

LETTERS TO THE EDITOR

Effects of exosome from adipose-derived stem cell on hair loss: A retrospective analysis of 39 patients

To the Editor,

Hair loss is a common disorder accompanied by severe psychosocial problems in many patients.^{1,2} Considering that exosomes have been revealed as important modulators of paracrine signaling, they

could be implemented as therapeutic option in regenerative medicine, especially in patients with hair loss.

Exosomes are extracellular vesicles of the smallest size (40–160 nm) that act as cell-to-cell transporters and messengers by

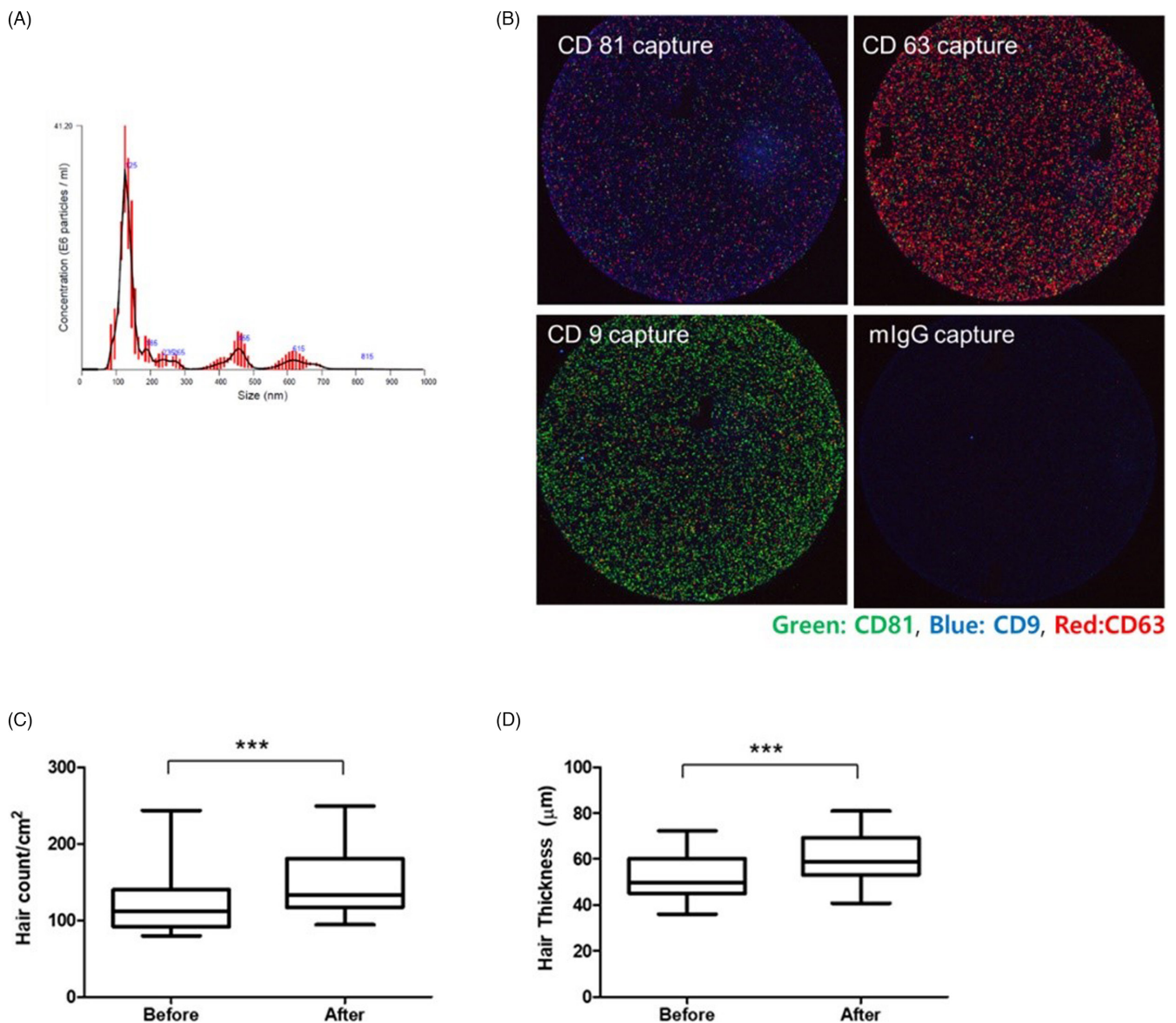
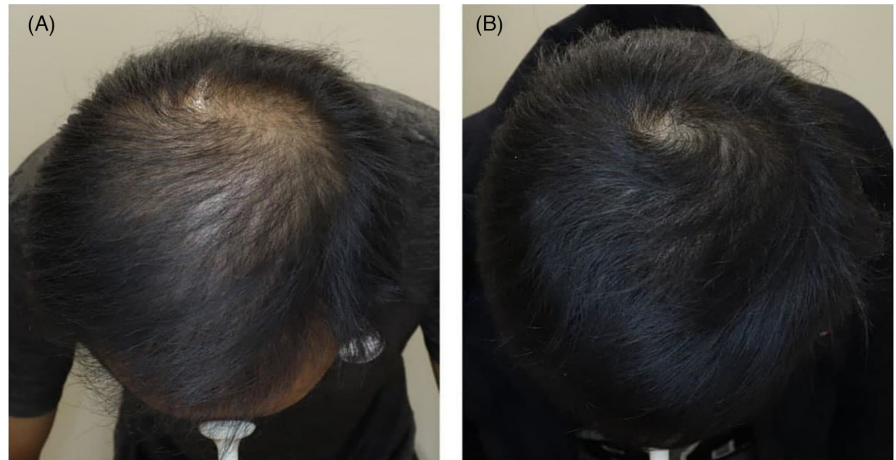


FIGURE 1 (A) Particle size distribution and (B) Detection of exosomal markers of ASC-exosome (C) Mean hair density and (D) mean hair thickness in 39 patients with androgenetic alopecia at baseline and at 12 weeks after the initiation of treatment with exosomes from adipose-derived stem cells. Data are shown in box-and-whisker plots. *** $p < 0.001$

FIGURE 2 38-year-old male patient. (A) Before the treatment. (B) 12 weeks after the initiation of treatment with exosomes from adipose-derived stem cells



carrying signaling molecules including transcription factors, cytokines, and ribonucleic acids.^{3,4} Several preclinical studies examining the use of exosomes for hair growth have shown favorable outcomes, and exosomes derived from dermal papilla cells could be of major importance for hair follicle regeneration.⁵ However, there are currently no clinical studies employing extracellular vesicle or exosome therapy for this purpose.

We analyzed the size and specific exosome markers from adipose-derived stem cells (ASC-exosome) by NanoSight NS300 and ExoView[®]. The mean diameter was 125.5 ± 2.2 nm (Figure 1A), and the ASC-exosomes were all positive for the three exosome markers, CD63, CD9, and CD81 (Figure 1B).

We performed an uncontrolled retrospective study to evaluate the efficacy of ASC-exosome for the treatment of hair loss. The medical records of patients with hair loss were reviewed to collect subjects treated with only ASC-exosome at the dermatologic clinic (Cellpark Clinic, Seoul, South Korea) from September 2018 to October 2019. Any patient who had used any products or drugs that might have influenced hair growth during the 6 months prior to the therapy was excluded. We enrolled the patient with Hamilton-Norwood type IIIa to V for male and Ludwig type I or II for female, respectively. This study had been conducted with the written informed consent, in accordance with the Declaration of Helsinki. A total of 39 patients (27 men and 12 women) with mean age of 42.5 years (range 20–66) were included. The treatment course consisted of repeated application of more than 6×10^{10} particles/vial of ASC-exosome (AAPE[®] version 2.0, Prostemics, Seoul, Korea) on the scalp area with micro-needle roller once per week for 12 consecutive weeks.

Routine phototrichographic images were taken at the first visit and at 12 weeks. Hair analyses were calculated with TrichoScan HD using the automated phototrichogram method.

The application of ASC-exosome for 12 weeks induced statistically significant improvements in hair density and hair thickness. Mean hair density increased from 121.7 ± 37.2 to 146.6 ± 39.5 hairs/cm² ($p < 0.001$) (Figure 1C), and mean hair thickness increased from 52.6 ± 10.4 to 61.4 ± 10.7 μ m ($p < 0.001$) (Figure 1D).

There was no correlation between patient age and an increase in hair thickness or density (age and hair thickness, $p = 0.706$; age and hair density, $p = 0.342$). Neither was the duration of hair loss correlated with the treatment response (disease duration and hair thickness, $p = 0.584$; disease duration and hair density, $p = 0.128$). None of the patients reported severe adverse reactions. No patients reported irritation or itching. The only inconvenience reported referred to the pricking of the needles during application.

Although the application of exosomes can be utilized in various dermatological fields, most studies have been focusing on cellular and animal levels so far. This is a pioneering study in which exosomes are applied to the treatment of hair loss. The results support that the ASC-exosome could be a potential therapeutic tool for hair loss (Figure 2). However, further research is needed to optimize the dosing, cell sources of exosomes, and frequency of administration for the safer and more effective exosome therapy for hair loss.

KEYWORDS

adipose tissue, exosome, hair loss, retrospective studies, stem cell

CONFLICTS OF INTEREST

Byung-Soon Park is founder and stockholder of PROSTEMICS Co., Ltd

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

PATIENT CONSENT


All patients signed the informed consent form after understanding the nature of the trial.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Byung-Soon Park MD, PhD¹ 

Hye-In Choi PhD² 

Gyoo Huh MD³ 

Won-Serk Kim MD, PhD³ 

¹Cellpark Clinic, Seoul, South Korea

²Prostemics Research Institute, Seoul, South Korea

Email: poppet82@naver.com

³Department of Dermatology, Kangbuk Samsung Hospital,
Sungkyunkwan University School of Medicine, Seoul, South
Korea

Email: huhgyoo90@naver.com

Email: susini@naver.com

Correspondence

Byung-Soon Park, Cellpark Clinic, 22, Apgujeong-ro 14-gil,
Gangnam-Gu, Seoul, South Korea.

Email: skinmd@naver.com

ORCID

Byung-Soon Park  <https://orcid.org/0000-0002-3972-612X>

Hye-In Choi  <https://orcid.org/0000-0003-4348-0780>

Gyoo Huh  <https://orcid.org/0000-0003-4080-8103>

Won-Serk Kim  <https://orcid.org/0000-0001-8795-0866>

REFERENCES

1. Blumeyer A, Tosti A, Messenger A, et al. Evidence-based (S3) guideline for the treatment of androgenetic alopecia in women and in men. *J Dtsch Dermatol Ges*. 2011;9(Suppl 6):S1-57.
2. Marks DH, Penzi LR, Ibler E, et al. The medical and psychosocial associations of alopecia: recognizing hair loss as more than a cosmetic concern. *Am J Clin Dermatol*. 2019;20(2):195-200.
3. Chevillet JR, Kang Q, Ruf IK, et al. Quantitative and stoichiometric analysis of the microRNA content of exosomes. *Proc Natl Acad Sci USA*. 2014;111(41):14888-14893.
4. Liu R, Liu J, Ji X, Liu Y. Synthetic nucleic acids delivered by exosomes: a potential therapeutic for generelated metabolic brain diseases. *Metab Brain Dis*. 2013;28(4):551-562.
5. Zhou L, Wang H, Jing J, Yu L, Wu X, Lu Z. Regulation of hair follicle development by exosomes derived from dermal papilla cells. *Biochem Biophys Res Commun*. 2018;500(2):325-332.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

How to cite this article: Park B-S, Choi H-I, Huh G, Kim W-S. Effects of exosome from adipose-derived stem cell on hair loss: A retrospective analysis of 39 patients. *J Cosmet Dermatol*. 2022;21:2282-2284. doi:[10.1111/jocd.14846](https://doi.org/10.1111/jocd.14846)

Copyright of Journal of Cosmetic Dermatology is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.