocitinib for 24 weeks was well tolerated and resulted in clinically significant hair regrowth in patients who had alopecia areata with ≥ 50% scalp hair loss.

AA can have a significant negative impact on health-related quality of life and has been associated with depression and anxiety.[8,9] No AA therapy has been approved by the United States Food and Drug Administration, and efficacious treatment options for extensive or persistent disease are lacking.[10] Thus, there is a significant unmet need for effective therapy, as was highlighted at the Patient-Focused Drug Development meeting for AA held by the Food and Drug Administration.[11]

AA is believed to be T-cell mediated. In a murine model, upregulation of interleukin (IL)-15 in hair follicles initiates the recruitment and activation of natural killer, gene 2D-expressing $CD8^+$ T cells, which produce interferon (IFN) gamma (IFN-$\gamma$), and subsequent loss of hair follicle immune privilege.[2,12,13] Cell signaling via IFN-$\gamma$ and IL-15 occurs through the Janus kinase (JAK)-signal transducer and activator of transcription signaling pathway.[12] The JAK family of enzymes, JAK1, JAK2, JAK3, and tyrosine kinase 2 (TYK2) are cytoplasmic tyrosine kinases that interact with Type 1 and Type 2 cytokine receptors to mediate signal transduction, thereby affecting activation, proliferation, and function of leukocytes and other cell types.[14] Open-label clinical trial results of tofacitinib (JAK1/JAK3) and ruxolitinib (JAK1/JAK2) in patients with AA suggest that JAK inhibitors can reverse hair loss.[15-17]

Ritlecitinib (PF-06651600) is an orally administered inhibitor of JAK3 and the tyrosine kinase expressed in hepatocellular carcinoma (TEC) kinase family.[18] It blocks $\gamma$ common chain cytokine signaling and inhibits the function of $CD8^+$ T cells and natural killer cells.[18] In vitro, its 50% inhibitory concentration (IC50) for JAK3 is 33.1 nM, compared with > 10,000 nM for JAK1, JAK2, and TYK2.[19] In vivo, it inhibits several kinases within the TEC family, including Bruton tyrosine kinase, IL-2-inducible T-cell kinase, bone marrow tyrosine kinase on chromosome X, resting lymphocyte kinase, and TEC.[18] Brepocitinib (PF-06700841) is an orally administered TYK2/JAK1 inhibitor, with IC50 values for TYK2, JAK1, JAK2, and JAK3 of 23 nM, 17 nM, 77 nM, and 6494 nM, respectively.[20] It blocks signal transduction of the cytokines IFN-$\gamma$, IFN-$\alpha$, IL-12/23, IL-15, IL-4, and IL-13, among others.[20,21]

The objective of the randomized, placebo-controlled portion of this study was to evaluate the efficacy and safety of ritlecitinib and brepocitinib in patients who have AA with ≥ 50% scalp hair loss.

## METHODS

### Study design

ALLEGRO was a phase 2a, randomized, double-blind, multicenter study with an initial 24-week primary efficacy endpoint evaluation period, followed by 2 extension periods. The data presented are from the first 24 weeks. The study was conducted in 31 centers in Australia, Canada, and the United States according to the Declaration of Helsinki and the Good Clinical Practice guidelines of the International Conference on Harmonization, and local country regulations, where applicable. The ethics committee or institutional review board at each participating center approved the study protocol and all patients provided written informed consent.

### Patients

Adults at least 18 years of age qualified for inclusion if they had AA with ≥ 50% scalp hair loss, no hair regrowth within 6 months of the screening and baseline visits, and a current episode of fixed hair loss of 7 years or less in duration.

Patients were excluded if they had another type of alopecia or active inflammatory disease involving the scalp, or if they used an oral or topical JAK inhibitor

*Abbreviations used:*

| | |
|---|---|
| AA: | alopecia areata |
| AASIS: | Alopecia Areata Symptom Impact Scale |
| AE: | adverse event |
| AT: | alopecia totalis |
| AU: | alopecia universalis |
| CI: | confidence interval |
| IC50: | 50% inhibitory concentration |
| IL: | interleukin |
| IFN: | interferon |
| IGA: | Investigator Global Assessment |
| IP-10: | induced protein 10 |
| JAK: | Janus kinase |
| QD: | once daily |
| SALT: | Severity of Alopecia Tool |
| TEC: | tyrosine kinase expressed in hepatocellular carcinoma |
| TYK2: | tyrosine kinase 2 |
| ULN: | upper limit of normal |

within 12 weeks of the first dose of the study drug, a biologic within 12 weeks or 5 half-lives (whichever is longer), systemic or intralesional treatment that could affect AA within 8 weeks or 5 half-lives, phototherapy within 4 weeks, or a topical treatment that could affect AA within 2 weeks.

### Randomization and masking

Interactive response technology randomly allocated patients (2:1:2:1) to receive ritlecitinib (200 mg once daily [QD] for 4 weeks, then 50 mg QD for 20 weeks) or matching placebo, or brepocitinib (60 mg QD for 4 weeks, then 30 mg QD for 20 weeks) or matching placebo. Patients were stratified according to their agreement to participate in an optional biopsy substudy and then further stratified according to the presence or absence of AT/AU. The interactive response technology provided study coordinators with the randomization number and treatment assignment; investigators, patients, and the sponsor were blinded to treatment group.

### Procedures

Complete physical examinations, including a 12-lead electrocardiogram, were conducted during screening, on day 1, and at week 24. Targeted physical examinations were conducted at weeks 2, 4, 6, 8, 12, 16, and 20. Vital signs, hematology, blood chemistry, and urinalysis were evaluated at every visit. Adverse events (AEs) were monitored throughout the study.

### Outcomes

The primary efficacy endpoint was change from baseline in Severity of Alopecia Tool (SALT) score at week 24. SALT is an instrument for measuring the amount of scalp hair loss and scores range from 0 (no scalp hair loss) to 100 (complete scalp hair loss).[22] The key secondary efficacy endpoint was the proportion of patients achieving 30% improvement in SALT score ($SALT_{30}$) at week 24. Other secondary efficacy endpoints were proportion of patients achieving $SALT_{50/75/90/100}$, percentage change from baseline in SALT score, and change in the Investigator Global Assessment (IGA; Supplemental Table 1, available via Mendeley at https://data.mendeley.com/datasets/b6sct48jmb/1). IGA and SALT scores were assessed at baseline and weeks 2, 4, 6, 8, 12, 16, 20, and 24.

Prespecified exploratory endpoints included the proportion of eyelash and eyebrow responders; change in the pharmacodynamic and disease-related biomarkers IFN-$\gamma$-induced protein 10 (IP-10/CXCL10) and high-sensitivity C-reactive protein; and change in the Alopecia Areata Symptom Impact Scale (AASIS) total and subscores.[23]

### Statistical analysis

The sample size was based on the primary efficacy endpoint. Placebo groups were combined for data analysis and all comparisons were between each active treatment and pooled placebo. Using a between-group comparison at week 24 for ritlecitinib versus placebo and brepocitinib versus placebo, 30 completers in each arm (with a combined placebo arm) would provide approximately 90% power to detect a true mean change from baseline in SALT score of 15, at a 1-sided significance level of 2.5% (adjusted for 2 comparisons of active treatment vs placebo using Bonferroni correction). Assuming a 30% dropout rate, the planned sample size was 132.

The primary endpoint analysis was conducted in all patients assigned to randomized treatment, regardless of whether treatment was received (full analysis set). The 97.5% upper confidence bounds [ie, 95% 2-sided confidence interval (CI)] comparing mean change from baseline for ritlecitinib versus placebo and brepocitinib versus placebo were calculated using an unstructured variance-covariance model. Sensitivity analyses for the primary endpoint used imputation of missing values and a linear mixed-effect model for longitudinal data.

For continuous efficacy endpoints, data were analyzed using linear mixed-effect models with repeated measures. Binary endpoints were evaluated as 2-sample proportions using Chan and Zhang's exact unconditional method for CI with small sample size. Patients with missing values were considered nonresponders. Adjustments for multiple comparisons were made for the primary endpoint only, using the Benjamini-Hochberg

**Table I.** Baseline demographics and disease characteristics of the full analysis set

| Characteristics | Placebo (n = 47) | Ritlecitinib (n = 48) | Brepocitinib (n = 47) |
|---|---|---|---|
| Sex, n (%) | | | |
| Female | 29 (62) | 37 (77) | 32 (68) |
| Male | 18 (38) | 11 (23) | 15 (32) |
| Age, y, mean (SD) | 38 (14) | 37 (13) | 34 (11) |
| Race, n (%) | | | |
| White | 45 (96) | 38 (79) | 36 (77) |
| Black | 0 | 4 (8) | 3 (6) |
| Asian | 2 (4) | 3 (6) | 3 (6) |
| Other | 0 | 3 (6) | 5 (11) |
| Duration since onset of disease, y, median (range) | 4.8 (0.2-53.4) | 6.7 (0.6-52.3) | 8.4 (0.3-48.5) |
| Duration of current episode of fixed hair loss, y, median (range)[*,†] | 2.4 (0.2-29.5) | 2.6 (0.3-7.5) | 1.9 (0.2-7.0) |
| SALT score, mean (SD) | 88.4 (18.1) | 89.4 (15.8) | 86.4 (18.1) |
| AASIS total score, mean (SD) | 30.1 (21.9) | 36.6 (24.0) | 33.9 (24.3) |
| Alopecia totalis, n (%)[‡] | 5 (11) | 7 (15) | 8 (17) |
| Alopecia universalis, n (%)[§] | 15 (32) | 13 (27) | 14 (30) |
| Eyelash assessment, n (%) | | | |
| Normal | 12 (26) | 11 (23) | 11 (23) |
| Moderate | 5 (11) | 5 (10) | 6 (13) |
| Minimal | 9 (19) | 8 (17) | 8 (17) |
| None | 21 (45) | 24 (50) | 22 (47) |
| Eyebrow assessment, n (%) | | | |
| Normal | 7 (15) | 7 (15) | 8 (17) |
| Moderate | 11 (23) | 11 (23) | 4 (9) |
| Minimal | 6 (13) | 8 (17) | 13 (28) |
| None | 23 (49) | 22 (46) | 22 (47) |

There were no statistically significant differences among the groups at baseline. Percentages have been rounded to the nearest integer and for this reason may not total 100.

AASIS disease severity subscore ranges from 0 to 70 and the disease impact subscore ranges from 0 to 60; the AASIS total score ranges from 0 to 130. Higher score indicates greater severity/impact.

*AASIS*, Alopecia Areata Symptom Impact Scale; *n*, number of patients in the group; *SALT*, Severity of Alopecia Tool; *SD*, standard deviation; *y*, years.

*One patient in each treatment group had a current episode of fixed hair loss < 6 months.

†Three patients in the placebo group and 1 patient in the ritlecitinib group had a current episode of fixed hair loss > 7 years; these were protocol deviations.

‡Defined in this study as a SALT score of 100 (ie, no hair on the scalp).

§Defined in this study as a SALT score of 100 and no eyelashes ("none" on the eyelash assessment scale) and no eyebrows ("none" on the eyebrow assessment scale).

procedure. For secondary endpoints, point estimates were reported with unadjusted CI; *P* values were not reported. Baseline demographics and disease characteristics were compared across the groups in a post hoc analysis using analysis of variance and the chi-square test.

## RESULTS

### Patient population

Between December 15, 2016 and July 14, 2017, there were 261 patients screened and 142 randomized to receive placebo (n = 47), ritlecitinib (n = 48), or brepocitinib (n = 47; Supplemental Fig 1). From baseline to week 24, there were 13 (28%), 3 (6%), and 12 (26%) patients, respectively, who discontinued treatment. Mean patient age was 36 years, 69% were women, 84% were White, median duration of the current episode of fixed hair loss was 2.4 years, and 44% had AT/AU (Table I). There were no statistically significant differences among groups at baseline.

### Efficacy

For the placebo group at week 24, the least-squares mean value for SALT score change from baseline was 1.4. The least-squares mean difference from placebo in the SALT score change from baseline was 31.1 (95% CI, 18.8-43.5) for the ritlecitinib group and 49.2 (95% CI, 36.6-61.7) for the brepocitinib group ($P < .001$ for both). In a sensitivity analysis of the primary endpoint, which excluded the 4 patients with a current episode of fixed hair loss of more than 7 years, the overall results and interpretation did not change meaningfully; the least-squares mean

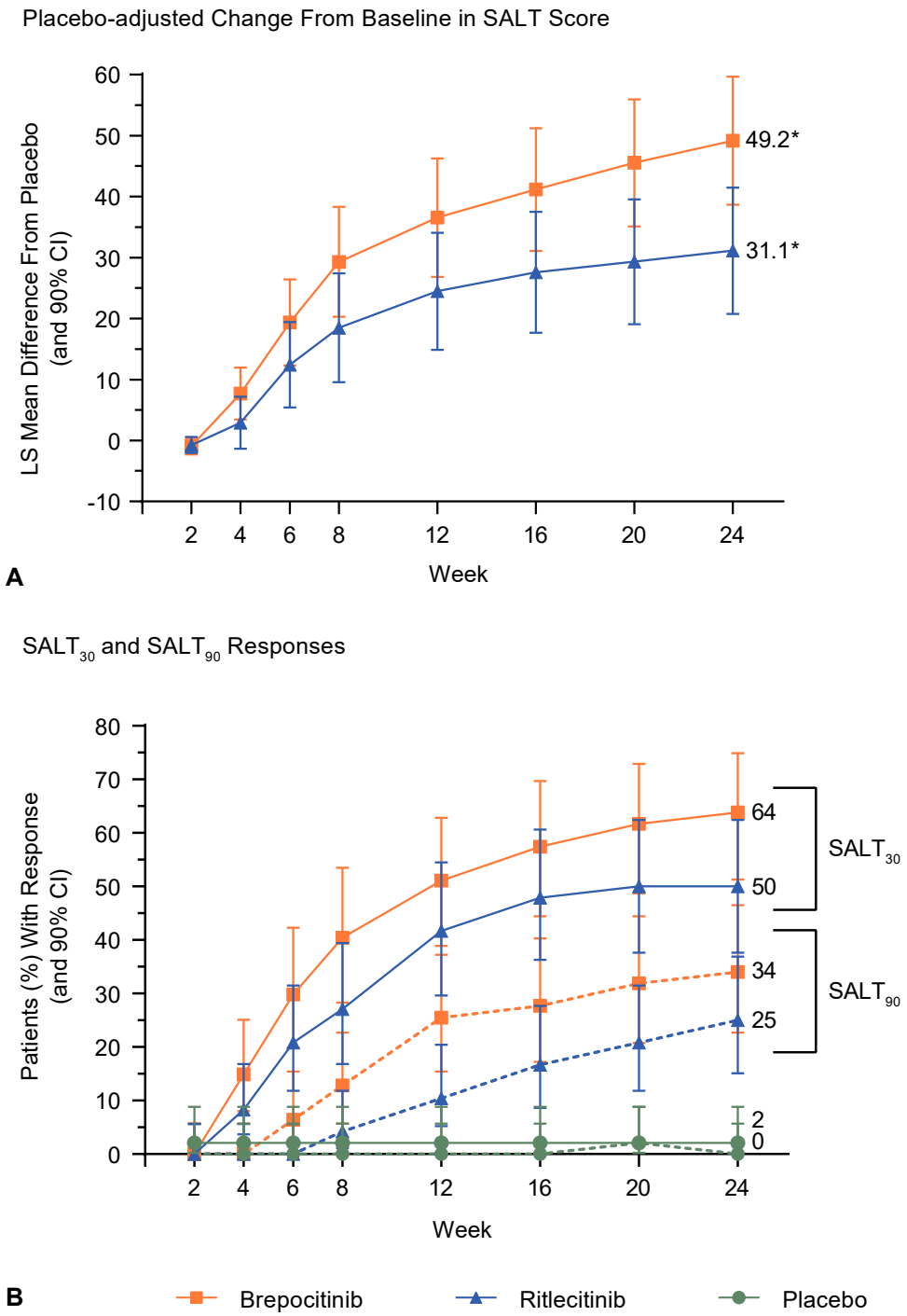


**Fig 1.** Response in patients with AA from baseline to week 24 according to SALT score for the full analysis set. **A**, LS mean difference from placebo in the SALT score change from baseline (MMRM [OC]). The absolute SALT score ranges from 0 to 100. A positive change from baseline in the SALT score indicates improvement. **B**, Proportion of patients in the full analysis set with $SALT_{30}$ response and $SALT_{90}$ response, baseline to week 24, Chan and Zhang's exact statistical method (NRI). $SALT_{30,90}$ response corresponds to 30% and 90% improvement in SALT score from baseline. *$P < .0001$ versus placebo. *AA*, Alopecia areata; *LS*, least-squares; *MMRM*, Mixed Model Repeated Measure; *NRI*, nonresponder imputation; *OC*, observed case; *SALT*, Severity of Alopecia Tool.

**Table II.** Summary of adverse events, serious adverse events, and discontinuations in the safety analysis set

| Adverse events | Placebo (n = 47) | Ritlecitinib (n = 48) | Brepocitinib (n = 47) |
|---|---|---|---|
| Total number of AEs | 105 | 82 | 124 |
| Patients with AEs, n (%) | 35 (74) | 32 (67) | 36 (77) |
| Patients with serious AEs, n (%) | 0 | 0 | 2 (4) |
| Deaths, n (%) | 0 | 0 | 0 |
| Patients discontinuing study drug due to AEs and continuing study, n (%) | 1 (2) | 2 (4) | 2 (4) |
| Patients discontinuing study due to AEs, n (%) | 2 (4) | 0 | 2 (4) |
| AEs occurring in > 5% of patients in a study group, n (%) | | | |
| Upper respiratory tract infection | 5 (11) | 4 (8) | 11 (23) |
| Nasopharyngitis | 6 (13) | 6 (13) | 4 (9) |
| Headache | 5 (11) | 6 (13) | 4 (9) |
| Acne | 2 (4) | 5 (10) | 5 (11) |
| Nausea | 5 (11) | 3 (6) | 3 (6) |
| Diarrhea | 3 (6) | 4 (8) | 1 (2) |
| Abdominal discomfort | 4 (9) | 0 | 1 (2) |
| Sinusitis | 2 (4) | 0 | 3 (6) |
| Viral upper respiratory tract infection | 0 | 2 (4) | 3 (6) |
| Folliculitis | 1 (2) | 3 (6) | 1 (2) |
| Atopic dermatitis | 0 | 3 (6) | 1 (2) |
| Neutrophil count decreased | 1 (2) | 0 | 3 (6) |
| Abdominal pain | 0 | 0 | 3 (6) |
| Fatigue | 3 (6) | 0 | 0 |
| Oropharyngeal pain | 0 | 0 | 3 (6) |

Data have been rounded to the nearest integer. Adverse events are all causality. The safety analysis set includes all patients who received at least 1 dose of study drug.
*AE*, adverse event; *n*, number of patients.

difference from placebo in the SALT score change from baseline was 31.7 (95% CI, 18.9-44.4) for the ritlecitinib group and 49.0 (95% CI, 36.1-61.9) for the brepocitinib group ($P < .001$ for both; Supplemental Table 2). Fig 1, *A* presents placebo-adjusted change from baseline in SALT score over time. Supplemental Fig 2 presents percentage change from baseline in SALT score over time.

At week 24, 50% (90% CI, 38%-62%) and 64% (90% CI, 51%-75%) of patients in the ritlecitinib and brepocitinib groups, respectively, achieved $SALT_{30}$ compared with 2% (90% CI, 0%-9%) in the placebo group (Fig 1, *B*). $SALT_{90}$ was achieved by 25% (90% CI, 15%-37%) and 34% (90% CI, 23%-47%) of patients in the ritlecitinib and brepocitinib groups, respectively, compared with 0% (90% CI, 0%-6%) in the placebo group (Fig 1, *B*). Supplemental Fig 3, *A-C* presents the proportions of patients achieving $SALT_{50/75/100}$. Supplemental Fig 4 presents photos over time of representative patients who responded to ritlecitinib and brepocitinib.

At baseline, all patients received an IGA score of 0 (no change or further loss). At week 24, the proportion of patients with an IGA score of 0 (no change or further hair loss) was 13 of 44 (30%), 4 of 40 (10%), and 27 of 35 (77%) in the ritlecitinib, brepocitinib, and placebo groups, respectively (Supplemental Fig 5 and Supplemental Table 3). The proportions of patients with eyelash involvement at baseline who achieved ≥ 1 grade improvement in the eyelash assessment at week 24 were 22 of 37 (60%), 29 of 36 (81%), and 5 of 35 (14%), respectively (Supplemental Fig 6, *A*). The proportions achieving ≥ 1 grade improvement in the eyebrow assessment were 21 of 41 (51%), 28 of 39 (72%), and 6 of 40 (15%), respectively (Supplemental Fig 6, *B*). At 24 weeks, the least-squares mean improvement in the AASIS total score was greater for the ritlecitinib (−10.8 [90% CI, −15.6, −5.9]) and the brepocitinib groups (−17.4 [90% CI, −22.4, −12.3]) than the placebo group (3.0 [90% CI, −2.1, 8.1]) (Supplemental Fig 7, *A*). Similar results were observed in the disease severity and disease impact subscores (Supplemental Fig 7, *B*, *C*).

There were no changes in high-sensitivity C-reactive protein, but median values for change from baseline in IP-10 decreased in both active groups (Supplemental Table 4). The median change from baseline for IP-10 was greater in the brepocitinib group than in the ritlecitinib group, respectively (−25.4 and −23.0 pg/mL at week 4; −25.5 and −10.0 pg/mL at week 24). IP-10 did not change in the placebo group; however, in comparing the range of IP-10 values at baseline (42.1-506.0), there were no

substantial differences between the active and placebo groups.

### Safety

AEs were reported in 35 of 47 (74%), 32 of 48 (67%), and 36 of 47 (77%) of patients in the placebo, ritlecitinib, and brepocitinib groups, respectively (Table II). The most common AEs were upper respiratory tract infection, nasopharyngitis, headache, acne, and nausea. There were no cases of opportunistic infections. Two patients receiving brepocitinib experienced the serious AE of rhabdomyolysis not accompanied by acute kidney injury; both were preceded by strenuous physical activity and resolved without sequelae. AEs that led to study drug discontinuation occurred in 3 (6%), 2 (4%), and 4 (9%) patients in the placebo, ritlecitinib, and brepocitinib groups, respectively (Supplemental Table 5).

In all 3 treatment groups, there were no clinically relevant changes from baseline in hematology tests, electrocardiogram findings, or vital signs. Three patients had laboratory abnormalities of grade 3 at a single time point according to the Common Terminology Criteria for AEs: 1 patient receiving ritlecitinib had a decreased lymphocyte count and 2 patients receiving brepocitinib had decreased neutrophil counts. Three patients (6%) receiving brepocitinib had laboratory test values, confirmed through retesting, that met discontinuation criteria: 2 patients with aspartate aminotransferase $> 2.5\times$ upper limit of normal (ULN), alanine aminotransferase $> 2.5\times$ ULN, and creatine kinase $> 10\times$ ULN; and 1 patient with creatine kinase $> 10\times$ ULN. None of the patients in the placebo and ritlecitinib groups had laboratory test values meeting these criteria.

Fasting total and low-density lipoprotein-cholesterol levels, and the low-density lipoprotein-/high-density lipoprotein-cholesterol ratio remained comparable to baseline values in all treatment groups. One patient receiving brepocitinib had an elevated fasting cholesterol level $> 1.3\times$ ULN. In the placebo and ritlecitinib groups, the high-density lipoprotein-cholesterol level remained comparable to baseline values, whereas a slight increase was observed in the brepocitinib group.

The serum creatinine level in the placebo and ritlecitinib groups remained comparable to baseline (mean percent change from baseline $\leq 5\%$ at each visit), whereas in the brepocitinib group it increased slightly (mean percent change from baseline 21% and 20% at weeks 2 and 24, respectively). Overall, 2, 0, and 13 patients in the placebo, ritlecitinib, and brepocitinib groups, respectively, experienced a decline $\geq 30\%$ from baseline in serum creatinine-based estimated glomerular filtration rate; these were not accompanied by a concomitant decline of $\geq 30\%$ in serum cystatin C-based estimated glomerular filtration rate.

## DISCUSSION

These are the first results from a randomized controlled study of ritlecitinib and brepocitinib in patients who had AA and $\geq 50\%$ scalp hair loss. At 24 weeks, there was a significant difference between both JAK inhibitors and placebo in the primary endpoint, and 25%, 34%, and 0% of patients in the ritlecitinib, brepocitinib, and placebo groups, respectively, achieved near-complete regrowth of hair, as measured by $SALT_{90}$.

In this study, both JAK inhibitors were generally well tolerated. Data from in vitro evaluation of brepocitinib indicated that the slight increase in serum creatinine was due to inhibition of renal transporters rather than nephrotoxicity, as supported by the lack of changes from baseline in serum cystatin C-based estimated glomerular filtration rate.[24] Further clinical assessment is required to understand the risk for OCT2 (organic cation transporter 2)-mediated drug-drug interactions.

Considering the known negative impact of AA on patients' lives in social, psychological, quality of life, and other aspects,[8,9] we included the AASIS, an internally consistent patient-reported outcome measurement tool, to assess AA-related symptoms and the impact on daily functioning.[25] The improvements in AASIS scores after 24 weeks in the active treatment groups, but not in the placebo group, suggest that successful treatment of AA positively impacts patients' daily lives.

This study is limited by the inclusion of a single-dosage regimen of each study drug. Additionally, 84% of the patients were White and 69% were women, and it is not known whether efficacy and safety would be the same with greater demographic representation. Longer-term studies are needed to evaluate efficacy and safety of continued JAK inhibition beyond 24 weeks. This trial has 2 extension periods that will evaluate (1) safety and efficacy of an additional 24 weeks of active treatment with ritlecitinib or brepocitinib, (2) withdrawal of therapy and re-treatment, and (3) crossover of therapy in nonresponders.

## CONCLUSIONS

Treatment with the JAK3/TEC inhibitor ritlecitinib and TYK2/JAK1 inhibitor brepocitinib for 24 weeks resulted in clinically significant hair regrowth in patients who have AA with $\geq 50\%$ scalp hair loss.

This confirms that JAK inhibitors induce hair regrowth in patients with AA. Additional studies are warranted.

## Data availability

Upon request, and subject to certain criteria, conditions, and exceptions (see https://www.pfizer.com/science/clinical-trials/trial-data-and-results for more information), Pfizer will provide access to individual de-identified participant data from Pfizer-sponsored global interventional clinical studies conducted for medicines, vaccines, and medical devices (1) for indications that have been approved in the US and/or EU or (2) in programs that have been terminated (i.e., development for all indications has been discontinued). Pfizer will also consider requests for the protocol, data dictionary, and statistical analysis plan. Data may be requested from Pfizer trials 24 months after study completion. The de-identified participant data will be made available to researchers whose proposals meet the research criteria and other conditions, and for which an exception does not apply, via a secure portal. To gain access, data requestors must enter into a data access agreement with Pfizer.

The authors thank the patients involved in this study. Editorial and medical writing support was provided by Jennica Lewis, PharmD, of Engage Scientific Solutions and was funded by Pfizer.

### Conflicts of interest

Dr King is a clinical trial investigator for Pfizer, Concert Pharmaceuticals, and Eli Lilly and Company and has received honoraria and/or consulting fees from Aclaris Therapeutics, Arena Pharmaceuticals, Bristol-Meyers Squibb, Celgene, Concert Pharmaceuticals, Dermavant Sciences, Eli Lilly and Company, Pfizer, Regeneron, and Sanofi Genzyme. Dr Guttman-Yassky has received institutional grants from AbbVie, Celgene, Eli Lilly, Janssen, Dermavant, DS Biopharma, Novartis, Pfizer, Regeneron, Glenmark, Galderma, Asana Biosciences, Innovaderm, Dermira, LEO Pharma, Novan, Kyowa Kirin, Concert, Union Therapeutics, and Ralexar and is a consultant for Sanofi, Regeneron, Celgene, Dermira, Galderma, Glenmark, Novartis, Pfizer, LEO Pharma, AbbVie, Eli Lilly, Kyowa Kirin, Mitsubishi Tanabe, Asana Biosciences, Union Therapeutics, Allergan, Amgen, Concert, DS Biopharma, EMD Serono, Escalier, and Flx Bio. Drs Peeva and Banerjee are employees and stockholders of Pfizer. Dr Sinclair has provided professional services for Novartis, Merck & Co, Janssen, Samson Clinical, Pfizer, Eli Lilly and Company, Arena, Demira, AstraZeneca, Sanofi, AbbVie, Galderma, Principia, Reistone Pharma, Aclaris, and Sun Pharma. Dr Zhu is an employee and stockholder of Pfizer. Dr Cox is a paid consultant to Pfizer. Dr Craiglow has participated on advisory boards, received honoraria and consulting fees from Aclaris, Arena Pharmaceuticals, and Pfizer, and participated on the speaker's bureau for Regeneron and Sanofi-Genzyme. Drs Chen and Zhang were employees of Pfizer at the time the study was conducted. Drs Banfield, Page, and Vincent are employees and stockholders of Pfizer. Dr Pavel has no conflicts of interest to declare.

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Title:
A phase 2a randomized, placebo-controlled study to evaluate the efficacy and safety of the oral Janus kinase inhibitors ritlecitinib and brepocitinib in alopecia areata: 24-week results

Date:
2021-08

Citation:
King, B., Guttman-Yassky, E., Peeva, E., Banerjee, A., Sinclair, R., Pavel, A. B., Zhu, L., Cox, L. A., Craiglow, B., Chen, L., Banfield, C., Page, K., Zhang, W. & Vincent, M. S. (2021). A phase 2a randomized, placebo-controlled study to evaluate the efficacy and safety of the oral Janus kinase inhibitors ritlecitinib and brepocitinib in alopecia areata: 24-week results. JOURNAL OF THE AMERICAN ACADEMY OF DERMATOLOGY, 85 (2), pp.379-387. https://doi.org/10.1016/j.jaad.2021.03.050.

Persistent Link:
http://hdl.handle.net/11343/278532