Evaluation of eyebrow and eyelash regrowth and patient satisfaction in the Phase 3 THRIVE-AA1 trial with CTP-543 (deuruxolitinib) in adult patients with alopecia areata

Arash Mostaghimi[1], Natasha A Mesinkovska[2], Maryanne Makredes Senna[3], Brett King[4], Colleen Hamilton[5], James Cassella[5]

[1]Department of Dermatology, Brigham and Women's Hospital, Boston, MA, USA; [2]Department of Dermatology, University of California, Irvine, CA, USA; [3]Lahey Hair Loss Center of Excellence/Research Unit, Beth Israel Deaconess Medical Center, Burlington, MA, USA; [4]Department of Dermatology, Yale School of Medicine, New Haven, CT, USA; [5]Sun Pharmaceutical Industries, Inc., Lexington, MA, USA

INTRODUCTION

- Alopecia areata (AA) is an autoimmune disorder that causes partial or complete loss of hair, leading to reduced quality of life and considerable psychosocial impacts for patients[1]
- Janus kinase (JAK) inhibitors have been shown to reverse hair loss in patients with AA[2]
- Deuruxolitinib is an inhibitor of JAK1 and JAK2 that resulted in significant improvements in hair regrowth compared with placebo in the Phase 2 dose-ranging trial (NCT03137381)[3]

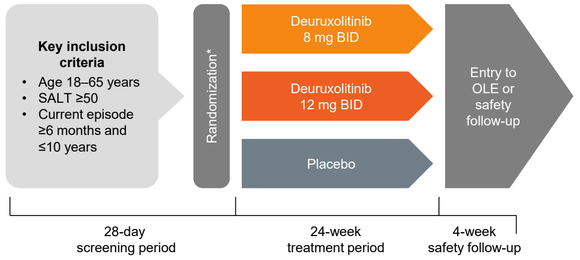
OBJECTIVE

- To present the clinician- and patient-reported assessments of eyebrow and eyelash hair improvements over time up to Week 24 from the Phase 3 THRIVE-AA1 trial (NCT04518995)

METHODS

- The overall study design is shown in **Figure 1**
- The quantitative Brigham Eyebrow Tool for Alopecia (BETA) and Brigham Eyelash Tool for Alopecia (BELA) assessments (**Figure 2**) were performed centrally by trained, board-certified dermatologists at baseline, Week 12, and Week 24
- The Quality of Hair Patient-Reported Outcome (QPRO) assessment was used to evaluate satisfaction with eyebrows and eyelashes

Figure 1. Study design



Primary endpoint
- SALT score ≤20 at Week 24

Key secondary endpoints
- BETA eyebrow score (change from baseline)
- BELA eyelash score (change from baseline)
- QPRO (change from baseline)

*Randomization 3:5:2 to deuruxolitinib 12 mg BID, deuruxolitinib 8 mg BID, or placebo. BELA, Brigham Eyelash Tool for Alopecia; BETA, Brigham Eyebrow Tool for Alopecia; BID, twice daily; OLE, open-label extension; QPRO, Quality of Hair Patient-Reported Outcome; SALT, Severity of Alopecia Tool.

Figure 2. BETA and BELA assessments

BETA total eyebrow score = left eyebrow + right eyebrow

Right/left eyebrow total score = D x SA

BETA total eyebrow hair score = $(D_R \times SA_R) + (D_L \times SA_L)$ = right eyebrow + left eyebrow

BELA total eyelash score = left eyelash + right eyelash

Right/left eyelash total score = (% distribution of top lid present) x (grade of patient's eyelashes)

BELA total eyelash score = right eyelash total + left eyelash total

BELA and BETA score range: 0 to 6

BELA, Brigham Eyelash Tool for Alopecia; BETA, Brigham Eyebrow Tool for Alopecia; D, density; D_L, density left; D_R, density right; SA, surface area; SA_L, surface area left; SA_R, surface area right.

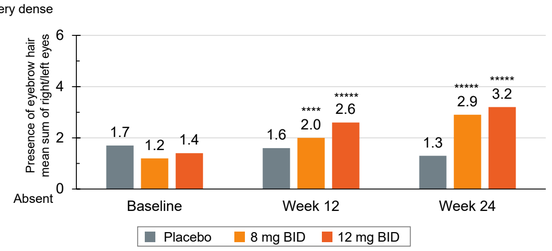
RESULTS

Table 1. Baseline demographics and disease characteristics

	Placebo (n = 140)	Deuruxolitinib 8 mg BID (n = 351)	Deuruxolitinib 12 mg BID (n = 215)	Total (N = 706)
Age, years, mean ± SD	38.7 ± 13.81	38.9 ± 13.32	38.2 ± 12.80	38.6 ± 13.25
Female, n (%)	89 (63.6)	217 (61.8)	131 (60.9)	437 (61.9)
White, n (%)	98 (70.0)	241 (68.7)	145 (67.4)	484 (68.6)
Total SALT score, mean ± SD	88.1 ± 15.10	85.5 ± 18.35	85.2 ± 18.41	85.9 ± 17.78
Duration of current episode, years, mean ± SD	3.9 ± 2.88	3.6 ± 2.63	3.6 ± 2.86	3.7 ± 2.75
Alopecia areata classification, n (%)				
Partial scalp hair loss (SALT ≥50 and <95)	62 (44.3)	155 (44.2)	95 (44.2)	312 (44.2)
Complete or near-complete scalp hair loss (SALT ≥95)	78 (55.7)	196 (55.8)	120 (55.8)	394 (55.8)
Current eyebrow involvement, n (%)	97 (69.3)	245 (69.8)	151 (70.2)	493 (69.8)
Current eyelash involvement, n (%)	92 (65.7)	246 (70.1)	158 (73.5)	496 (70.3)

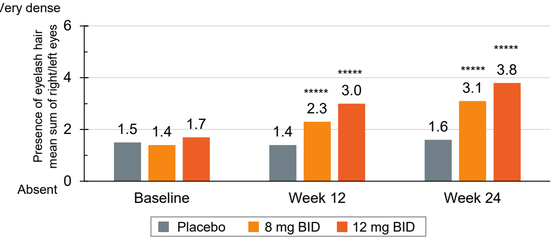
BID, twice daily; SALT, Severity of Alopecia Tool; SD, standard deviation.

Figure 3. BETA scores for patients with eyebrow involvement at baseline only



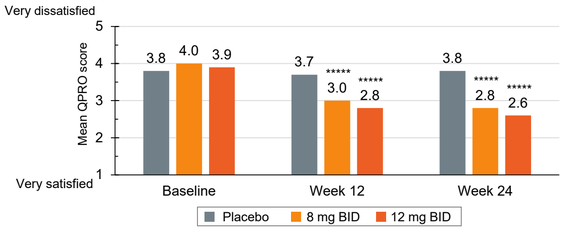
****P <0.001 vs placebo; *****P <0.0001 vs placebo based on treatment differences.
BETA, Brigham Eyebrow Tool for Alopecia; BID, twice daily.

Figure 4. BELA scores for patients with eyelash involvement at baseline only



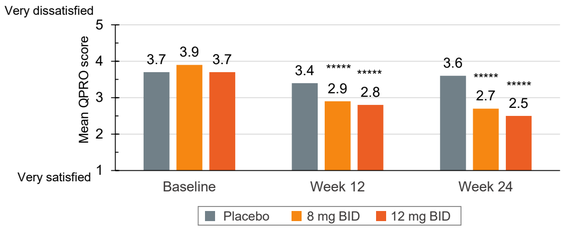
*****P <0.0001 vs placebo based on treatment differences.
BELA, Brigham Eyelash Tool for Alopecia; BID, twice daily.

Figure 5. QPRO: Satisfaction "with your eyebrows"*



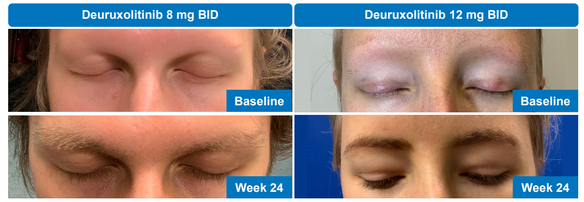
*Includes only patients with eyebrow involvement at baseline.
*****P <0.0001 vs placebo based on treatment differences.
BID, twice daily; QPRO, Quality of Hair Patient-Reported Outcome.

Figure 6. QPRO: Satisfaction "with your eyelashes"*



*Includes only patients with eyelash involvement at baseline.
*****P <0.0001 vs placebo based on treatment differences.
BID, twice daily; QPRO, Quality of Hair Patient-Reported Outcome.

Figure 7. Representative photos of eyebrow and eyelash regrowth



The patients provided consent to share their photographs for presentation at medical conferences.
BID, twice daily.

CONCLUSIONS

- Patient satisfaction and clinician-rated assessments of eyebrow and eyelash hair were significantly higher for both deuruxolitinib 8 mg twice daily (BID) and 12 mg BID compared with placebo, starting at 12 weeks and extending through 24 weeks of treatment
  - For the BELA and BETA assessments, significant differences from placebo were found with both doses of deuruxolitinib starting at 12 weeks and increasing through 24 weeks of treatment
  - Compared with placebo, patients on either dose of deuruxolitinib reported increased satisfaction with their eyelashes or eyebrows beginning at Week 12, as assessed using the QPRO scale
  - Further evaluation of the durability, association with overall response, and psychosocial impact of eyebrow and eyelash growth for patients is warranted

REFERENCES

1. Lintzeri DA, et al. *J Dtsch Dermatol Ges.* 2022;20(1):59-90. 2. Dillon KL, et al. *Clin Cosmet Investig Dermatol.* 2021;14:691-714. 3. King B, et al. *J Am Acad Dermatol.* 2022;87(2):306-13.

ACKNOWLEDGMENTS

We thank the patients for their participation in the study. The study was funded by Sun Pharma. Medical writing and editorial support were provided by Elisabetta Lauretti, PhD, of AlphaBioCom, a Red Nucleus company, and funded by Sun Pharma.

DISCLOSURES

AM has been a consultant for AbbVie, Boehringer Ingelheim, CoNCERT Pharmaceuticals (acquired by Sun Pharma in March 2023), Digital Diagnostics, Eli Lilly, Equillium, Hims, LEO Pharma, and Pfizer. **NAM** has served as an adviser for CoNCERT Pharmaceuticals (acquired by Sun Pharma in March 2023), Eli Lilly, and Pfizer; as a principal investigator for AbbVie, Arcutis Biotherapeutics, Bristol Myers Squibb, CoNCERT Pharmaceuticals (acquired by Sun Pharma in March 2023), Eli Lilly, and Pfizer; and as a speaker for Eli Lilly. **MS** has served as a speaker for Eli Lilly and Pfizer; has been a principal investigator and has received research funding from CoNCERT Pharmaceuticals (acquired by Sun Pharma in March 2023), Eli Lilly, Follica, LEO Pharma, and Santiste Medical; and has been a consultant and/or scientific/medical adviser for American Hair Research Society, Eli Lilly, Follica, Kintor, L'Oreal, National Alopecia Areata Foundation, Pfizer, and Scarring Alopecia Foundation. **BK** has been a consultant and/or scientific adviser and/or has served as a principal investigator for AbbVie, AltruBio Inc, Almirall, AnaptysBio, Arena Pharmaceuticals, Bioniz Therapeutics, Bristol Myers Squibb, CoNCERT Pharmaceuticals (acquired by Sun Pharma in March 2023), Eli Lilly, Equillium, Horizon Therapeutics plc, Incyte, Janssen, LEO Pharma, Otsuka/Visterra Inc, Pfizer, Regeneron, Sanofi Genzyme, Sun Pharma, TWi Biotechnology Inc, and Viela Bio; and has served as a speaker for AbbVie, Eli Lilly, Incyte, Pfizer, Regeneron, and Sanofi Genzyme; and as a scientific adviser for BiologicsMD. **CH** and **JC** are employees of Sun Pharmaceutical Industries, Inc.