# Use of diphenylcyclopropenone for alopecia areata treatment during pregnancy

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## INTRODUCTION

Diphenylcyclopropenone (DPCP) is a topical immunotherapy for alopecia areata (AA), particularly effective for individuals with more than 50% scalp involvement. Although it was initially developed in 1978, the precise mechanism of action remains unclear. The prevailing theory suggests that DPCP induces an allergic contact dermatitis, reducing T-cell mediated immune reactions against the hair bulb by promoting apoptosis in autoreactive T-lymphocytes.[1] This form of immunotherapy establishes antigenic competition, redirecting lymphocytes from their primary target, and facilitating hair regrowth. While previous studies have demonstrated its efficacy in promoting terminal hair regrowth, investigations into its safety remain limited. Although DPCP has not exhibited mutagenicity in the Ames assay, its precursor, $\alpha$- $\alpha'$dibromodibenzyl ketone, is considered mutagenic.[2] Currently, dermatologists strongly discourage DPCP use during pregnancy or for women planning to conceive. Herein, we present a unique case where DPCP immunotherapy was employed during pregnancy for the treatment of AA.

*Abbreviations used:*

AA: alopecia areata
DPCP: diphenylcyclopropenone

## REPORT OF A CASE

A 23-year-old female initially sought consultation at the New York University hair clinic due to extensive hair loss affecting her scalp, body, eyebrows, and eyelashes. Physical exam revealed widespread hair loss, with trichoscopic evidence of yellow dots, leading to a diagnosis of alopecia totalis. The initial treatment involved monthly application of DPCP 2%. With this regimen, the patient experienced significant improvement, with no alopecic patches noted and complete regrowth of eyelashes. However, upon expressing a desire to conceive in the near future, the patient was advised to discontinue DPCP during pregnancy and breastfeeding. The patient adhered to this advice during her first pregnancy, but experienced hair loss again after delivery, reaching SALT 100. Subsequently, the patient returned to the clinic during her second pregnancy, choosing to persist with DPCP 2% monthly treatment during her second and third pregnancies, against the clinician's recommendation. Treatment was initiated 4 months into the second pregnancy and continued throughout the entire duration of the third pregnancy, resulting in significantly less hair loss compared to the first pregnancy. Remarkably, there were no documented complications during her pregnancies and vaginal deliveries. Furthermore, no teratogenic effects were observed in any of her children. Both of her second and third children had APGAR scores of 9 at both 1 and 5 minutes. Additionally, the obstetrics and gynecology team noted no observed anomalies in

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the neonates. Of note, the patient did breastfeed exclusively, but we are uncertain if she continued treatment during that time.

## DISCUSSION

DPCP has proven to be a highly efficacious therapy for individuals with treatment-resistant AA or those experiencing 50% to 90% hair loss, supported by numerous studies. Prior research underscores an overall hair regrowth rate of 69%, with complete regrowth observed in 23% of cases.[3] Additional investigations reveal success rates ranging from 50% to 60%, with variability between 9% and 87%.[4]

Given the unpredictable nature of AA and the associated negative self-perception, heightened emotional burden, and increased psychosocial distress, patients express a keen interest in sustaining treatment regimens.[5,6] However, women facing AA encounter a unique challenge during pregnancy, planning for conception, or postpartum nursing. Prevailing guidelines strongly recommend discontinuing all medications during these periods, with a heightened emphasis on caution for women in these reproductive phases.[4] In this context, we present a case of a patient who continued DPCP treatment during 2 pregnancies and postpartum nursing, despite being advised to discontinue. This instance raises evidence for the safe use of DPCP during pregnancy without adverse effects or birth defects related to its use. Nevertheless, further studies are imperative to enhance our understanding of the safety profile of DPCP during pregnancy.

### Conflicts of interest

Dr Shapiro is a consultant for Lilly, Replicel Life Sciences, Thirty Madison and DS Laboratories. Drs. Shapiro and Lo Sicco have been investigators for Regen Lab and are investigators for Pfizer. Dr Lo Sicco is a consultant for Pfizer and Aquis. DD and AN have no conflicts to disclose.

### REFERENCES

1. Bulock KG, Cardia JP, Pavco PA, Levis WR. Diphencyprone treatment of alopecia areata: postulated mechanism of action and prospects for therapeutic synergy with RNA interference. *J Investig Dermatol Symp Proc*. 2015;17(2):16-18. https://doi.org/10.1038/jidsymp.2015.33
2. Singh G, Lavanya M. Topical immunotherapy in alopecia areata. *Int J Trichology*. 2010;2(1):36-39. https://doi.org/10.4103/0974-7753.66911
3. Zhu J, Qiao R, Li Y, et al. The efficacy, safety, and recurrence rate of diphenylcyclopropenone topical immunotherapy for alopecia areata: a systemic review and meta-analysis. *Dermatol Ther*. 2023;12:6073889.
4. Alkhalifah A, Alsantali A, Wang E, et al. Alopecia areata update: part II. Treatment. *J Am Acad Dermatol*. 2010;62(2):191-202, quiz 203-4. https://doi.org/10.1016/j.jaad.2009.10.031
5. Mesinkovska N, Craiglow B, Ball SG, et al. The invisible impact of a visible disease: psychosocial impact of alopecia areata. *Dermatol Ther (Heidelb)*. 2023;13(7):1503-1515. https://doi.org/10.1007/s13555-023-00941-z
6. Kutlubay Z, Sevim A, Aydın Ö, et al. Assessment of treatment efficacy of diphenylcyclopropenone (DPCP) for alopecia areata. *Turk J Med Sci*. 2020;50(8):1817-1824. https://doi.org/10.3906/sag-1807-230