15th Annual Meeting of The Korean Hair Research Society

# 제15차 대한모발학회 학술대회

The Korean Hair Research Society

- 일시 : 2019년 5월 26일(일) 09:00~17:00
- 장소 : 연세대학교 백양누리 그랜드볼룸

## 대 한 모 발 학 회

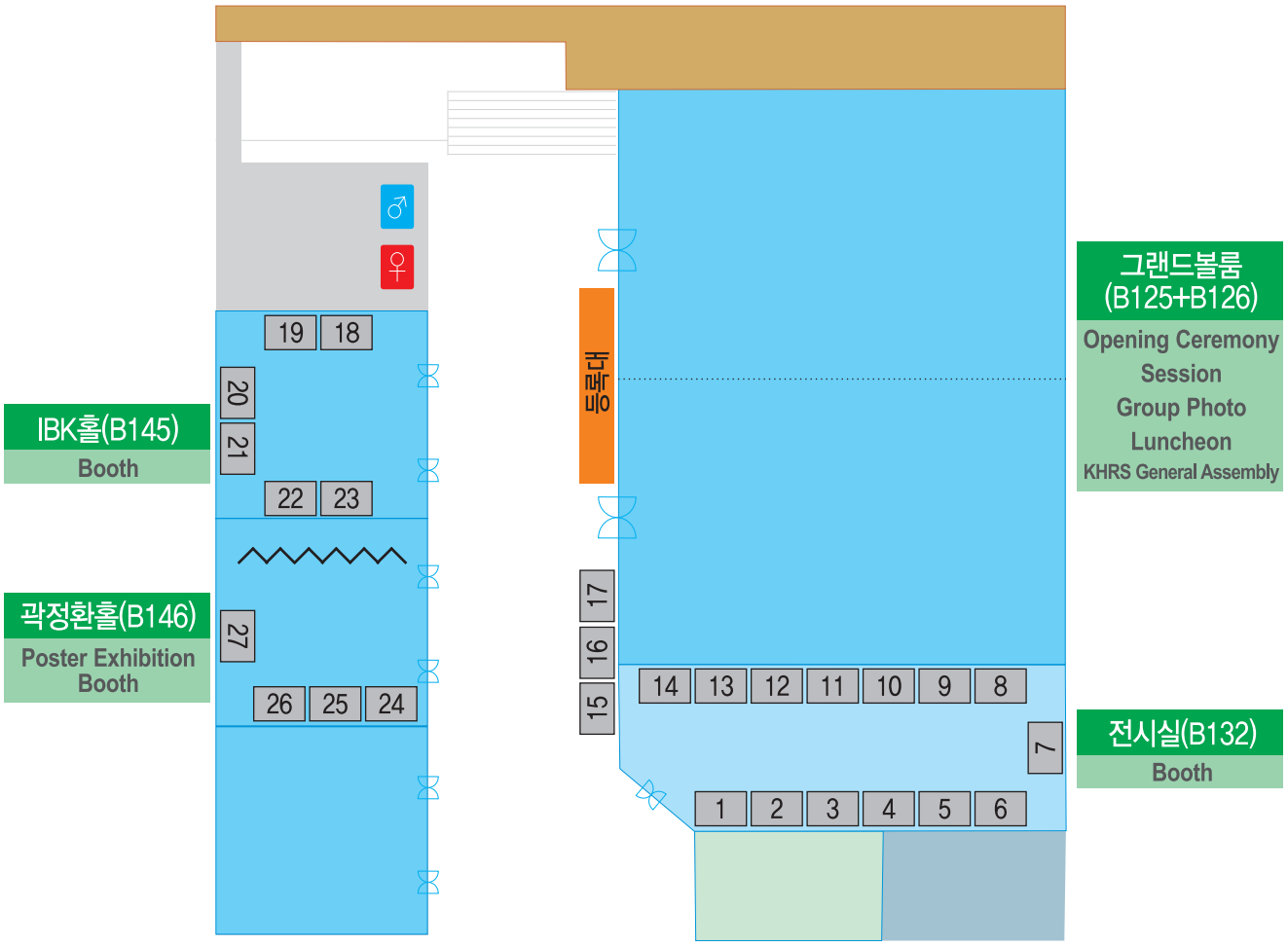
# 학회장 안내도

## [ 백양누리, 국제회의실 ]


· 학회장, 회원점심: 그랜드볼룸 (B125+B126)
· 부스전시: 전시실, IBK홀, 곽정환홀
· 포스터전시: 곽정환홀
· 이사회의 (점심): 최영홀(Lounge)
· 커피: 전시실, IBK홀

# 부스배치도

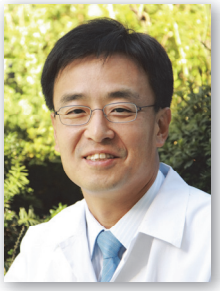
## [ 백양누리, 국제회의실 ]




### [ 전시회사 ]

1 GSK
2 GSK
3 종근당
4 동아ST
5 동구바이오제약
6 현대약품
7 한국노바티스
8 한미약품
9 한국릴리
10 한국얀센
11 갈더마코리아
12 갈더마코리아
13 존슨앤드존슨
14 존슨앤드존슨
15 후파마
16 한국MSD
17 한국MSD
18 동화약품
19 바름메디
20 대웅제약
21 코오롱제약
22 사노피젠자임
23 한림제약
24 보령제약
25 리드엠
26 정우의학
27 원형탈모환우회

# 초대의 글



회원 여러분 안녕하십니까?

최근 점점 더 심각해지는 환경문제로 우리의 건강을 지키는 것이 그리 녹록지만은 않지만, 그래도 어김없이 찾아오는 따뜻한 계절은 어느새 우리 몸과 마음을 한결 가볍게 해 주는 것 같습니다. 이 좋은 계절만큼 회원님들의 가정과 직장에 행복과 기쁨이 충만하기를 기원합니다.

대한모발학회에서는 다가오는 2019년 5월 26일(일)에 연세대학교 백양누리 그랜드볼룸에서 “제15차 대한모발학회 학술대회” 를 개최합니다. 여러 회원들의 적극적인 참여로 14차에 걸친 지난 대한모발학회 학술대회가 성황리에 마무리되었음에 감사의 말씀을 드립니다. 이번 학술대회는 연자 구성과 세션 특성을 감안하여 한국어 또는 한국어/영어 혼용 세션으로 구성하였습니다. 기초부터 임상까지 모발 진료와 연구에 실질적인 도움이 되는 내용으로 심도있게 다루려고 합니다.

모낭의 미토콘드리아를 대상으로 한 탈모치료 연구에 관해 Thomas Dawson 박사 (Skin Research Institute, Singapore), 일본의 남성형탈모증에 대한 finasteride 치료 효과에 대해 Akio Sato 박사 (Tokyo Memorial Clinic, Japan), 원형탈모증의 최신지견에 대해서 Kevin McElwee 교수(Univ. of Bradford, UK)의 해외 연자 강연이 준비되어 있습니다.

특히 올해부터는 KHRS와 같이 International Federation of Hair Research Society의 sister society인 일본의 SHSR(The Society for Hair Science Research)과 함께 한국-일본 연합 세션을 마련하기로 하였습니다. 이는 양국 모발연구자들의 교류 활성화는 물론, 나아가 아시아 지역의 모발연구 활성화에 이바지 할 것으로 기대가 됩니다. 한일 연합 세션에서는 SHSR 회장인 Manabu Ohyama 교수 (Kyorin University)와 Koji Sugawara 교수(Osaka City University), Masaki Uchiyama 교수(Tokyo Medical University) 3명이 연제를 발표하고 이에 맞서서 KHRS에서 3명이 발표하는 새로운 형식으로 진행되어 많은 흥미를 유발할 것으로 예상됩니다.

아무쪼록 이번 학술대회가 회원 여러분들께 모발관련 임상과 기초연구 및 정보교환에 유익한 토론의 장으로써 적극 활용되기를 기대합니다. 지금까지 대한모발학회에 보내주신 회원님들의 관심과 성원에 감사 드리며 이번 “제15차 대한모발학회 학술대회” 에도 열성적이고 적극적인 참여를 부탁드립니다. 감사합니다.

2019년 5월

대한모발학회 회장 **강 훈**

15th Annual Meeting of The Korean Hair Research Society

# 제15차 대한모발학회 학술대회

# 일 정 표

| Time | Baekyangnuri Grand Ballroom |
|---|---|
| 09:00 | Registration |
| 09:00 | **KHRS Research Grants Report** (Korean-speaking session) (09:00~09:15) |
| 09:30 | Opening Ceremony (09:15~09:30) |
| 10:00 | **Session 1. Back to the Basics**<br>(Korean & English-speaking session)<br>(09:30~10:30) |
| 10:30 | Opening Ceremony (10:30-10:45) |
| 11:00<br>11:30<br>12:00 | **Session 2.**<br>**Korea-Japan Joint Session for Future Frontiers in Hair Research**<br>(English-speaking session)<br>(10:45~12:15) |
| 12:00 | Group Photo (12:15~12:20 ) |
| 12:30<br>13:00 | **Lunch / KHRS Board Meeting**<br>(12:20~13:20) |
| 13:30<br>14:00 | **Session 3. Free Communications**<br>(Korean-speaking session)<br>(13:20~14:05) |
| 14:30<br>15:00 | **Session 4. Patterned Hair Loss**<br>(Korean & English-speaking session)<br>(14:05~15:05) |
| 15:00 | Coffee Break (15:05~15:20) |
| 15:30<br>16:00 | **Session 5. Alopecia Areata**<br>(Korean & English-speaking session)<br>(15:20~16:20) |
| 16:30 | **Session 6. Devices for Hair Loss Treatment**<br>(Korean-speaking session) (16:20~16:50) |
| 17:00 | Closing Ceremony (16:50-17:00) |
| 17:30 | KHRS General Assembly (17:00- ) |

15th Annual Meeting of The Korean Hair Research Society

# 제15차 대한모발학회 학술대회

# 프 로 그 램

08:00-09:00 Registration

| | |
|---|---|
| 09:00-09:15 | **KHRS Research Grants Report** (Korean-speaking session) |
| 09:00-09:15 | Epidemiological studies of alopecia areata using National Health Insurance Service-National Sample Cohort (NHIS-NSC)<br>**Jee Woong Choi** *(Ajou Univ.)* |

09:15-09:30 **Opening Ceremony**
Opening Remarks **Hoon Kang** (*President, Korean Hair Research Society*)

| | |
|---|---|
| 09:30-10:30 | **Session 1. Back to the Basics** (Korean- & English-speaking session)<br>**Chairs**: **Dong-Youn Lee** *(Sungkyunkwan Univ.)*, **Ohsang Kwon** *(Seoul National Univ.)* |
| 09:30-09:45 | Skin equivalent assay: an optimized method for testing for hair growth reconstitution capacity of epidermal and dermal cells<br>**Seung Hwan Paik** *(Clar & B Medical Skin Center)* |
| 09:45-10:00 | Induction of alopecia areata in C3H/HeJ mice using polyinosinic-polycytidylic acid (poly[I:C]) and interferon-gamma **Young Lee** *(Chungnam Univ.)* |
| 10:00-10:30 | Maintaining your mane: mitochondrial metabolism as a target for hair treatment<br>**Thomas L Dawson** *(Skin Research Institute, Singapore)* |

10:30-10:45 Coffee Break

| | |
|---|---|
| 10:45-12:15 | **Session 2. Korea-Japan Joint Session for Future Frontiers in Hair Research** (English-speaking session)<br>**Chairs: Hoon Kang** *(The Catholic Univ.)*, **Manabu Ohyama** *(Kyorin Univ., Japan)* |
| 10:45-11:10 | Senescence preventive effect of the newly synthesized cosmetic ingredient ceramide on human dermal papilla cells<br>**Hoon Kang** *(President of KHRS, The Catholic University of Korea)* |
| 11:10-11:35 | Revisiting the pathophysiology of hair loss disorders for better management - a physician-scientist's approach -<br>**Manabu Ohyama** *(President of SHSR, Kyorin University, Japan)* |

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|---|---|
| 11:35-11:45 | Quality of life in Korean alopecic patient: nationalwide studies supported by the Korean Hair Research Society **Gwang Seong Choi** *(Inha University)* |
| 11:45-11:55 | Neuroendocrine system in hair growth -Is cannabinoid receptor-related signaling a new regulator of hair biology? **Koji Sugawara** *(Osaka City Univ., Japan)* |
| 11:55-12:05 | Dermoscopy uses for hair & scalp diseases **Moon-Bum Kim** *(Pusan National Univ.)* |
| 12:05-12:15 | Folliculitis decalvans: Study of clinical and histopathological features **Masaki Uchiyama** *(Tokyo Medical Univ., Japan)* |
| 12:15-12:20 | Group Photo |
| 12:20-13:20 | Lunch / KHRS Board Meeting |
| 13:20-14:05 | **Session 3. Free Communications** (Korean-speaking session) **Chairs: Tae Young Yoon** *(Chungbuk Univ.),* **Ki-Ho Kim** *(Dong-A Univ.)* |
| 14:05-15:05 | **Session 4. Patterned Hair Loss** (Korean- & English-speaking session) **Chairs: Kyu Han Kim** *(Seoul National Univ.),* **Moon-Bum Kim** *(Pusan National Univ.)* |
| 14:05-14:35 | Ten-year efficacy of finasteride in 532 Japanese men with androgenetic alopecia **Akio Sato** *(Tokyo Memorial Clinic, Japan)* |
| 14:35-14:50 | The use of 5ARI in elderly and female patients with AGA **Bark Lynn Lew** *(Kyunghee Univ.)* |
| 14:50-15:05 | Transcriptomic analysis of balding and non-balding scalp in male pattern baldness and female pattern hair loss **Byung Cheol Park** *(Dankook Univ.)* |
| 15:05-15:20 | Coffee Break |
| 15:20-16:20 | **Session 5. Alopecia Areata** (Korean- & English-speaking session) **Chairs: Won-Soo Lee** *(Yonsei Wonju Univ.),* **Gwang Seong Choi** *(Inha Univ.)* |
| 15:20-15:50 | Review update on alopecia areata **Kevin McElwee** *(Univ. of Bradford, UK)* |
| 15:50-16:05 | Mechanism: Mesenchymal stem cell therapy to treat alopecia areata **Jung Eun Kim** *(The Catholic Univ.)* |
| 16:05-16:20 | Oral JAK inhibitors for moderate-to-severe alopecia areata from clinician's view point **Hyunsun Park** *(Seoul National Univ.)* |

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|---|---|
| 16:20-16:50 | **Session 6. Devices for Hair Loss Treatment** (Korean-speaking session)<br>**Chair: Kwang Young Kang** *(Moraenae Dermatologic Clinic)* |
| 16:20-16:35 | Role of hair prostheses (wigs) in patients with severe alopecia areata<br>**Jin Park** *(Chonbuk National Univ.)* |
| 16:35-16:50 | Therapeutic efficacy and safety of a 1927-nm fractionated thulium laser on pattern hair loss: an evaluator-blinded, split-scalp study<br>**Sung Bin Cho** *(Yonsei Seran Dermatology and Laser Clinic)* |

16:50-17:00 Closing Remarks

17:00- **KHRS General Assembly**

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# 제15차 대한모발학회 학술대회

# 목 차

## Session 3 Free Communications (Korean-speaking session)



## Session 4 Patterned Hair Loss (Korean- & English-speaking session)

**Session 5** **Alopecia Areata** (Korean- & English-speaking session)



**Session 6** **Devices for Hair Loss Treatment** (Korean-speaking session)

## Posters

# KHRS Research Grants Report

(Korean-speaking session)

The Korean Hair Research Society

# Epidemiological studies of alopecia areata using National Health Insurance Service-National Sample Cohort (NHIS-NSC)

**Jee Woong Choi, M.D., Ph.D.**

Department of Dermatology, Ajou University School of Medicine

The National Health Insurance Service–National Sample Cohort (NHIS-NSC) is a population-based cohort established by the National Health Insurance Service (NHIS) in South Korea. The cohort is a sample database with a substantial volume of representative information that does not require privacy regulation for research and policy development. The data are large-scale, extensive and stable because it is constructed based on nationwide health insurance data generated by the government or public institutions' involvement. In addition, the NHIS-NSC is a cohort based on nationwide health insurance data, it is both representative of the population and overcomes the limitations of cross-sectional data.

In this presentation, I will briefly introduce the composition of the NHIS-NSC database and show the final results of two epidemiological studies using the cohort. These two studies titled "Increasing prevalence of alopecia areata in South Korea" and "Impacts of Alopecia Areata on Psychiatric Disorders" were conducted by the Korean Hair Research Society (KHRS) research grant support.

I would like to take this opportunity to express my gratitude and thanks to the KHRS, and it is a great honor for me to receive the 1st KHRS research grant.

## [ CURRICULUM VITAE ]

**Jee Woong Choi, M.D., Ph.D.**

Clinical Assistant Professor, Department of Dermatology

Ajou University School of Medicine, Ajou University Medical Center

### Education and Training:

| | |
|---|---|
| 2007 | M.D., Seoul National University College of Medicine, Seoul, Korea |
| 2007-2008 | Internship, Samsung Medical Center, Seoul, Korea |
| 2008-2012 | Resident, Department of Dermatology, Seoul National University Hospital, Seoul, Korea |
| 2012 | M.S., Seoul National University Graduate School of Medicine, Seoul, Korea |
| 2018 | Ph.D., Seoul National University Graduate School of Medicine, Seoul, Korea |

### Current and Past Professional Positions:

| | |
|---|---|
| 2012-2015 | Public Health Doctor, Danyang Public Health Care Center, Danyang, Korea |
| 2015-2017 | Clinical Fellow, Seoul National University Bundang Hospital, Seongnam, Korea |
| 2017-present | Clinical Assistant Professor, Department of Dermatology Ajou University School of Medicine, Ajou University Medical Center |

### Awards:

| | |
|---|---|
| 2010 | Travel Grant, Korean Hair Research Society |
| 2017 | Travel Grant, Korean Hair Research Society |
| 2018 | Research Grant, Korean Hair Research Society |
| 2019 | Travel Grant, Korean Hair Research Society |

### Society Memberships:

The Korean Dermatological Association

The Korean Hair Research Society

The Korean Society for Aesthetic and Dermatologic Surgery

The Korean Society of Skin Cancer

### Featured Publications related with hair research:

1. Soh BW, Kim SM, Kim YC, Choi GS, Choi JW. Increasing prevalence of alopecia areata in South Korea. J Dermatol. 2019 Mar 25
2. Kim JC, Lee E, Choi JW. Impacts of Alopecia Areata on Psychiatric Disorders : A Retrospective

Cohort Study. J Am Acad Dermatol. in press
3. Yoon JS, Choi JW. Primary Cicatricial Alopecia in a Single-ethnic Asian Population : A 10-year Nationwide Population-based Study in South Korea. J Dermatol. 2018 Nov;45(11):1306-1311
4. Choi JW, Na SY, Park KC, Youn SW, Huh CH. Relation between treatment efficacy and cumulative dose of 3% topical minoxidil in male pattern baldness. J Am Acad Dermatol. 2012 Jan;66(1):e10-2.
5. Kim BJ, Kim MH, Oh JK, Rho YK, Kim DH, Choi JW, Youn SW, Park KC, Huh CH. Objective evaluation of photoepilation by phototrichogram. J Dermatol. 2010 Dec;37(12):1019-24.
6. Yeon JH, Jung JY, Choi JW, Kim BJ, Youn SW, Park KC, Huh CH. 5 mg/day finasteride treatment for normoandrogenic Asian women with female pattern hair loss. J Eur Acad Dermatol Venereol. 2011 Feb;25(2):211-4.
7. Kim H, Choi JW, Kim JY, Shin JW, Lee SJ, Huh CH. Low-level light therapy for androgenetic alopecia: a 24-week, randomized, double-blind, sham device-controlled multicenter trial. Dermatol Surg. 2013 Aug;39(8):1177-83.
8. Jung JY, Yeon JH, Choi JW, Kwon SH, Kim BJ, Youn SW, Park KC, Huh CH. Effect of dutasteride 0.5 mg/d in men with androgenetic alopecia recalcitrant to finasteride Int J Dermatol. 2014 Nov;53(11):13

# Session 1

## Back to the Basics

(Korean- & English-speaking session)

The Korean Hair Research Society

# Skin equivalent assay: an optimized method for testing for hair growth reconstitution capacity of epidermal and dermal cells

**Seung Hwan Paik, M.D., Ph.D.**

Clar & B Medical Skin Center

Hair follicle reconstitution requires highly organized epithelial-mesenchymal interactions. Skin equivalents containing the epidermal and dermal cells with hair reconstitution capacity can reproduce these processes, but have not been established. This study was conducted to develop a hair follicle-producing three-dimensional (3D) skin equivalent assay using neonate mouse epidermal and dermal cells. A skin equivalent comprised of mouse dermal cells (MDCs) embedded in type I collagen and overlaid with mouse epidermal cells (MECs) was used. MDCs were mixed with type I collagen and cultured for 7 days. One day after adding MECs on top, the composites were grafted onto nude mice. MDCs cultured on a two-dimensional (2D) plate for 7 days and mixed with MECs as a negative control, and freshly isolated MDCs and MECs mixture (chamber assay) as a positive control were also grafted. Six weeks after grafting, regenerated hair follicles were analyzed. Our 3D skin equivalent culture assay reproducibly regenerated hair follicles, while MDCs precultured in the 2D model with MECs did not. Compared to the chamber assay, which produced randomly oriented hair follicles, nearly all regenerated hair follicles in our assay extruded through the skin and numerous regenerated hair follicles were higher than those in the chamber assay. Several representative genes associated with hair induction showed higher expression in our assay than in the 2D model. When Wnt3a was added, the number of regenerated hairs increased. Organized hair follicle regeneration was accomplished using our assay. This approach can be applied to assess a test agent with hair growth-promoting effects.

## [ CURRICULUM VITAE ]

**Seung Hwan Paik, M.D., Ph.D.**

Clar & B Medical Skin Center

### Education and Training:

| | |
|---|---|
| 2002-2008 | M.D., Seoul National University College of Medicine, Seoul |
| 2011-2013 | M.S. in Clinical Medicine, Seoul National University College of Medicine, Seoul |
| 2016-present | Ph.D. in Medicine, Seoul National University College of Medicine, Seoul |
| 2008-2009 | Internship in Seoul National University Hospital |
| 2009-2013 | Residency in Department of Dermatology, Seoul National University Hospital |

### Current and Past Professional Positions:

| | |
|---|---|
| 2016-2017 | Fellowship in Department of Dermatology, Seoul National University Hospital |
| 2017-2018 | Fellowship in Department of Dermatology, Asan medical center |
| 2018-2019 | Clinical instructor in Department of Dermatology, Asan medical center |
| 2019-present | Clar & B Medical Skin Center |

### Awards:

| | |
|---|---|
| 2011 | Poster Presentation Award, The 21st Academic Meeting of Korean Society for Investigative Dermatology |
| 2011 | The Award for the Highest Grade in Examination for Resident, The Korean Dermatological Association |
| 2012 | The Award for publication of SCI papers during residency in SNUH, seoul, Korea. |

### Featured Publications:

1. Paik SH, Kim HJ, Lee S, Im SW, Ju YS, Yeon JH, Jo SJ, Eun HC, Seo JS, Kim JI, Kwon OS. Linkage and association scan for tanning ability in an isolated Mongolian population. BMB Rep. 2011 Nov;44(11):741-6.
2. Paik SH, Kim HJ, Son HY, Lee S, Im SW, Ju YS, Yeon JH, Jo SJ, Eun HC, Seo JS, Kwon OS, Kim JI. Gene Mapping Study for Constitutive Skin Color in an Isolated Mongolian Population. Exp Mol Med. 2011 Dec 26.
3. Paik SH, Cho HH, Jeon HC, Jo SJ, Kwon OS. Iatrogenic androgenetic alopecia in a male phenotype 46XX true hermaphrodite. Br J Dermatol. 2012 Jan;166(1):221-2.
4. Lee S & Paik SH, Kim HJ, Ryu HH, Cha S, Jo SJ, et al. Exomic sequencing of immune-related

genes reveals novel candidate variants associated with alopecia universalis. PloS one. 2013;8(1):e53613. Epub 2013/01/18.

5. Paik SH & Yoon JS, Ryu HH, Lee JY, Shin CY, Min KH, et al. Pretreatment of epidermal growth factor promotes primary hair recovery via the dystrophic anagen pathway after chemotherapy-induced alopecia. Experimental dermatology. 2013;22(7):496-9. Epub 2013/06/27.
6. Paik SH, Jang S, Joh HK, Lim CS, Cho B, Kwon O, et al. Association Between Premature Hair Greying and Metabolic Risk Factors: A Cross-sectional Study. Acta dermato-venereologica. 2018.
7. Paik SH, Kim YJ, Won CH, Chang SE, Lee MW, Choi JH, et al. Cutaneous posttransplantation lymphoma: clinical features and survival outcomes. J Am Acad Dermatol. 2018.
8. Paik SH, Choi SJ, Jang S, Jo SJ, Kim KH, Kwon O. Skin equivalent assay: an optimized method for testing for hair growth reconstitution capacity of epidermal and dermal cells. Exp Dermatol. 2019 Jan 31. doi: 10.1111/exd.13897. [Epub ahead of print]
9. Paik SH, Kim HT, Chang SE. Severe Bitemporal Alopecia As a Complication of the Thread Lift Procedure. Dermatol Surg. 2019 Jan 11. doi: 10.1097/DSS.0000000000001709. [Epub ahead of print]

# Induction of alopecia areata in C3/HeJ mice using polyinosinic-polycytidylic acid (poly[I:C]) and interferon-gamma

**Young Lee, M.D., Ph.D.**

Professor, Department of Dermatology, School of Medicine,
Chungnam National University, Daejeon, Korea

Alopecia areata (AA) is a cell-mediated autoimmune disease that targets anagen-stage hair follicles. Although AA is not a life-threatening disease, it may lead to psychological consequences, including high levels of anxiety and depression. AA animal models are urgently needed to elucidate the pathogenesis and screen for effective therapeutic targets. The most well-established animal models are inbred C3H/HeJ mice, which develop AA-like hair loss spontaneously or after experimental induction, as well as humanized mouse model with transplantations of human scalp skin followed by either autologous or allogenic peripheral blood mononuclear cells, to severe-combined immunodeficient (SCID) mice. However, existing animal models have limitations including low frequency of occurrence of AA and difficulty in controlling AA onset and obtaining human scalp tissues.

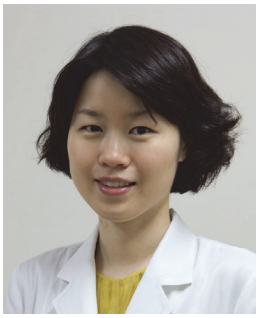
IFN$\gamma$ is used to upregulate expression of major histocompatibility complex in hair follicles to increase the occurrence rate of AA. Intravenous injection of IFN$\gamma$-induced AA in young C3H/HeJ mice has been previously reported; however, subcutaneous IFN$\gamma$ injection failed to induce hair loss, suggesting that the route of administration and other co-factors are critical for induction of AA. Recently, we published a paper demonstrating the important role of innate immunity and inflammasome in AA pathogenesis. Polyinosinic-polycytidylic acid (poly[I:C]), a synthetic dsRNA, treatment activated NLRP3 inflammasome, TLR3, and NF-$\kappa$B signaling result in TNF-$\alpha$ and IL-1$\beta$ secretion in outer root sheath cells. In this study, we present a novel non-invasive AA rodent model that avoids skin or lymph-node cell transfer. We simply co-injected IFN$\gamma$ along with poly(I:C) in C3H/HeJ mice subcutaneously to initiate innate immunity via inflammasome activation. Approximately 80% of the IFN$\gamma$ and poly(I:C) co-injected mice showed patchy AA lesions after

8 weeks. None of the mice displayed hair loss in the IFN$\gamma$ or poly(I:C) solely injection group. Immunohistochemical staining of the AA lesions revealed increased infiltration of CD4+ and CD8+ cells infiltration around the hair follicles. IFN$\gamma$ and poly(I:C) increased the expression of NLRP3, IL-1$\beta$, CXCL9, CXCL10, and CXCL11 in mouse skin. Taken together, these findings indicate a shorter and more convenient means of AA animal model induction and demonstrate that inflammasome-activated innate immunity is important in AA pathogenesis.

## [ CURRICULUM VITAE ]

**Young Lee, M.D., Ph.D.**

Professor, Department of Dermatology, School of Medicine, Chungnam National University, Daejeon, Korea



### Education and Training:

| | |
|---|---|
| 2003-2007 | Resident, Department of Dermatology, Chungnam National University, Korea |
| 2005 | M.S. in Dermatology, Chungnam National University, Daejeon, Korea |
| 2008 | Ph.D. in Dermatology, Chungnam National University, Daejeon, Korea |

### Current and Past Professional Positions:

| | |
|---|---|
| 2007-2009 | Fellow, Department of Dermatology, Chungnam National University, Korea |
| 2009-2011 | Instructor, Department of Dermatology, Chungnam National University, Korea |
| 2011-2014 | Assistant Professor, Department of Dermatology, Chungnam National University, Korea |
| 2014-2018 | Associate Professor, Department of Dermatology, Chungnam National University, Korea |
| 2018-present | Professor, Department of Dermatology, Chungnam National University, Korea |

### Awards:

| | |
|---|---|
| 2015 | Research award (Daejeon Medical R&D Forum) |
| 2017 | Uam award (The Korean Society for Investigative Dermatology) |
| 2017 | 27$^{th}$ KOFST award |

### Society Memberships:

Member of the Korean Hair Research Society
Member of Korean Society for Investigative Dermatology
Member of Korean Society of Dermatology

### Featured Publications:

1. Shin JM, Choi DK, Sohn KC, Koh JW, Lee YH, Seo YJ, Kim CD, Lee JH, Lee Y. Induction of alopecia areata in C3H/HeJ mice using polyinosinic-polycytidylic acid (poly[I:C]) and interferon-gamma. Sci Rep. 2018 21;8:12518

2. Shin JM, Choi DK, Sohn KC, Kim SY, Ha JM, Lee YH, Im M, Seo YJ, Kim CD, Lee JH, Lee Y. Double-stranded RNA induces inflammation via the NF-κB pathway and inflammasome activation in the outer root sheath cells of hair follicles. Sci Rep. 2017 7;7:44127
3. YH Chang, YA Shin, JH Kim, HM Kim, DW Lee, HK Chung, SJ Kim, CD Kim, JH Lee, YJ Seo, M Im, Y Lee. Use of whole-exome sequencing to determine the genetic basis of signs of skin youthfulness in Korean women. J Eur Acad Dermatol Venereol 2017;31:e138-e141
4. Lim SK, Lim CA, Kwon IS, Im M, Seo YJ, Kim CD, Lee JH, Lee Y. Low-dose systemic methotrexate therapy for recalcitrant alopecia areata. Ann Dermatol. 2017;29:263-267
5. JM Shin, IK Chang, YH Lee, MK Yeo, JM Kim, KC Sohn, M Im, YJ Seo, CD Kim, JH Lee, Y Lee. Potential role of S100A8 in cutaneous squamous cell carcinoma differentiation. Ann Dermatol 2016;28:179-185

# Maintaining your mane: mitochondrial metabolism as a target for hair treatment

**Thomas L Dawson, Ph.D.**

Skin Research Institute Singapore, and Department of Drug Discovery, School of Pharmacy, Medical University of South Carolina, Charleston, SC USA

For over 4 decades, research into biological manipulation of hair has ebbed and waned. Historically, this research was based on murine models and focused on manipulation of the hair cycle in an attempt to treat male pattern baldness by preventing hair miniaturization or converting follicles in telogen or exogen to anagen. Today there is a resurgence, based on newly identified opportunities targeted to the anagen follicle and directed at improving the patients' perception of their hair "amount". Hair amount is driven by multiple levels including hair number density, shaft diameter, pigmentation, and strength (by preventing loss by breakage). Thus, hair "amount" is regulated by multiple intervention opportunities – adding more hairs by pushing follicles from Telogen to Anagen or by slowing the transition from Anagen into Telogen; making "more" hair by modulating shaft diameter or shape; or, in principle, by altering the shaft physical properties by changing its synthesis. The vastly most common mechanism of investigation is to identify small molecule drugs to increase hair density. This has obviously proven difficult and, to date, has yielded minimal perceptible benefits. We hypothesize that perceptible benefits may be best achieved by combining multiple opportunity areas – minimizing hair loss and miniaturization, maximizing shaft production, and treating/strengthening existing hairs. As a foundation, we must have better characterization of hair fiber assembly during Anagen.

Producing full anagen hair follicles and terminal hair shaft is among the most energy intensive processes in human metabolism. This leads to the hypothesis that improving mitochondrial metabolism may beneficially impact hair shaft formation. Several recent investigations of balding versus non-balding male follicles implicate follicle mitochondria in MPB, specifically via alteration of the global mitochondrial regulator PGC1a, that alteration of follicle metabolism can influence hair shaft diameter, and that compartmentation of mitochondrial metabolism is key to appropriate hair shaft synthesis. In the follicle base multiple biologically driven zones can be defined with vastly different processes: proliferation, production, construction and elongation, and maturation. Recent investigations into the transition from each phase has identified a novel developmental threshold, where hair shaft production rapidly transitions from a primarily biological into a primarily biochemical process. We now name this "The Orwin Threshold".

## [ CURRICULUM VITAE ]

### Thomas L Dawson, Ph.D.

Senior Principal Investigator, Skin Research Institute, Singapore
Affiliated Professor, Medical University of South Carolina, USA
President, Skin Research Society, Singapore

### Education and Training:

| | |
|---|---|
| 2016 | Course in Medical Mycology, Westerdijk Institute, Utrecht, The Netherlands |
| 1994 | Ph.D. Pharmacology, University of North Carolina at Chapel Hill |
| 1986 | Bachelors Chemistry, West Virginia University |

### Current and Past Professional Positions:

| | |
|---|---|
| 2015-Present | Senior Principal Investigator, Hair and Cutaneous Microbiome A*STAR IMB |
| 2016-Present | Adjunct Professor, Drug Discovery, MUSC College of Pharmacy, USA |
| 2003-Present | Adjunct Assistant Professor, Biology, Miami Univ., Oxford, OH |
| 2013-2015 | P&G Technical Strategy Leader, life sciences, P&G Singapore |
| 1998-2013 | P&G Technical Strategy Leader, hair and scalp biology (Pantene, H&S) |
| 1994-1998 | Fellow, Pediatric Medical Genetics, Duke University Medical Center |
| 1986-1989 | Research Technician, Cell Biology and Anatomy, UNC-CH, NC, USA |

### Career Highlights:

- Awarded $8.7 million SGD ($6.4 MM USD) to lead exploring skin microbiome as a vector for improving human health.
- Awarded $230K NZD ($155 K USD) to develop novel imaging methods to change the paradigm on hair loss intervention efficacy assessment.
- Published first study on human skin mycobiome, publication >225 citations.
- Led Hair and Scalp Biology R&D technology development program for the Procter & Gamble Co. (P&G), the world's largest consumer care company at $120 billion USD.
- Defined cause of dandruff, identified cause (Malassezia); developed strategic opportunities; executed technologies; improved efficacy and sales (current technology for >$3 B/yr brand, H&S).
- Developed novel Hair Care strategy by identifying a new target: hair diameter, basic research idea to marketed product in 5 years.

- Envisioned, created, and leads the Malassezia Research consortium, a global network researching the most common fungus on human and animal skin.
- Member, development team for Myozyme, orphan drug licensed from Duke University to Genzyme, which later progressed to market.

## Appointments:

| | |
|---|---|
| 2018-Present | Scientific Advisory Board, Rodan-Fields |
| 2018-Present | European Research Council Proposal Reviewer |
| 2017-2019 | Founding President, Singapore Society for Skin Research |
| 2017-2020 | Vice Chair, IUMS Eukaryotic Microbiology and Mycology |
| 2017 | Scientific Advisory Board, Symrise |

## Society Memberships:

American Association for the Advancement of Science
International Society for Human and Animal Mycology
American Society of Microbiology
North American Hair Research Society
Singapore Women in Science Association

## Featured Publications:


2019 TL Dawson. Malassezia: The Forbidden Kingdom Opens. Cell Host Microbe https://doi.org/10.1016/j.chom.2019.02.0102019

2019 Lim YS, Harland DP, and T.L. Dawson. Wanted, dead and alive; why a multidisciplinary approach is needed to unlock hair treatment potential. Exp Dermatol. https://doi.org/10.1111/exd.13898. [Epub ahead of print] Review.

2018 Lim, Y., D. Harland, and TL. Dawson. Hair shaft formation and mitochondrial bioenergetics: Combining Biology, Chemistry, and Physics. Journal of Cosmetic Science, 69: 1-11.

2017 Lemasters, J. J., V.K. Ramshesh, G.L. Lovelace, J. Lim, G.D. Wright, D. Harland, and T.L. Dawson. Compartmentation of Mitochondrial and Oxidative Metabolism in Growing Hair Follicles: A Ring of Fire. Journal of Investigative Dermatology, 137, 1434e1444; doi:10.1016/j.jid.2017.02.983.

2016 Chew, E.G.Y., B.S.-Y. Ho, S. Ramasamy, T. L. Dawson, C. Tennakoon, X. Liu, et. al. Comparative Transcriptome profiling provides new insights into mechanisms of androgenetic alopecia progression. British Journal of Dermatology, 176, 1, p 265-269; doi.org/10.1111/bjd.14767.

# Session 2

## Korea-Japan Joint Session for Future Frontiers in Hair Research

(English-speaking session)

The Korean Hair Research Society

# Senescence preventive effect of the newly synthesized cosmetic ingredient ceramide on human dermal papilla cells

**Hoon Kang, M.D., Ph.D.**

Department of Dermatology, Eunpyeong St. Mary's Hospital
College of Medicine, The Catholic University of Korea, Seoul, Korea

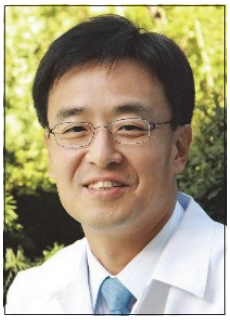
The number of patients suffering from hair and scalp-related diseases is gradually increasing due to various factors such as industrialization and urbanization as well as various environmental changes and changes in diet patterns. As more patients suffer from hair and scalp-related illnesses, the desire to treat them is increasing day by day. Unfortunately, medical treatment for hair loss is not perfect yet. Many people are trying to escape from mental stress caused by hair loss through supplementary hair-related products or oral supplements. Given this reality, it is necessary to understand the various components of hair-related products from the point of view of a doctor treating hair diseases and treating hair loss diseases.

As a bioactive lipid, ceramide has been implicated in a variety of physiological functions including apoptosis, cell growth arrest, differentiation, cell senescence, cell migration and adhesion. And ceramide is known to play an important role in the formation of intracellular lipids, and play a crucial role as a barrier for hair cuticle.

Recently, a study reported that the ceramide has a potential role on hair growth in mouse model. In this respect, if we investigate the effect of Ceramide on DPCs involved in hair growth, it may be helpful in treating hair loss disease.

To investigate the ceramide effects on hair growth related pathway, we evaluated how ceramide affects Wnt/β-catenin and BMP2/4 signaling target expression. We found that Wnt/β-catenin and BMP2/4 expression (such as Wnt3a, Wnt5a, Wnt10b, β-catenin, AP-1, Lef-1, and BMP2/4) were increased by ceramide treatment compared to control group. Also, we confirmed that ceramide might help hDPCs proliferation via increase ERK, Akt, Cyclin D1 and Bcl-2 expression. These results suggest that ceramide treatment may be closely related to the hair growth by regulating hair growth related factor expression. Our data suggest that synthetic ceramides stimulates hair growth by induction proliferation of hDPCs via modulation of Wnt/β-catenin and BMP2/4 signaling.

## [ CURRICULUM VITAE ]



**Hoon Kang, M.D., Ph.D.**

Professor, Department of Dermatology, Eunpyeong St. Mary's Hospital
College of Medicine, The Catholic University of Korea, Seoul, Korea

### Education:

| | |
|---|---|
| 1988 | M.D. degree from College of Medicine, The Catholic University of Korea, Seoul, Korea |
| 1993 | Master degree from College of Medicine, The Catholic University of Korea, Graduate School, Seoul, Korea |
| 1998 | Ph.D. degree from College of Medicine, The Catholic University of Korea, Graduate School, Seoul, Korea |

### Training and Professional Positions:

| | |
|---|---|
| 1990 | Internship, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea |
| 1995 | Dermatology residency, Department of Dermatology, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea |
| 1998-2019 | Instructor, Assistant Professor, Associate Professor and Professor, Department of Dermatology, St. Paul's Hospital, The Catholic University of Korea, Seoul, Korea |
| 2007-2008 | Hair Clinic Fellowship, Department of Dermatology & Skin Science, University of British Columbia, Vancouver, Canada |
| 2019-present | Professor, Department of Dermatology, Eunpyeong St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea |

### Society Membership:

The Korean Society for Dermatology
The Korean Hair Research Society
American Hair Research Society, International member
American Academy of Dermatology, International Fellow
The Korean Society for Dermatologic Surgery
American Society for Dermatologic Surgery

# Revisiting the pathophysiology of hair loss disorders for better management – a physician-scientist's approach -

**Manabu Ohyama, M.D., Ph.D.**

Department of Dermatology, Kyorin University Faculty of Medicine Mitaka, Tokyo, Japan

Deep dissection of the pathophysiology of intractable hair loss diseases facilitates better management of tackling conditions. Well-orchestrated combination of basic science approaches, including those of molecular and cell biology, immunology and digital image analysis, with clinical and regenerative medicine techniques should facilitate the improvement of therapeutic outcomes. In this talk, recent examples supporting this theory reported by this author and colleagues will be presented to demonstrate the advantage of being a physician-scientist in the management of hair diseases. The underlying mechanism accounting for the phenotypic variation among autosomal recessive wooly hair/hypotrichosis patients with identical LIPH mutation could be elucidated by the combination of trichoscopy and digital image analyses, which theoretically support the use of minoxidil for affected individuals with resultant satisfactory phenotypic improvement in some cases. The causative role of decreased estrogen has been clinically discussed and experimentally supported by the observations in ovariectomized mice, which, at least, partially mimics the phenotype of female pattern hair loss (FPHL). Via investigating the influence of estradiol on human dermal papilla cells, the existence of estradiol-ANGPT2 axis in the hair follicle has been delineated. The findings may not only endorse the importance of estradiol in the management of FPHL but may also lead to the development of novel remedies. Detailed immunological and clinicopathological dissection of rapidly-progressive alopecia areata uncovered the increase in regulatory T cell subset in those responded well to intravenous corticosteroid pulse therapy and detected persisting cell infiltration in severe cases refractory to the remedy, suggesting the need for further optimization of pulse treatment regimens. Such observations can hardly be obtained through clinical practice alone. Further enhancement of hair science research is necessary. Therefore, intellectual exchange among hair research societies, of note, between SHSR and KHRS is encouraged.

## [ CURRICULUM VITAE ]

### Manabu Ohyama, M.D., Ph.D.

President, The Society for Hair Science Research-Japan
Professor and Chair, Department of Dermatology, Kyorin University Faculty of Medicine Mitaka, Tokyo, Japan

### Education and Training :

| | |
|---|---|
| 1987-1993 | M.D., Keio University School of Medicine, Tokyo, Japan |
| 2002 | Ph.D., Keio University, Tokyo, Japan |

### Current and Past Professional Positions :

| | |
|---|---|
| 1993-1994 | Lecturer, Division of Histology and Embryology, Department of Anatomy, University, School of Medicine, Tokyo, Japan |
| 1994-1996 | Resident, Department of Dermatology, Keio University, School of Medicine, Tokyo, Japan |
| 1996-1998 | Dermatologist, Division of Dermatology, Kasumigaura National Hospital, Tuchiura, Ibaraki, Japan |
| 1998-2000 | Lecturer, Department of Dermatology, Keio University, School of Medicine, Tokyo, Japan |
| 2000-2002 | Sub-chief, Division of Dermatology Tokyo Electric Power Company Hospital, Tokyo, Japan |
| 2002-2005 | Postdoctoral visiting fellow Dermatology branch, National Cancer Institute National Institutes of Health, Bethesda, MD, USA |
| 2005-2006 | Lecturer, Department of Dermatology Keio University School of Medicine, Tokyo, Japan |
| 2006-2014 | Assistant Professor, Department of Dermatology Keio University School of Medicine, Tokyo, Japan |
| 2014-2015 | Associate Professor, Department of Dermatology Keio University School of Medicine, Tokyo, Japan |
| 2015-2016 | Professor, Department of Dermatology Kyorin University Faculty of Medicine, Tokyo, Japan |
| 2016-present | Professor and Chair, Department of Dermatology Kyorin University Faculty of Medicine, Tokyo, Japan<br>Director, Flow Cytometry Core Facility, Kyorin University Graduate School of Medicine |

**Awards :**

| | |
|---|---|
| 2005 | Poster Prize, North American Hair Research Society at the 66th Annual Meeting of the Society for Investigative Dermatology (St. Louis, MO, USA) |
| 2006 | William J. Cunliffe Scientific Award 2006 (from the European Academy of Dermatology and Venereology) |
| 2008 | JSID fellowship Shiseido award 2008 |
| 2010 | Rhoto Skin Medical Research Award |

**Society Memberships :**

The Society for Hair Science Research - Japan (President), The Japanese Dermatological Association (Delegate), The Japanese Society for Investigative Dermatology (Board member), The Japanese Scoiety for Regenerative Medicine (Delegate), The Japanese Society for Cutaneous Immnunology and Allergy (Delegate), The Japanese Society for Psoriasis Research (Delegate), The Society for Skin Structure Research (Board member), The Japan Society of Clinical Hair Restoration (member), The Japan Organization of Clinical Dermatologists (member), The Japanese Skin Cancer Society (member), The Society for Investigative Dermatology (member), The European Society for Dermatological Research (member), American Hair Research Society (member)

**Editorial Board Memberships (International journals) :**

Journal of Dermatology (Editor), Journal of Dermatological Science (Section Editor), British Journal of Dermatology (Specialist Associate Editor), Journal of Investigative Dermatology (Editorial consultant), Experimental Dermatology (Editorial board), Annals of Dermatology (Editorial board elect)

**Featured Publications: *corresponding author**

1. Ohyama M*, Amagai M, Tsunoda K, Ota T, Koyasu S, Hata J, Umezawa A, Nishikawa T. Immunologic and histopathologic characterization of an active disease mouse model for pemphigus vulgaris. J Invest Dermatol 118 (1): 199-204 (2002.1)
2. Ohyama M, Terunuma A, Tock CL, Radonovich MF, Pise-Masison CA Hopping SB, Brady JN, Udey MC Vogel JC. Characterization and isolation of stem cell enriched human hair follicle bulge cells. J Clin Invest 116 (1): 249-60 (2006.1)
3. Ohyama M*, Kobayashi T, Sasaki T, Shimizu A, Amagai M. Restoration of the intrinsic properties of human dermal papilla in vitro. J Cell Sci 125 (Pt 17): 4114-25 (2012.9)
4. Veraitch O, Kobayashi T, Imaizumi Y, Akamatsu W, Sasaki T, Yamanaka S, Amagai M, Okano H, Ohyama M*. Human induced pluripotent stem cell-derived ectodermal precursor cells contribute to hair follicle morphogenesis in vivo. J Invest Dermatol 133 (6):1479-88 (2013.1)
5. Endo Y, Obayashi Y, Ono T, Serizawa T, Murakoshi M, Ohyama M*. Reversal of the hair loss phenotype by modulating the estradiol-ANGPT2 axis in the mouse model of female pattern hair loss. J Dermatol Sci 91(1): 43-51 (2018.7)

# Qualiy of life in Korean alopecic patients: nationwide studies supported by the Korean Hair Research Society

**Gwang Seong Choi, M.D., Ph.D.**

Department of Dermatology, Inha University College of Medicine

Korean Hair Research Society (KHRS) has supported eight nationwide collaboration of studies since 2004. Among them, three are studies on quality of life (QOL) among alopecic patients, two studies are already published, and the last one is preparing for publication.

Followings are topic of collaborative nationwide works by KHRS members.

1. Quality of Life Assessment in Male Patients with Androgenetic Alopecia: Result of a Prospective, Multicenter Study (Ann Dermatol. 2012 Aug;24(3):311-8.)
2. Factors affecting the psychosocial distress of patients with Alopecia Areata: A nationwide study in Korea (J Invest Dermatol. 2019 Mar;139(3):712-715.)
3. Impact of Pediatric Alopecia Areata on Quality of Life of Patients and Their Family Members : A Nationwide Multicenter Questionnaire Study(in press)

Results of all the studies indicate that alopecic condition, both of androgenetic alopecia (AGA) and alopecia areata (AA), harmfully affect the patients QOL. In pediatric AA, linear correlations were demonstrated between the severity and impairment of patient's QOL and family life. Patient satisfaction on treatment options was greater in immunotherapy.

These collaboration studies suggested that dermatologists should consider QOL of patients when treating alopecic patient.

## [ CURRICULUM VITAE ]

### Gwang Seong Choi, M.D., Ph.D.

Professor and Director, Department of Dermatology, Inha University College of Medicine,
Chairman of Institutional Review Board (IRB), Inha University Hospital
Director of Medical Center Branch, Inha University Research and Business Foundation

### Education and Training:

| | |
|---|---|
| 1989 | M.D., from Yonsei University College of Medicine |
| 1994-1996 | Received the Master's degree at Graduate School of Ajou University |
| 1997-1999 | Received the Ph.D. at Graduate School of Yonsei University |
| 1989-1990 | Internship in Severance Hospital, Yonsei University College of Medicine |
| 1993-1997 | Resident in the Depart of Dermatology, Severance Hospital |

### Current and Past Professional Positions:

| | |
|---|---|
| 1997-1999 | Research instructor in the Depart of Dermatology, Inha University Hospital |
| 1999-present | Clinical instructor, Assistant professor, Associate professor and Professor in the Department of Dermatology, Inha University College Medicine |
| 2005-2006 | Visiting Investigator, Center for Cutaneous Research, Bart and London, London University |
| 2015-present | Chairman of Institutional Review Board (IRB), Inha University Hospital |
| 2016-present | Director of Medical Center Branch, Inha University Research and Business Foundation |

### Society Memberships:

Korean Society for Investigative Dermatology (Board member)
Korean Dermatological Association (Board member)
Korean Hair Research Society (Board member)
Korean Society for Dermatological Surgery (Board member)
Korean Academy of Vitiligo (Board member)

**Featured Publications (about 5):**

1. Hee Seong Yoon, Jung Min Bae, Seung Dohn Yeom, et al. Factors Affecting the Psychosocial Distress of Patients with Alopecia Areata: A Nationwide Study in Korea. Journal of Investigative Dermatology (2018 doi:10.1016/j.jid.2018.09.024
2. Tsen-Fang TSAI,1 Gwang Seong CHOI,2 Beom Joon KIM, et al Prospective randomized study of sexual function in men taking dutasteride for the treatment of androgenetic alopecia. Journal of Dermatology. 2018 Jul;45(7):799-804.
3. J.M. Bae, S.C. Lee, T.H. Kim, et al. Factors affecting quality of life in patients with vitiligo: a nationwide study. British Journal of Dermatology (2018) 178, pp238–244
4. Ji Won Byun, Hyo Jin Kim, Kwangmin Na, et al. Bone marrow-derived mesenchymal stem cells prevent alopecia areata development through the inhibition of NKG2D expression: A pilot study. Experimental Dermatology. 2017;26:532–535.
5. Ji Won Byun, Jong Hyuk Moon, Chan Yl Bang, Jeonghyun Shin, Gwang Seong Choi. Effectiveness of 308-nm Excimer Laser Therapy in Treating Alopecia Areata, Determined by Examining the Treated Sides of Selected Alopecic Patches. Dermatology. 2015;231(1):70-6.

# Neuroendocrine system in hair growth -Is cannabinoid receptor-related signaling a new regulator of hair biology?-

**Koji Sugawara, M.D., Ph.D.**

Osaka City University, Japan

Several neuroendocrine hormones are involved in hair growth. For example, prolactin modulates cytokeratin 15 (CK15) positive hair follicle (HF) bulge stem cells. Thyrotropin-releasing hormone (TRH) stimulates hair growth.

Among these neuroendocrine hormones, endocannabinoids are increasingly recognized as important regulator in human skin biology.

In human skin, epidermal keratinocytes are reported to express specific receptors for endocannabinoids, cannabinoid receptor (CB)s. We have previously shown that cannabinoid receptor type 1 (CB1)-stimulation inhibits epidermal keratinocyte proliferation and induces their apoptosis. In addition, CB1 stimulation also regulates keratinocyte differentiation, including their expression of cytokeratins (CKs) 6 and 16. Furthermore, CB1 stimulation decreases the expression of one of main components of the basal membrane, laminin-511. These results suggest that CB1 may regulate epidermal keratinocytes biology.

For the impact of CB1 on HF biology, we have previously shown that CB1 stimulation by an endogenous agonist inhibits the proliferation and promotes apoptosis of HF keratinocytes in the hair matrix and outer root sheath (ORS) by using human HF organ culture system.

However, in contrast to hair matrix or ORS cells, CB1 stimulation by CB1 specific agonist increases the number of CK15 positive bulge stem/progenitor cells.

Although it remains unknown how CB1 stimulation impacts on stem/progenitor cells in the bulge region and HF keratinocytes in the hair matrix and ORS, CB1 signaling may play important roles in HF biology.

## [ CURRICULUM VITAE ]

### Koji Sugawara, M.D., Ph.D.

Associate Professor, Osaka City University Graduate School of Medicine

### Education and Training:

| | |
|---|---|
| 2000 | M.D., Osaka City University Graduate School of Medicine |
| 2000-2002 | Resident, Department of Dermatology, Osaka City University Graduate School of Medicine |
| 2007 | Ph.D., Dermatology, Osaka City University Graduate School of Medicine |

### Current and Past Professional Positions:

| | |
|---|---|
| 2008-2011 | Postdoctoral Fellow, Department of Dermatology, University of Lübeck, Lübeck, Germany |
| 2012-2017 | Assistant Professor, Department of Dermatology, Osaka City University Graduate School of Medicine |
| 2017-present | Associate Professor, Department of Dermatology, Osaka City University Graduate School of Medicine |

### Awards:

| | |
|---|---|
| 2006 | Young Investigator Award (Japanese Society for Matrix Biology and Medicine) |
| 2008 | Osaka City Mayor's Award |
| 2010 | Travel Grant (6th World Congress for Hair Research) |
| 2013 | Travel Grant (40th Annual Meeting of the Arbeitsgemeinschaft Dermatologische Forschung) |
| 2013 | Osaka City University Dean's Award (Award for Excellence) |
| 2013 | Reseatch Grant for dermatological sciences (Japanese Dermatological Association, contributed by Shiseido) |
| 2014 | Osaka City University Dean's Award (Encouragement Award) |
| 2014 | Poster Award (44th Annual Meeting of ESDR) |

### Society Memberships:

Japanese Dermatological Association
The Japanese Society for Investigative Dermatology (Councilor)
Society for Hair Research

The International Cannabinoid Research Society

**Featured Publications (Up to 5):**

1. Re-investigating the Basement Membrane Zone of Psoriatic Epidermal Lesions: Is Laminin-511 a New Player in Psoriasis Pathogenesis? Natsumi A, Sugawara K, Yasumizu M, Mizukami Y, Sano S, Morita A, Paus R, Tsuruta D. J Histochem Cytochem. 2018 Dec;66(12):847-862. doi: 10.1369/0022155418782693.
2. Sorafenib stimulates human skin type mast cell degranulation and maturation. Mizukami Y, Sugawara K, Kira Y, Tsuruta D. J Dermatol Sci. 2017 Dec;88(3):308-319. doi: 10.1016/j.jdermsci.2017.08.005.
3. Cannabinoid receptor 1 controls human mucosal-type mast cell degranulation and maturation in situ. Sugawara K, Zákány N, Hundt T, Emelianov V, Tsuruta D, Schäfer C, Kloepper JE, Bíró T, Paus R. J Allergy Clin Immunol. 2013 Jul;132(1):182-93. doi: 10.1016/j.jaci.2013.01.002.
4. Endocannabinoids limit excessive mast cell maturation and activation in human skin. Sugawara K, Bíró T, Tsuruta D, Tóth BI, Kromminga A, Zákány N, Zimmer A, Funk W, Gibbs BF, Zimmer A, Paus R. J Allergy Clin Immunol. 2012 Mar;129(3):726-738.e8. doi: 10.1016/j.jaci.2011.11.009.
5. Spatial and temporal control of laminin-332 (5) and -511 (10) expression during induction of anagen hair growth. Sugawara K, Tsuruta D, Kobayashi H, Ikeda K, Hopkinson SB, Jones JC, Ishii M. J Histochem Cytochem. 2007 Jan;55(1):43-55.

# Dermoscopy uses for hair and scalp disorders

**Moon-Bum Kim, M.D., Ph.D.**

Department of Dermatology, Pusan National University

Although dermoscopy was mostly used for pigmentary skin lesions such as nevomelanocytic nevus, melanoma, basal cell carcinoma, and etc, its clinical application has been extending into general dermatologic fields including various inflammatory, infectious, autoimmune and hair disorders.

Trichoscopy is the term when dermscopy is tried for hair and scalp abnormalities. The main role of trichoscopy could be quick identification of hair shaft abnormalities, assessing features such as hair thickness, number of hairs in 1 pilosebaceous unit, or teriminal to vellus hair ratio, and visualization of hair follicle ostia. Four trichoscopic structures are hair shaft, hair follicle opening, perifollicular epidermis, and cutaneous vessel. Trichoscopy started from the early 1990s, but gained popularity in recent years. According to the contribution of leading groups ( Tosti A I Miami university, Rudnicka L in CSK MSWiA, and Inui S in Osaka university in trichoscopy) and other trichoscopists, specific or characteristic trichoscopic findings of various hair and scalp disorders have been identified. These trichoscopic findings were proved to be useful for the dermatologists dealing with hair and scalp abnormalities. Here, I will present the characteristic trichoscopic findings of various hair and scalp disorders.

## [ CURRICULUM VITAE ]

### Moon-Bum Kim, M.D., Ph.D.

Professor, Department of Dermatology, Pusan Natl. University

### Education and Training:

| | |
|---|---|
| 1988-1992 | M.D. degree from College of Medicine, PNU |
| 1992-1993 | Internship, Pusan National University Hospital(PNUH), Pusan, Korea |
| 1997-2001 | Residency of Dermatology, PNUH |
| 2001-2002 | Fellow, Department of Dermatology, PNUH |

### Current and Past Professional Positions:

| | |
|---|---|
| 2003-2005 | Clinical assistant professor, Department of Dermatology, PNUH |
| 2006-2007 | Assistant professor, Department of Dermatology, College of Medicine, PNU |
| 2008- | Associate professor, Department of Dermatology, College of Medicine, PNU |
| 2013- | Professor, Department of Dermatology, College of Medicine, PNU |

### Awards:

| | |
|---|---|
| 2001 | Travel Award, the 12th Japan-Korea Joint Meeting of Dermatology |
| 2011 | Award for Best Teacher, PNU |
| 2012 | 22nd World Congress of Dermatology Post Award (Bronze) |
| 2012 | Scholarship award, PNU |
| 2012 | Scholarship award, PNUH |
| 2013 | Youn Do-Jun Award, KDA |
| 2017 | Stiefel Scholarship Award, KDA |

### Society Memberships:

Korean Dermatological Association (1997-) Board of Director (2010-) Executive Director of Planning and Policy Division (2014-2015), Executive Director of Ethics and Legislation (2016-2017),

Korean Hair Research Society (2006-) Executive Director of Education (2010-2014), Executive Director of Publication and Information (2014-2016) Executive Director of Scientific Affairs (2016-2018) Secretary General (2018-)

Korean Society for Dermatopathology (2005-)

Koean Society for Atopic Dermatitis(2006-) Executive Director of Education(2010-2012)

Korea Society for Vitiligo (2005-)

**Featured Publications:**

모난 사람이 되자

피부과학 6판, 2014, 대한의학서적

# Folliculitis decalvans: Study of clinical and histopathologic features

**Masaki Uchiyama, M.D., Ph.D.**

Department of Dermatology, Tokyo Medical University, Japan

Folliculitis decalvans (FD) is a rare type of cicatricial alopecia. To describe the clinical features of FD including dermoscopic findings and the clinico-pathological correlation, dermoscopic images and histopathological specimens were obtained in the patients diagnosed as FD at our hospital. The symptom of itching was experienced by most of the patients, and the most frequent affected area was the vertex. Staphylococcus aureus was cultured from most of the patients. Tufted hairs, and white and milky-red areas were seen in most of the patients. Crusts and pustules were observed in the active inflammatory lesions. Histopathologically, lymphocytic-dominant infiltrations with or without infiltrates of plasma cells or neutrophils were seen in more than half of the patients, and neutrophilic infiltrations with or without lymphocytes, plasma cells or eosinophils were seen in less than half of the patients. Fused infundibulae with inflammation around upper follicles were seen in most of the patients. The method using dermoscopy and scalp biopsy are useful in the diagnosis and evaluate the activity of FD.

## [ CURRICULUM VITAE ]

**Masaki Uchiyama, M.D., Ph.D.**

Department of Dermatology, Tokyo Medical University

### Education / Training and Degrees:

| | |
|---|---|
| 2005 | Graduated from Yamagata University Faculty of Medicine |
| 2005-2007 | Primary Resident, Tokyo Medical University Hospital Senior Resident |
| 2007-2010 | Dermatology, Tokyo Medical University Hospital |
| 2010-2012 | Clinical researcher, Dermatology, Tokyo Medical University Hospital |
| 2012-2014 | Research Associate, Dermatology, Tokyo Medical University |
| 2014-2016 | Hospital Department manager, Niiza Shiki Central General Hospital |
| 2014 | Obtained a doctorate in medicine |
| 2016- | Research Associate, Dermatology, Tokyo Medical University Hospital |

### Society Membership:

1) Japanese Dermatological Association
2) Japanese Society for Hair Science Research
3) Japanese Dermatohistopathology Society
4) Japanese Society of Travel Medicine

### Featured Publications:

Uchiyama M, Egusa C, Hobo A, et al. Multivariate analysis of prognostic factors in patients with rapidly progressive alopecia areata. J Am Acad Dermatol. 2012; 67: 1163-73.

# Session 3

## Free Communications

(Korean-speaking session)

The Korean Hair Research Society

# O1
# Home-based contact immunotherapy improves treatment adherence in the patients with alopecia areata

**Beom Jun Kim, Solam Lee, Chung Hyeok Lee, Won-Soo Lee**

Department of Dermatology and Institute of Hair and Cosmetic Medicine, Yonsei University Wonju College of Medicine, Wonju, Korea

**Background:** Although contact immunotherapy (CI) is an efficacious treatment modality for alopecia areata (AA), it often imposes financial and temporal burdens for patients. We recently reported that home-based treatment, which can reduce treatment burden, is as effective and safe as clinic-based treatment.

**Objective:** To quantify the effect of home-based CI on treatment adherence comparing to clinic-based treatment.

**Methods:** A total of 840 AA patients treated with diphenylcyclopropenone were recruited, and a nested case-control study with 1:3 matching by age and sex was performed. Finally, 51 patients treated with home-based CI and 153 patients treated on clinic basis were analyzed. An optimal distance from patients' dwelling to clinic for applying home-based treatment was determined from integrative area under curve analysis.

**Results:** Home-based treatment reduced the risk of follow-up loss comparing to clinic-based treatment (HR=0.441, 95% CI 0.309-0.630). The optimal distance determined from analysis for considering home-based treatment promptly was 35km or over. In patients who treated with clinic-based treatment, the greater distance was associated with frequent follow-up loss (HR=1.504, 95% CI 1.048-2.158), whereas this association was not found in patients with home-based treatment (p=0.531).

**Conclusion:** Home-based CI improves treatment adherence comparing to clinic-based treatment. It might be beneficial to the patients who need long-term treatment, especially whose dwelling is far from clinic for better therapeutic outcome.

# O2
# Cause-specific mortality risks in patients with alopecia areata: a nationwide population-based study

**Solam Lee[1,2], Young Bin Lee[1], Beom Jun Kim[1], Won-Soo Lee[1]**

[1]Department of Dermatology and Institute of Hair and Cosmetic Medicine, Yonsei University Wonju College of Medicine,
[2]Department of Preventive Medicine, Yonsei University Wonju College of Medicine

**Background:** Alopecia areata is associated with various systemic conditions and mental illnesses. However, cause-specific mortality risk in patients comparing to the general population have been rarely investigated.
**Objective:** To estimate cause-specific mortality in patients with alopecia areata.
**Methods:** Using the National Health Insurance Service database and National Death Registry of Korea, this study identified participants in 2006 and investigated mortality until 2016. Patients with alopecia areata with at least 3 visits to a dermatologist with ICD-10 code of L63 from 2002 to 2006 were included. For controls, 1:10 age- and sex-matched participants without visits with a code of L63 until 2016 were selected.
**Results:** The study population consisted of 73107 patients with alopecia areata and 731070 controls. No differences in all-cause mortality risk between two groups were found (HR, 0.97; 95% CI, 0.87-1.09). However, the mortality from intentional self-harm/psychiatric disease was greater in patients (HR, 1.21; 95% CI, 1.04-1.41). Young adults aged 35 years or younger (HR, 1.85; 95% CI 1.25-2.75) were markedly affected. Mortality from lung cancer was greater in patients with alopecia totalis/universalis. Contrary, mortality from diabetes mellitus was significantly lower in patients with alopecia areata (HR, 0.53; 95% CI, 0.36-0.79).
**Conclusion:** Patients with alopecia areata have a greater mortality risk from self-harm, psychiatric disease, and smoking-associated malignant diseases. For better outcomes, clinicians should manage patients to ensure psychological well-being.

# O3
# Clinical relevance for serum cold-inducible RNA-binding protein level in alopecia areata

**Jung-Min Shin[1], Jung-Woo Ko[1], In Sun Kwon[2], Jin-Hyup Lee[1], Dong-kyun Hong[1], Chong-Won Choi[1], Kyung-Duck Park[1], Chang-Deok Kim[1], Young-Joon Seo[1], Jeung-Hoon Lee[1], Young Lee[1]**

[1]Department of Dermatology, School of Medicine, Chungnam National University, Daejeon, Korea, [2]Clinical Trials Center, Chungnam National University Hospital, Daejeon, Korea

**Background:** Alopecia areata (AA), a chronic, relapsing hair-loss disorder, is considered to be a T-cell-mediated autoimmune disease. Cold-inducible RNA-binding protein (CIRP) belongs to the family of cold shock protein that responds to cold stress, which has been identified as a damage-associated molecular pattern (DAMP) molecule that triggers inflammatory responses. Recent studies have shown high-mobility group box 1 which is also one of the DAMP molecules is elevated in serum and scalp tissue of AA patients suggesting the relationship between DAMP and pathogenesis of AA.

**Objective:** We investigated the clinical significance of serum CIRP levels and AA.

**Methods:** We compared serum levels of CIRP in 68 patients with AA and 20 healthy control subjects. Moreover, we evaluated the correlation between CIRP level and several clinical markers.

**Results:** The CIRP levels were significantly higher in AA patients compared to healthy subjects. And, there was association between serum CIRP levels and the clinical characteristics, including duration of disease and disease activity. However, there was no statistical significance in serum level of CIRP between clinical types of AA (AA multiplex, alopecia totalis, and alopecia universalis).

**Conclusion:** These results suggest that CIRP may play a significant role in the pathogenesis of AA and can be a potential marker for monitoring disease activity of AA.

# O4
# Expression of IL-17 from CD49a-Trm cells in chronic alopecia areata acording to the mTregs depletion

**Ho-Jin Kim, Jung-Hwan Kim, Yeo-Rye Cho, Gun-Wook Kim, Ki-Ho Kim**

Department of Dermatology, College of Medicine, Dong-A University, Busan, Korea

**Background:** Alopecia areata (AA) is an autoimmune disease resulting from the attack of hair follicle (HF) autoantigens through T-cell-mediated mechanism. Beyond the hypothesis of immune privilege collapse, we suppose any change of memory regulatory T cells (mTregs) affect the balance between effector T cell subsets in AA pathogenesis. CD49a expression defines different functional subsets in Trm cells. The role of mTregs and Trm cells has not been studied yet in AA lesions.

**Objectives:** To determine whether effector T cells are associated with intralesional localizations of Trm cells and mTregs, which could be expected to reflect the clinicohistopathological severity and immunopathogenesis.

**Methods:** We investigated the correlation between the effector T cells-related cytokines and the infiltrations of Trm cells and mTregs around the hair bulb/bulge in 9 chronic AA patients according to histopathological grades through double immunofluorescence.

**Results:** Lesional IL-17 in both HF bulge and bulb was significantly increased in parallel with the severer histopathologic gradings. IFN-$\gamma$ was expressed in a lesser degree. CD8+CD49a-Trm cells in both HF bulge and bulb were increased in parallel with the severer histopathologic gradings. Infiltrated Foxp3+mTregs were decreased in an inverse manner to the severer histopathologic gradings of AA.

**Conclusions:** These results showed significantly higher IL-17 expression and denser infiltrations of CD8+CD49a-Trm cells in lesion in AA patients, which may highlight another functional role of these cytokines in the pathogenesis of AA.

# O5
# Oral tofacitinib and ruxolitinib for the treatment of alopecia areata: a systematic review and meta-analysis

**Da-Ae Yu[1], Ye Eun Kim[1], Ohsang Kwon[1,2], Hyunsun Park[3]**

[1]Department of Dermatology, Seoul National University College of Medicine, Seoul, Korea; [2]Laboratory of Cutaneous Aging and Hair Research, Biomedical Research Institute, Seoul National University Hospital, Institute of Human-Environment Interface Biology, Medical Research Center, Seoul National University, Seoul, Korea;[3]Department of Dermatology, SMG-SNU Boramae Medical Center, Seoul, Korea

**Background:** Janus kinase (JAK) inhibitors have been considered as a promising therapy for moderate to severe alopecia areata (AA). However, there is no comprehensive review on the comparison of oral JAK inhibitors, including tofacitinib and ruxolitinib.

**Objective:** To compare the therapeutic efficacy and adverse events of oral tofacitinib and ruxolitinib in AA.

**Methods:** We performed the literature search using the MEDLINE, EMBASE, and The Cochrane Library. A systematic review and meta-analysis was performed.

**Results:** We pooled 13 studies and 339 cases (281 with oral tofacitinib and 58 with oral ruxolitinib). 79.3% patients treated with ruxolitinib showed clinically significant hair growth (50-100% hair growth), while only 50.6% patients with tofacitinib showed good response. Infections, including upper respiratory infection and urinary tract infection, were the most common adverse events (31.3% in tofacitinib, 32.8% in ruxolitinib). In addition, laboratory abnormalities and other mild systemic symptoms were more commonly reported in tofacitinib than ruxolitinib.

**Conclusion:** Oral ruxolitinib demonstrated better therapeutic response and less frequent adverse events compared to oral tofacitinib in moderate to severe AA. Further head-to-head randomized controlled trials are required to confirm the results.

# O6
# Hypertrichosis after 5% minoxidil solution in trichorhinophalangeal syndrome

**Choong Jae Kim, Hoon Choi, Chan Ho Na, Bong Seok Shin, Min Sung Kim**

Department of dermatology, Chosun University of Medicine, Gwangju, Korea

**Background:** Trichorhinophalangeal syndrome (TRPS) is a rare genetic condition that affects the hair, nose, and phalanges. Patients with TRPS visit dermatologic clinics with complaint of alopecia.

**Objective:** Treatment option for alopecia in TRPS remains unclear. We assumed minoxidil solution might be effective for hypotrichosis in TRPS.

**Methods:** A 6-year-old female patient complained of diffuse hair loss and slow growth of hair since she was born. She had bulbous pear-shaped nose, long philtrum, thin and sparsed hairs on vertex. She had x-ray finding with hands skeletal abnormalities. She had the typical triad of TRPS, including hair alterations, craniofacial changes, and skeletal abnormalities. We prescribed only topical 5% minoxidil solutions for 9 months to see it would be effective for hypotrichosis in TRPS.

**Results:** Patient hairs showed improvement with using topical minoxidil solutions. On the 9th month of treatment, there were more hairs on the forehead, thickened eyebrows, hairs were grown where nanoxidil were not used, and a few hairs on the pubic hair without secondary growth.

**Conclusion:** TRPS1 protein is known to develop symptoms of TRPS. This gene is associated with the androgen pathway in prostatic cancer and breast cancer. Topical minoxidil solution was very effective for hypotrichosis in TRPS and also the first case showing hypertrichosis in TRPS.

# O7
# Adalimumab-induced psoriatic alopecia in a patient with ulcerative colitis

**Kyung Muk Jeong, Jin Young Song, Ji Yun Seo, Yoo Sang Baek, Hae Jun Song, Jiehyun Jeon**

Department of Dermatology, College of Medicine, Korea University, Seoul, Korea

Anti-tumor necrosis factor (anti-TNF) agents have been successfully used to treat autoimmune diseases, but they can also induce a wide array of cutaneous reactions. Above all, alopecia is a less well-known side effect of TNF-$\alpha$ inhibitors that has become more recognized in recent years.

A 38-year-old man with ulcerative colitis (UC) has developed abrupt hair shedding from scalp associated with lightly scaly psoriasiform patches. In addition, similar psoriasiform patches also appeared on beard area. The patient had been on the adalimumab therapy for about 2 years, and started cutaneous symptoms 2 weeks ago. He denied personal history of psoriasis or alopecia. The biopsy specimen from the lesion showed psoriasiform epidermal changes in association with alopecia areata-like changes in the dermis along with atrophy of the sebaceous glands. The diagnosis was made as adalimumab-induced psoriatic alopecia. Considering UC condition of the patient, the topical application of steroid and moisturizer was started while maintaining the adalimumab treatment.

Paradoxical reaction during anti-TNF-$\alpha$ therapy has an estimated prevalence of 1.5 to 5%. Although not well understood, increased interferon-$\alpha$ production by TNF-$\alpha$ blockade might be relevant to the pathogenesis. When affecting the scalp, new-onset psoriasis induced by anti-TNF-$\alpha$ agents can result in non-scarring or scarring alopecia. Histological findings of psoriatic alopecia include psoriasiform epidermal features and alopecia areata-like dermal changes, and in late stages, destruction of the hair follicle with perifollicular fibrosis. Although there is no consensus in management of this entity yet, cessation of anti-TNF therapy may not be mandatory, as alopecia has showed significant improvement with topical treatment alone. The decision whether to continue anti-TNF therapy depends on the severity of the psoriasis, the effect of treatment modification on the primary disease, and the risk-benefit ratio of alternative forms of therapy.

# Session 4

## Patterned Hair Loss

(Korean- & English-speaking session)

The Korean Hair Research Society

# Ten-year efficacy of finasteride in 532 Japanese men with androgenetic alopecia

**Akio Sato, M.D., Ph.D.**

Tokyo Memorial Clinic, Japan

We followed Japanese men with androgenetic alopecia treated with finasteride for 10 years to evaluate long-term treatment efficacy. Of 532 patients treated with finasteride (1 mg/day) were evaluated over 10 years by modified global photographic assessment.

We investigate how the modified Norwood-Hamilton scale (N-H scale) at the time of first visit and 10 years later changed. The Patient satisfaction was examined by Visual Analogue Scale (VAS). In the untreated AGA male, the N - H scale progressed in two stages.

In 10 years, the N-H scale of the untreated AGA males progressed in two stages. However, treatment with finasteride for 10 years improved N-H scale by one stage.

The AGA symptoms compared with the same age, they felt below average at the beginning of therapy, but they felt the same degree by the treatment for 10 years. Patients satisfaction with finasteride treatment were high (VAS: 7.2), and future motivation for the treatment is also high (VAS: 8.3). There were no adverse events that appeared early in treatment, but ED appeared during subsequent treatment. However, the incidence rate of mild symptoms in ED in the 40s is about 20%, which is lower than that.

In conclusion, continuous finasteride treatment for 10 years improved androgenetic alopecia with sustained effect among Japanese.

## [ CURRICULUM VITAE ]

**Akio Sato, M.D., Ph.D.**
Tokyo Memorial Clinic Hirayama, Tokyo

**Career:**

| | |
|---|---|
| 1990-1999 | Physician;<br>Department of Plastic and Aesthetic Surgery, Kitasato University, School of Medicine, Japan |
| 1999-Present | Private practice;<br>Tokyo Memorial Clinic Hirayama, Tokyo |
| 2018-Present | Visiting Professor;<br>Department of Plastic and Reconstructive Surgery, Kitasato University School of Medicine, Japan<br>Project Professor, Plastic and Reconstructive Surgery, School of medicine, Keio University |

# Pattern hair loss: The use of 5ARI in elderly and female patients with AGA and long term use

**Bark-Lynn Lew, M.D., Ph.D.**

Department of Dermatology, School of Medicine, KyungHee University, Seoul, Korea

## 1. Pattern hair loss

- the most common hair loss disorder, affecting both men and women
- usually develop during teenage years leading to progressive hair loss with a pattern distribution, moreover, its frequency increases with age
- treatment modalities

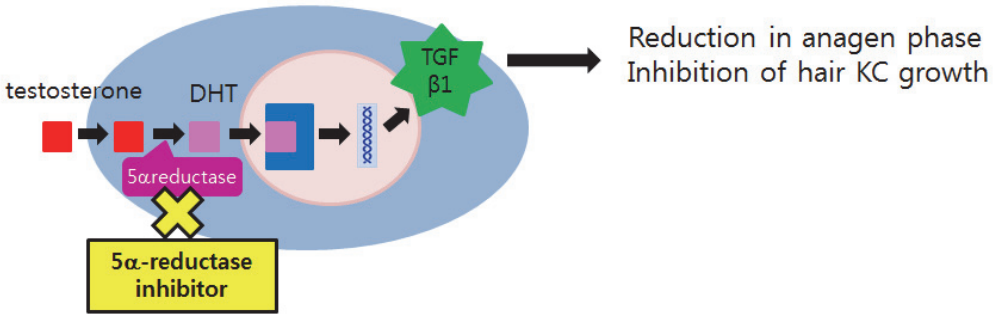
| Treatment | Level of evidence | Efficacy to prevent | Efficacy to improve |
|---|---|---|---|
| Male | | | |
| finasteride 1mg | 1 | +++ | +++ |
| dutasteride 0.5mg | 1 | +++ | +++ |
| minoxidil 5% | 1 | +++ | ++ |
| hair transplantation | 2 | - | +++ |

## 2. 5 alpha reductase inhibitor

1) drugs

- Finasteride : competitive inhibitor of 5$\alpha$-reductase type 2
  : 1mg
- Dutasteride : dual inhibitor of both 5$\alpha$-reductase type 1 and 2
  : 0.5mg

2) Action mechanism




### 3. Effect of 5 alpha reductase inhibitors in elderly male patients

1) Until now, many studies have been reported on the efficacy and side effects of 5ARI, but most of them were conducted on young men under 50 years of age.

2) The study of the efficacy and side effects of 5ARI in men aged over 50 years

- 499 patients
- mean age at onset : 48.2 years / start of treatment : 55.4 years
- N-H scale II/III/IV/V/VI/VII/F1/F2 : 24/170/104/83/18/2/61/37
- Assessement : seven-point scale (-3: greatly decreased, -2: moderately decrease, -1: slightly decreased, 0: no change, 1: slightly increased, 2: moderately increased, 3: greatly increased).
- improvement (≥1) : 93.0% / prevention of disease progression (≥0) : 98.6%
- fina vs duta : no statistically significant difference
- patients under 55 years vs older than 55 years : 1.71 vs 1.63
- comparison to the efficacy in relatively younger patients (<50 yrs)
  : showed similar improvement

### 4. Use of 5 alpha reductase inhibitors in female patients

1) Use

- pregnancy category X
- but use in postmenopausal and premenopausal women without a plan to get pregnant
- clinical efficacy remains controversial

2) The study of the efficacy of finasteride 2.5mg in female patients

- 112 patients (mean age : 54.1)
- significant improvement : 65.2% / slight improvement : 29.5% / no change : 5.4%
- lower Ludwig scale, older age at onset → good efficacy

3) meta-analysis

- efficacy (+)

**5. Long-term use of 5 alpha reductase inhibitors**

1) the efficacy in long-term use
   - 10 years study : effective and safe

2) the methods of long-term use for maintenance
   - use in every other month
   - indication : after 1~2 yrs of treatment, full improvement or satisfaction (+)
   - the result of efficacy : maintenance (+)

## [ CURRICULUM VITAE ]

**Bark-Lynn Lew, M.D., Ph.D.**

Professor, Dept. of Dermatology, Kyunghee University Hospital at Gangdong

### Education:

| | |
|---|---|
| 2001 | A Graduate of College of Medicine, Kyunghee University, Seoul, Korea |
| 2005 | A Master of Medicine, Kyunghee University, Seoul, Korea |
| 2007 | A Doctor of Medicine, Kyunghee University, Seoul, Korea |

### Positions Held Since Graduation:

| | |
|---|---|
| 2001-2002 | Internship, Kyunghee University hospital |
| 2002-2006 | Residency in Dermatology, Kyunghee University hospital |
| 2006-2019 | Instructor, Assistant Professor, Associate Professor, Dept. of Dermatology, Kyunghee University hospital at Gangdong |
| 2019-present | Professor, Dept. of Dermatology, Kyunghee University hospital at Gangdong |

### Medical Society Membership:

Korean Hair Research Society, Financial Director
Korean Atopic Dermatitis Association, Academic Director
Korean Society of Chemical Peeling, Financial Director
Korean Society for Cosmetics, Board
Korean Dermatologic Association, Educational program Assistant Director
Journal of American Academy of Dermatology, Reviewer
American Academy of Dermatology, Member
Society for Investigative Dermatology, Member

### Awards:

| | |
|---|---|
| 2004 | Travel Grant, Korean Hair Research Society |
| 2006 | Best Poster, the 58thAnnual Meeting of KDA |
| 2009 | Best Paper, College of Medicine, Kyunghee University |
| 2012 | Best Poster, the 9th Annual Meeting of Korean Hair Research Society |

2013 Research scholarship, Amore pacific
2014 Faculty Excellence prize, College of Medicine, Kyunghee University
2015 Faculty Excellence prize, College of Medicine, Kyunghee University
2017 Basic research grant, National Research Foundation of Korea
2018 Best Poster, the 14th Annual Meeting of Korean Hair Research Society

**Interests:**

Hair and hair diseases, Atopic dermatitis, Laser and Dermatologic surgery

# Transcriptomic analysis of balding and non-balding scalp in male pattern baldness and female pattern hair loss

**Byung Cheol Park, M.D., Ph.D.**

Department of Dermatology, Medical College, Dankook University, Cheon-An, Korea

**Background:** To identify effective biomarkers for androgenetic alopecia, it is very useful to analyze the transcriptomic expression on the balding and non-balding area. In recent, due to the advancement of genetic analysis technique like Next generation sequencing (NGS), we can evaluate the expression of mRNA more easily and deeply.

**Objectives:** In the present study, we tried to identify molecular biomarkers associated with male pattern baldness and female pattern hair loss through transcriptomic analysis using NGS technique.

**Materials and methods:** We took scalp tissue samples from 5 MPB and 18 FPHL

Scalp tissue samples were acquired from vertex (balding area) and occiput (non-balding area) of each volunteers. We analyzed the transcriptomes from 18 FPHL and 5 MPB using NGS technique.

**Result:** We found 8 significant genes in the FPHL 12 in MPB which were confirmed by real time qPCR. PTGDS, SFRP2 gene and protein expression were elevated and the expression of TGF $\beta$-2 was down-regulated in the vertex tissue of FPHL. AR gene and SRD5A2 gene expression were elevated but TGF $\beta$-2 expression was down-regulated in the balding area MPB

**Conclusion:** Using NGS technique, we found some significant candidate genes associated with the pathogenesis of androgenetic alopecia but further study is needed to confirm their functional role in hair morphogenesis.

## [ CURRICULUM VITAE ]

### Byung Cheol Park, M.D., Ph.D.

Associate Professor and Chair, Department of Dermatology, Dankook Medical College, Korea

### Education and Training:

| | |
|---|---|
| 1994-2000 | M.D., School of medicine, Kyungpook National University (KNU) |
| 2004-2008 | Resident, Department of Dermatology, KNU Hospital, Korea |
| 2011-2013 | Ph.D., School of Medicine, Choongnam University Graduate School |

### Current and Past Professional Positions:

| | |
|---|---|
| 2008-2009 | Research Fellow, Department of Dermatology, Ajou University hospital |
| 2010-2016 | Assistant Professor, Department of Dermatology, Dankook Medical College |
| 2016-present | Associate Professor and Chair, Department of Dermatology, Dankook Medical College |

### Awards:

| | |
|---|---|
| 2010 | Travel grant for 6th Meeting of World Hair Research Society |
| 2014 | Travel grant for 8th Meeting of World Hair Research Society |
| 2015 | Travel grant for 23rd Meeting of World Congress of Dermatology |

### Society Memberships:

Korean Dermatological Society (Board member)
Korean Hair Research Society
International Society for Hair Reconstruction Surgery
American Board of Hair Reconstruction Surgery (diplomat)

# Session 5

## Alopecia Areata

(Korean- & English-speaking session)

The Korean Hair Research Society

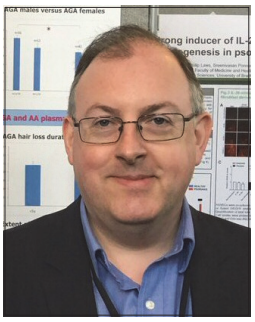
# Review update on alopecia areata

**Kevin McElwee, Ph.D.**

Centre for Skin Sciences, University of Bradford, Bradford, United Kingdom

Alopecia areata (AA) is a subject of research that has received increased interest in recent years. Not least the discovery of JAK inhibitors and their potential efficacy in treating AA have promoted a significant number of new clinical and laboratory studies. The initial studies on JAK inhibitors were conducted with AA affected mice; a disease model that several AA research laboratories are now using. In this review update on AA, the mouse model some of the latest research using the model will be presented, along with translation from the mouse model to human research. Following on from research conducted in Korea, we have used AA mice to look at the potential for heart disease. There is some evidence that AA development in mice is associated with enlarged hearts. More recently, using blood samples from humans with AA, we identified a small, but statistically significant, increase in cardiac troponin in blood plasma, suggesting increased heart tissue remodeling may occur in AA patients. Unlike the clear link between psoriasis and atherosclerosis, the link between AA and heart disease is subtle. The data is not indicative of ischemia, but may reflect atrial fibrillation and/or cardiomyopathy. Somewhat related, we have also been using the mouse model to explore the relationship between stress and AA. In previous research, we revealed that AA affected mice have an aberrant response to stress, suggesting that presence of AA might alter stress hormone activity. Most recently, we have used blood samples from AA patients to investigate the potential for stress hormones to alter immune responses. The data suggest antigen presenting cells may be sensitive to corticotropin releasing hormone, which may promote an increased state of cell activation. These and other data will be presented which I hope will encourage some lively debate on the causes and consequences of AA.

## [ CURRICULUM VITAE ]



### Kevin McElwee, Ph.D.

Professor and 50th Anniversary Chair, Centre for Skin Sciences, University of Bradford, UK

### Education and Training:

| | |
|---|---|
| 1992-1996 | Ph.D., Immuno-biology of Alopecia Areata, University of Dundee, Scotland |
| 1996-1999 | Postdoctoral Fellow, Department of Pathology, The Jackson Laboratory, USA |
| 1999-2003 | Postdoctoral Fellow, Department of Dermatology, University of Marburg, Germany |

### Current and Past Professional Positions:

| | |
|---|---|
| 2004-2010 | Assistant Professor, Department of Dermatology, University of British Columbia, Canada |
| 2010-2017 | Associate Professor, Department of Dermatology, University of British Columbia, Canada |
| 2017- | Adjunct Professor, Department of Dermatology, University of British Columbia, Canada |
| 2017- | Professor, Centre for Skin Sciences, University of Bradford, United Kingdom |

### Society Memberships:

| | |
|---|---|
| 2017-present | Royal Society of Biology (RSB): Member |
| 2017-present | British Society for Investigative Dermatology (BSID): Member |
| 2015-present | European Society for Dermatological Research (ESDR): Member |
| 2015-2017 | Canadian Hair Research Foundation (CHRF): Member |
| 2004-2017 | Chair and Board Member |
| 2000-present | North American Hair Research Society (NAHRS): Member |
| 2009-2013 | Board Member |
| 1999-present | European Hair Research Society (EHRS): Member |
| 2005-2008 | Board Member |
| 1997-present | Society for Investigative Dermatology (SID): Member |

**Featured Publications:**

1. Wang EH, Santos L, Li XY, Tran A, Kim SSY, Woo K, Shapiro J, McElwee KJ. Alopecia Areata is Associated with Increased Expression of Heart Disease Biomarker Cardiac Troponin I. Acta Derm Venereol. 2018; 98: 776-782. PMID: 29740659.
2. Gong Y, Zhao Y, Zhang X, Qi S, Li S, Ye Y, Yang J, Caulloo S, McElwee KJ, Zhang X. Serum level of IL-4 predicts response to topical immunotherapy with diphenylcyclopropenone in alopecia areata. Exp Dermatol. 2018; in press. PMID: 30047620.
3. Jalili RB, Kilani RT, Li Y, Khosravi-Maharlooie M, Nabai L, Wang EHC, McElwee KJ, Ghahary A. Fibroblast cell-based therapy prevents induction of alopecia areata in an experimental model. Cell Transplant. 2018; 27: 994-1004. PMID: 29871523
4. Wang EH, Yu M, Breitkopf T, Akhoundsadegh N, Wang X, Shi FT, Leung G, Dutz JP, Shapiro J, McElwee KJ. Identification of Autoantigen Epitopes in Alopecia Areata. J Invest Dermatol 2016; 136: 1617-26. PMID: 27094591.
5. Wang EH, Khosravi-Maharlooei M, Jalili RB, Yu R, Ghahary A, Shapiro J, McElwee KJ. Transfer of Alopecia Areata to C3H/HeJ Mice Using Cultured Lymph Node-Derived Cells. J Invest Dermatol 2015; 135: 2530-2. PMID: 25946709.

# Mechanism: Mesenchymal stem cell therapy to treat alopecia areata

**Jung Eun Kim, M.D., Ph.D.**

Department of Dermatology, Eunpyeong St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea

The management of extensive alopecia areata (AA) is quite challenging because the treatment response rate is generally lower in these patients and recurrence is common. The limited success of JAK inhibitors points to complexity of the pathogenesis of AA. Thus, multiple approaches are often required for the treatment severe AA. The concept of mesenchymal stem cell therapy (MSCT) differs from the concept of conventional immunosuppressive drugs or small molecule inhibitors in that MSCT is a multi-targeted therapy. Only a few clinical and preclinical studies have reported the efficacy of MSCT. The prerequisite for applying MSCT to treat AA in clinical practice is to understand basic pathomechanisms.

In this presentation, I would like to review recently reported clinical and experimental MSCT to treat AA and to share our experimental results of MSCT in vitro AA models. An AA-like environment was induced by pretreatment of human dermal papilla cells (hDPCs) with interferon gamma (IFN-$\gamma$). Human hematopoietic MSCs (hHMSCs) were administered to the hDPCs and cell viability was determined. The change of expression of the Wnt/$\beta$-catenin pathway and JAK-STAT pathway-related molecules and growth factors in hHMSC-treated hDPCs was also examined by reverse transcription PCR, Western blot assay and growth factor array. Immune-privilege related molecules were examined by immunohistochemistry in hair follicle culture models.

## [ CURRICULUM VITAE ]

### Jung Eun Kim, M.D., Ph.D.

Assistant Professor, Department of Dermatology, Eunpyeong St. Mary's Hospital College of Medicine, The Catholic University of Korea

### Education and Training:

| | |
|---|---|
| 2004 | M.D., College of Medicine, The Catholic University of Korea |
| 2004-2005 | Internship, Department of Dermatology, Catholic Medical Center |
| 2005-2009 | Resident, Department of Dermatology, Catholic Medical Center |
| 2008-2012 | Ph.D. Department of Dermatology, Graduate School of Medical Science, The Catholic University of Korea |

### Current and Past Professional Positions:

| | |
|---|---|
| 2009-2011 | Clinical Instructor, Dermatology, Catholic Medical Center |
| 2011-2015 | Clinical Assistant Professor, Department of Dermatology, St. Paul's Hospital |
| 2016-2018 | Assistant Professor, Department of Dermatology, St. Paul's Hospital |
| 2019-present | Assistant Professor, Department of Dermatology, Eunpyeong St. Mary's Hospital |

### Major interest:

Atopic Dermatitis, Hair, Stem cells, Wound healing, Dermatopathology

### Awards:

| | |
|---|---|
| 2016 | Amore-Pacific grant |
| 2017 | The National Research Foundation of Korea (NRF) grant funded by the Korea government |

### Society Memberships:

Korean Dermatological Association
American Academy of Dermatology
The Korean Atopic Dermatitis Association
The Korean Hair Research Society
The Korean Society of Dermatopathology

**Featured Publications:**

1. Effects of mesenchymal stem cell therapy on alopecia areata in cellular and hair follicle organ culture models. Exp Dermatol. 2018 Oct 29. doi: 10.1111/exd.13812. [Epub ahead of print]
2. Wnt/β-catenin and ERK pathway activation: A possible mechanism by which light-emitting diodes regulate the proliferation of human outer root sheath cells. Lasers in surgery and medicine 2017 Sep 25. doi: 10.1002/lsm.22736
3. A Clinicoimmunohistopathologic Study of Anetoderma: Is Protruding Type More Advanced in Stage Than Indented Type? J Immunol Res. 2016;2016:4325463
4. Hair growth-promotion effects of different alternating current parameter settings are mediated by the activation of Wnt/β-catenin and MAPK pathway. Exp Dermatol. 2015 Dec;24(12):958-63
5. Molecular Mechanisms of Cutaneous Inflammatory Disorder: Atopic Dermatitis. Int J Mol Sci. 2016 Jul 30;17(8).

# Oral JAK inhibitors for moderate to severe alopecia areata fromclinician's view point

**Hyunsun Park, M.D., Ph.D.**

Clinical Associate Professor, Department of Dermatology SMG-SNU Boramae Medical Center

Alopecia areata (AA) is a relatively common disease, but no satisfactory treatment has yet been developed. Recently, research progress has been made in the pathogenesis of AA, revealing that the interaction between autoreactive cytotoxic T cells and follicular epithelial cells is important and that the Janus kinase/signal transducer and activator of transcription (JAK/STAT) pathway is involved. Therefore, the potential of JAK inhibitors as therapeutic agents for AA is attracting attention. Several open-label single-arm clinical trials and retrospective studies demonstrated that oral JAK inhibitors including tofacitinib are effective and tolerable treatments for AA. In particular, oral JAK inhibitors are considered a promising alternative option for severe AA with more than 50% hair loss that is nonresponsive to conventional therapy. As a result of these recent advances, JAK inhibitors are emerging as an innovative treatment for AA. However, further placebo-controlled clinical trials are required to confirm the effect and long-term safety of JAK inhibitors.

Key words: alopecia areata, Janus kinase inhibitors, tofacitinib, baricitinib, ruxolitinib

## [ CURRICULUM VITAE ]

**Hyunsun Park, M.D., Ph.D.**

Clinical Associate Professor, Department of Dermatology SMG-SNU Boramae Medical Center

### Education and Training:

| | |
|---|---|
| 1998-2000 | College of Natural Science, Seoul National University, Seoul, Korea (B.S.) |
| 2000-2004 | College of Medicine, Seoul National University, Seoul, Korea (M.D.) |
| 2007-2009 | Graduate School, Seoul National University, Seoul, Korea (M.S.) |
| 2009-2014 | Graduate School, Seoul National University, Seoul, Korea (Ph.D.) |

### Current and Past Professional Positions:

| | |
|---|---|
| 2004-2005 | Internship, Seoul National University Hospital, Seoul, Korea |
| 2005-2009 | Resident, Department of Dermatology, Seoul National University Hospital, Seoul, Korea |
| 2009-2011 | Fellow, Department of Dermatology, Seoul National University Hospital, Seoul, Korea |
| 2011-2012 | Fellow, Department of Dermatology, SMG-SNU Boramae Medical Center, Seoul, Korea |
| 2012-2015 | Clinical medical professor, Department of Dermatology, SMG-SNU Boramae Medical Center, Seoul, Korea |
| 2015-Present | Clinical assistant, associate professor, Department of Dermatology, SMG-SNU Boramae Medical Center, Seoul, Korea |

### Awards:

$6^{th}$ Korean Nail Forum, Best presentation (2016)

$21^{st}$ Symposium of Korean Society of Dermatological Surgery, Best poster presentation (2016)

2017 AAD Annual Meeting, Registration scholarships (2017)

$21^{st}$ Annual meeting of Korean society of psoriasis, Best presentation (2017)

$10^{th}$ World Congress for Hair Research, travel grant (2017)

$18^{th}$ meeting of European Hair Research Society, travel grant

$7^{th}$ Annual Meeting of Asian Organization for Cronh's & Colitis, travel grant (2019)

**Society Memberships:**

Korean Dermatological Association, Member
The Association of Korean Dermatologists, Member
Korean Hair Research Society, Member (councilor)
Korean Society of Dermatopathology, Member (councilor)
Korean Society for Anti-Aging Dermatology, Board Member
Council for Nail Disorders, Board Member
The Korean Society for immunodermatology, Member (councilor)

**Featured Publications:**

1. Shin JW, Huh CH, Kim MW, Lee JS, Kwon O, Cho S, Park HS. Comparison of the Treatment Outcome of Oral Tofacitinib with Other Conventional Therapies in Refractory Alopecia Totalis and Universalis: A Retrospective Study. Acta Derm Venereol 2019; 99: 41-46
2. Park HS, Hye-Youn S, Choi MH, Son Y, Kim S, Hong HS, Park JU. Adipose-derived stem cells attenuate atopic dermatitis-like skin lesions in NC/Nga mice. Exp Dermatol 2019
3. Lee J, Kang S, Bae J, Jo S, Koh S-J, Park H-S. Psoriasis increases the risk of concurrent inflammatory bowel disease: A population-based nationwide study in Korea. 2019; 85: 145-152
4. Lee JS, Huh CH, Kwon O, Yoon HS, Cho S, Park HS. Nail involvement in patients with moderate-to-severe alopecia areata treated with oral tofacitinib. J Dermatolog Treat 2018: 1-4
5. Jin SP, Koh SJ, Yu DA, Kim MW, Yun HT, Lee DH, Yoon HS, Cho S, Park HS. Imiquimod-applied Interleukin-10 deficient mice better reflects severe and persistent psoriasis with systemic inflammatory state. Exp Dermatol 2018; 27: 43-49
6. Park HS, Kim MW, Lee JS, Yoon H-S, Huh C-H, Kwon O, Cho S. Oral tofacitinib monotherapy in Korean patients with refractory moderate-to-severe alopecia areata: A case series. J Am Acad Dermatol 2017; 77: 978-979

# Session 6

## Devices for Hair Loss Treatment

(Korean-speaking session)

The Korean Hair Research Society

# Role of hair prostheses (wigs) in patients with severe alopecia areata

**Jin Park, M.D., Ph.D.**

Department of Dermatology, School of Medicine, Chonbuk National University

**Background:** The wig is expected to have a positive effect on the quality of life (QOL) in patients with severe alopecia areata (AA). However, there were very few studies about the objective evaluation of the wig in AA.

**Objective:** To evaluate the objective role of wigs as medical assisting devices in patients with severe AA measuring its impact on biological, psychosocial aspects and economic loss.

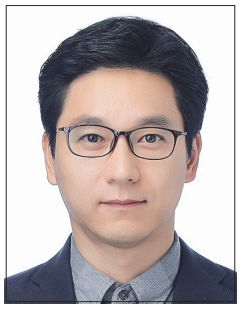
**Methods:** Fourty patients with severe AA (SALT score > 30%), who had been wearing wigs more than 2 weeks, were enrolled in this study. The patient's baseline characteristic information and burden including economic loss were evaluated by patient's answers in the questionnaire. The psychosocial effects from wearing wigs were evaluated by Psychosocial Impact of Assistive Device Scale (PIADS), and hair specific Skindex-29.

**Results:** The total PIADS score was significantly increased from 0 to 1.46 ($p<0.001$) and its three subscales (competence, adaptability and self-esteem) were significantly improved ($P<0.001$). The total hair specific Skindex-29 score was also significantly decreased from 3.56 to 2.93 after using the wigs ($P<0.001$). The most common patient's burden was the economic loss and there was no one getting the financial or institutional support. In addition, there were only 10.0% of patients who received the information about wig through physicians.

**Conclusion:** A wig has objective benefits as medical assisting device in severe AA. Physicians should realize the role of using wigs in severe AA and giving practical information to patients. Furthermore, physicians should make an effort to get a financial and institutional support from national medical insurance program for patients.

Keywords: alopecia areata

## [ CURRICULUM VITAE ]



### Jin Park, M.D., Ph.D.

Associate Professor, Department of Dermatology, School of Medicine, Chonbuk National University

### Education and Training:

| | |
|---|---|
| 2003 | M.D., Wonkwang university of Medical Science |
| 2007-2011 | Resident, Department of Dermatology, Chonbuk National University Hospital |
| 2018 | Ph.D., Medicine, Chonnam National University Graduate School of Medicine |

### Current and Past Professional Positions:

| | |
|---|---|
| 2011-2012 | Instructor, Department of Dermatology, Chonbuk National University |
| 2012-2015 | Assistant Professor, Department of Dermatology, Chonbuk National University |
| 2015-present | Associate Professor, Department of Dermatology, Chonbuk National University |

### Awards :

| | |
|---|---|
| 2010 | Best Paper Award, the 62$^{th}$ Autumn Meeting of Korean Dermatological Association |
| 2016 | Best Paper Award, 9$^{th}$ Annual meeting of the Korean Society for Medical Mycology |
| 2016 | Best Presentation Award, 9$^{th}$ Annual meeting of the Korean Nail form |
| 2016 | Best Presentation Award, 12$^{th}$ Annual meeting of the Korean Hair Research Society |
| 2017 | Best Presentation Award, 24$^{th}$ Annual meeting of the Korean Society for Medical Mycology |
| 2018 | Best Poster Award, 70$^{th}$ Spring Meeting of the Korean Dermatological Association |
| 2018 | Best Presentation Award, 25$^{th}$ Annual meeting of the Korean Society for Medical Mycology |
| 2018 | Yong Investigator Award, Korean Society for Medical Mycology |

### Society Memberships:

Korean Society of Dermatology
Korean Hair Research Society (Board member)
Korean Society for Medical Mycology (Board member)

**Featured Publications:**

1. Park J, Ihm CW. Evaluation of the Scalp Hair Mass of Koreans. Korean J Dermatol 2010;48(1):17-25
2. Park J, Song KH, Nam KH. Circumscribed alopecia areata incognita. Australals J Dermatol 2012;54(1):52-54
3. Park J, Kim JI, Kim HU, Yun SK, Kim SJ. Trichoscopic findings of hair loss in Koreans. Ann Dermatol 2015;27(5):539-550
4. Park SK, Yoo HH, Yun SK, Kim HU, Park J. Geometric alopecia associated with lupus erythematosus panniculitis of the scalp: a case series of nine Korean patients. Eur J Dermatol. 2018 28(3):399-400
5. Park J, Kim DW, Park SK, Yun SK, Kim HU. Role of Hair Prostheses (Wigs) in Patients with Severe Alopecia Areata. Ann Dermatol. 2018;30(4):505-507

# Therapeutic efficacy and safety of a 1927-nm fractionated thulium laser on pattern hair loss: an evaluator-blinded, split-scalp study

**Sung Bin Cho, M.D., Ph.D.**

Yonsei Seran Dermatology and Laser Clinic, Seoul, Korea

Laser- or light-assisted therapies have been used to improve the perifollicular environment by upregulating the expression of growth factors and signaling molecules for hair restoration. The aim of our study was to preclinically and clinically evaluate the therapeutic efficacy and safety of a 1927-nm fractionated thulium laser on pattern hair loss (PHL). An in vivo hairless mouse study and an in vivo human skin environmental scanning electron microscopy (ESEM) study were performed with different power and energy settings. Thereafter, an evaluator-blinded, split-scalp study was conducted to evaluate hair thickness and density in 10 PHL patients treated with 12 sessions of fractionated thulium laser treatment with or without post-laser treatment application of a growth factor-containing (GF) solution. In in vivo hairless mouse skin, inverted cone-shaped zones of thulium laser-induced tissue coagulation (LITC) were noted immediately after treatment in the epidermis and upper to mid-dermis without remarkable ablative tissue injury. The ESEM study revealed round to oval-shaped zones of non-ablative LITC on the surface of the stratum corneum of a human subject immediately after laser irradiation. In PHL patients, 12 sessions of thulium laser monotherapy at 1-week intervals resulted in significantly increased hair density and thickness. Post-laser treatment application of GF solution offered additional therapeutic efficacy by improving hair density and thickness on the split scalp. The use of a fractionated thulium laser with or without post-laser therapy application of GF solution to treat PHL elicited remarkable improvements in hair thickness and hair counts.

## [ CURRICULUM VITAE ]

### Sung Bin Cho, M.D., Ph.D.

Yonsei Seran Dermatology and Laser Clinic, Seoul, Korea

### Education and Training:

| | |
|---|---|
| 2001 | M.D., Yonsei University College of Medicine, Seoul, Korea |
| 2001-2002 | Internship, Severance Hospital, Yonsei University Health System, Yonsei University College of Medicine, Seoul, Korea |
| 2002-2006 | Resident, Department of Dermatology and Cutaneous Biology Research Institute, Yonsei University College of Medicine, Seoul, Korea |
| 2009-2010 | Fellow, Department of Dermatology and Cutaneous Biology Research Institute, Yonsei University College of Medicine, Seoul, Korea, 2009-2010 |
| 2011 | Ph.D., Graduate School, Yonsei University College of Medicine, Seoul, Korea |

### Current and Past Professional Positions:

| | |
|---|---|
| 2006-2009 | Army Medical Doctor: Department of Dermatology, Armed Forces Yangju Hospital, Yangju, Korea |
| 2010-2012 | Assistant Clinical Professor: Department of Dermatology and Cutaneous Biology Research Institute, Yonsei University College of Medicine, Seoul, Korea |
| 2012-2013 | Assistant Clinical and Research Professor: Department of Dermatology and Cutaneous Biology Research Institute, Yonsei University College of Medicine, Seoul, Korea |
| 2013-2016 | Post-doc Researcher: Department of Dermatology and Cutaneous Biology Research Institute, Yonsei University College of Medicine, Seoul, Korea |
| 2016-present | Post-doc Researcher: Department of Dermatology and Cutaneous Biology Research Center, International St. Mary's Hospital, Catholic Kwandong University College of Medicine, Incheon, Korea |

### Society Memberships:

Korean Dermatological Association
Korean Society for Behçet's Disease
The Korean Hair Research Society
The Korean Society of Laser Medicine and Surgery
Editor-in-Chief - Medical Lasers (The Korean Society of Laser Medicine and Surgery)

**Recent Publications:**

1. Cho SB, Goo BL, Zheng Z, Yoo KH, Kang JS, Kim H. Therapeutic efficacy and safety of a 1927-nm fractionated thulium laser on pattern hair loss: an evaluator-blinded, split-scalp study. Lasers Med Sci 2018;33(4):851-859.
2. Ahn KJ, Zheng Z, Kwon TR, Kim BJ, Lee HS, Cho SB. Pattern analysis of laser-tattoo interactions for picosecond and nanosecond-domain 1,064-nm neodymium-doped yttrium-aluminum-garnet lasers in tissue-mimicking phantom. Sci Rep 2017;7(1):1533.
3. Cho SB, Kwon TR, Yoo KH, Oh CT, Choi EJ, Kim BJ. Transcutaneous pneumatic injection of glucose solution: a morphometric evaluation of in vivo micropig skin and tissue-mimicking phantom. Skin Res Technol 2017;23(1):88-96.
4. Na J, Zheng Z, Dannaker C, Lee SE, Kang JS, Cho SB. Electromagnetic Initiation and Propagation of Bipolar Radiofrequency Tissue Reactions via Invasive Non-Insulated Microneedle Electrodes. Sci Rep 2015;5:16735.
5. Lee SH, Zheng Z, Kang JS, Kim DY, Oh SH, Cho SB. Therapeutic efficacy of autologous platelet-rich plasma and polydeoxyribonucleotide on female pattern hair loss. Wound Repair Regen. 2015;23(1):30-6.

# Posters

The Korean Hair Research Society

# P1
# 4-hydroperoxycyclophosphamide induces apoptosis of human follicular keratinocytes via regulation of ROS production

**Long-Quan Pi[1,2], Won-Soo Lee[2]**

[1]Department of Dermatology, Yanbian University Affiliated Hospital, Yanji, China, [2]Department of Dermatology and Institute of Hair and Cosmetic Medicine, Yonsei University Wonju College of Medicine, Wonju, Korea

**Background:** Previous studies have revealed that a key cyclophosphamide metabolite, 4-hydroperoxy-cyclophosphamide (4-HC) induces premature catagen development and stimulates apoptosis of follicular keratinocytes. However, the molecular mechanism of 4-HC action on hair follicles and follicular keratinocytes (FKC) has not yet been clearly elucidated.

**Objective:** We investigated the effects of 4-HC on cultured human FKC.

**Methods:** FKC were isolated from plucking hairs and cultured in keratinocyte growth medium (invitrogen) supplemented with penicillin (100IU/ml) and streptomycin (100 μg/ml). Second passage FKC were used in this Study. FKC were fixed in situ in 4% paraformaldehyde (Sigma) and air dried. The slides were stained with the ApopTag Plus peroxidase in situ apoptosis detection kits (Chemicon). Proteins were extracted in RIPA buffer, loaded in SDS-PAGE, transferred to membrane, incubated with cleaved caspase-3 (cell signaling), and detected by the ECL western blotting detection reagent. ROS generation was measured by confocal microscopy using DCF fluorescent probe.

**Results:** 4-HC-induces FKC apoptosis and ROS generation, increases p53 and cleaved caspase-3 expression. Pre-treatment of NAC suppresses 4-HC-induced ROS generation, p53 and cleaved caspase-3 expression. 1mM H2O2 induces FKC apoptosis, ROS generation and increases p53 /cleaved caspase-3 expression.

**Conclusion:** 4-HC, a key cyclophosphamide metabolite, induced FKC apoptosis might be through upregulation of ROS/caspase-3/p53 signaling pathway.

# P2
# Ceramide suppresses IGF-I-induced lipogenesis and inflammatory factors in SZ95 sebocyte

**Kwan Ho Jeong[1], Jung Eun Kim[1], C.C. Zouboulis[2], Hoon Kang[1]**

[1]Department of Dermatology, Eunpyeong St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea, [2]Departments of Dermatology, Venereology, Allergology and Immunology, Dessau Medical Center

**Background:** Ceramide is the basic structure of sphingolipids and have been used in cosmetics as anti-aging agents. It also has been recently used in medicinal fields for acne treatment by acting anti-inflammatory. However, the effect of ceramide as an anti-inflammatory agent on human sebocyte cell (SZ95) has been underinvestigated.

**Objectives:** We investigated possible cellular pathways associated with these anti-inflammatory on human SZ95 cell.

**Methods:** First, SZ95 were treated with IGF-1 (100ng) for 30 min or 24 h, and then treated with stearyl ceramide for 24 h. We performed inflammatory cytokines assay and immunofluorescence staining for AKT/PPAR-$\gamma$ and SREBP-1, respectively. Real time-PCR for target genes and western blot analyses for AKT/NF-$\kappa$B/JNK/IL-6 were also performed. IGF-1 increased the expression of inflammatory pathway that includes pro-inflammatory cytokines such as, IL-1$\beta$, IL-6, and activated NF-$\kappa$B/AKT/JNK.

**Results:** Synthesized ceramide suppressed IGF-1-induced inflammatory cytokines as well as NF-$\kappa$B/AKT/JNK expression. Also, ceramide inhibited the IGF-1-induced production of total lipid in vitro.

**Conclusion:** These data suggest that ceramide could regulate the inflammatory genes and ceramide is an effective candidate for acne treatment which mechanisms of IGF-1-related lipogenesis and inflammation.

# P3
# Modified basic and specific (BASP) classification for pattern hair loss

**Beom Jun Kim, Jaewoong Choi, Sung Jay Choe, Solam Lee, Won-Soo Lee**

Department of Dermatology and Institute of Hair and Cosmetic Medicine,
Yonsei University Wonju College of Medicine

**Background:** In 2007, the Basic and Specific (BASP) classification was introduced for pattern hair loss. It was comprehensive and applicable regardless of race or gender. However, this BASP classification has several limitations. Frontal type hair loss classification is relatively crude, and a specific hair loss pattern cannot be ascertained when hair loss is associated with the temporal and occipital areas.

**Objective:** To evaluate accuracy and ease of use of modified BASP classification compared to existing BASP classification.

**Methods:** In our modified BASP classification, frontal type classification was subdivided into 5 instead of 3 grades. Basic type classification remained the same as in the previous method. In addition, information regarding the involvement of the temporal or occipital scalp was recorded. Accuracy and ease of use were evaluated and compared with the existing BASP classification in 138 patients with pattern hair loss.

**Results:** Temporal or occipital involvement was observed in 14 patients, accounting for 11.1% of subjects. Final type accuracy was 82.5% in the existing BASP classification and 71.4% in the modified classification. Ease of use for two practitioners was 70.2% and 72.1% for the existing BASP classification, and 48.9% and 52.2% for the modified method.

**Conclusion:** We expect that the modified BASP classification will overcome the limitations of the existing BASP classification. We believe this modified classification will be a valuable tool for pattern hair loss classification because of its classification of previously unclassified types.

# P4
# Changes in androgen and prostaglandin levels in urine during finasteride treatment

**Ki-Hun Kim[1], Eunju Im[2,3], Mi Yeon Lee[4], Jeongae Lee[2], Ki Jung Paeng[2,3], Bong Chul Chung[2,5], Bark-Lynn Lew[1], Woo-Young Sim[1]**

[1]Department of Dermatology, Kyung Hee University hospital at Gang-dong, Kyung Hee University School of Medicine, Seoul, [2]Molecular Recognition Research Center, Korea Institute of Science and Technology, Seoul, [3]Department of Chemistry, Yonsei University, Wonju, [4]Advanced Analysis Center, Korea Institute of Science and Technology, Seoul, [5]Department of Converging Science and Technology, Kyung Hee University

**Background:** Male pattern baldness (MPB), an androgenic alopecia, is hair loss disease in which the hair gradually tapers, shortens, and falls off because of androgen and hereditary factors. The MPB mechanism which associated with dihydrotestosterone (DHT) and testosterone (T) is well known. Therefore previous metabolic profiling studies for MPB focused on androgens. As well as androgenic steroids, prostaglandins (PG) are also important role in hair growth and MPB. MPB patients also showed higher level of PG in hair. However there was no study about urine PG level change during finasteride treatment.

**Objective:** In this study, we investigated changes in urine androgen and PG level during finasteride treatment.

**Methods:** We collected urine sample of ten MPB patients who treated with finasteride for 1 year and ten normal healthy males for control group. And we analyzed T, DHT, EpiT, DHEA, and PGs in urine sample by ultra-high-performance liquid chromatography-tandem mass spectrometry.

**Results:** The urinary androgen and prostaglandin levels were not significantly different between the two groups. MPB patients usually have high levels of androgen and PG levels, but finasteride treatment reduces the levels of androgen and PG to similar levels as the healthy control group.

**Conclusion:** This study confirmed that finasteride treatment reduced urinary PG to normal levels. And with further studies about PGs, it is expected that urine PGs can be used as a marker for confirmation of finasteride therapeutic effect.

# P5
# The efficacy and safety of 5α-reductase inhibitors in 499 men over 50 years with AGA

**Min-Jeong Kang, Joong-Woon Choi, Ye-Jin Lee, Bark-Lynn Lew, Woo-Young Sim**

Department of Dermatology, Kyung Hee University hospital at Gang-dong, Kyung Hee University School of Medicine, Seoul, Korea

**Background:** Finasteride and dutasteride, inhibitors of 5$\alpha$-reductase (5ARI), were used for the treatments of androgenetic alopecia (AGA). Until now, many studies have been reported on the efficacy and side effects of 5ARI, but most of them were conducted on young men under 50 years of age.

**Objective:** we studied the efficacy and safety of 5ARI in men over 50 years of age.

**Methods:** We studied on the efficacy and side effects of 5ARI in men aged over 50 years who visited Kyung Hee University hospital at Gang-dong for the first time from 2006 to 2017 who were treated with finasteride(1mg/day) or dutasteride(0.5mg/day) on the diagnosis of AGA. We compared the photographs taken at the first visit with the photographs after taking the 5AR for 6 months or more, and described the degree of improvement as seven-point scale. (-3: greatly decreased, -2: moderately decrease, -1: slightly decreased, 0: no change, 1: slightly increased, 2: moderately increased, 3: greatly increased).

**Results:** Of the 499 patients, characteristics of all patients evaluated for treatment efficacy are as follows: mean age at onset and at start of treatment, 48.2 years (40-62) and 55.4 years (50-79); and values of each N-H scale II/III/IV/V/VI/VII/F1/F2 were 24/170/104/83/18/2/61/37, respectively. Compared with baseline, seven-point scores increased significantly after treatments as determined by Wilcoxon signed-rank test. (mean=1.61, $p < 0.001$).

**Conclusion:** Although 5ARI had been studied in patients under 50 years of age, this study proved efficacy and safety of 5ARI for patients over 50 years of age.

# P6
# Evaluation of illness behavior in androgenetic alopecia using the basic and specific classification

**Chung Hyeok Lee, Won-Soo Lee**

Department of Dermatology and Institute of Hair and Cosmetic Medicine,
Yonsei University Wonju College of Medicine, Wonju, Korea

**Background:** The concept of illness behavior aids in understanding a patient's responses to disease. In androgenetic alopecia (AGA), the Basic and Specific (BASP) classification may aid in predicting illness behavior of the affected individuals.

**Objective:** To assess whether BASP classification is associated with a patient's illness behavior.

**Methods:** Patients who visited Wonju Severance Christian Hospital from June 2017 through August 2018 were included. Questionnaires included items about sources of hair loss knowledge, willingness for treatment, expected effects of AGA treatment, expected effects of supplementary therapy, and the first treatment that the patient wants. The patients were divided into three groups according to their BASP classification: mild-to-moderate, BASP type M1-2, C1, F1-3 or V1-2; moderate-to-severe, BASP type M3, C2-3, U1-3 or V3; and severe, BASP type C3 or U1-3.5 The patients' questionnaires were then compared.

**Results:** A total of 339 questionnaires were analyzed. Most patients showed a mild-to-moderate degree of AGA (n=269, 79.3%), followed by moderate-to-severe (n=50, 14.7%) and severe (n=20, 5.8%) degrees of AGA. The mean age of patients in the mild-to-moderate, moderate-to-severe, and severe groups were 57.08, 59.58, and 58.07 years, respectively. For most items, there were positive correlations between hair loss severity and favorable illness behavior. In particular, willingness for treatment (P = 0.002) and source of hair loss knowledge (P=0.001) items showed statistically significant correlations.

**Conclusion:** This study revealed a positive correlation between hair loss severity according to BASP classification and favorable illness behavior. In the clinical field, the physician can predict a patient's illness behavior, such as willingness for treatment, by assessing the patient's BASP classification and could then help in establishing the treatment strategies.

# P7
# Relationship of regrowth pattern in alopecia areata according to DIMT classification with treatment

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**Background:** DIMT classification has been suggested as a morphological classification system for hair regrowth patterns in alopecia areata (AA) patches, that include diffuse (D), irregular (I), marginal (M), and targetoid (T) patterns. However, factors affecting hair regrowth patterns have not been previously evaluated.

**Objective:** To investigate whether the hair regrowth patterns in AA patches according to DIMT classification is associated with treatment modality which the patches have received.

**Methods:** Reviewing the serially-taken clinical photographs of AA patches where hair regrowth was observed, patterns of hair regrowth were determined according to DIMT classification. Treatment modalities which the AA patch received were categorized into topical corticosteroid (TSC), systemic corticosteroid (SCS), diphenylcyclopropenone contact immunotherapy (DPCP), and triamcinolone intralesional injection (TA ILI). A relationship of the hair regrowth pattern with the treatment modality was analyzed by chi-square test.

**Results:** A total of 152 hair regrown AA patches were analyzed. A diffuse hair regrowth pattern (57, 37.5%) was the most frequently observed pattern, followed by marginal (43, 28.3%), targetoid (36, 23.7%), and irregular hair regrowth patterns (16, 10.5%). An irregular pattern was most frequent in areas treated with TA ILI than with any other modalities ($p < 0.001$). A marginal pattern was more frequent in areas treated with SCS than with TA ILI ($p=0.002$).

**Conclusion:** The hair regrowth pattern is related to treatment modalities which the patches have received.

# P8
# Describing patterns and distributions of alopecia areata helpful for patient characterization

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**Background:** Alopecia areata (AA) is a disease of wide spectrum with varying extent and distribution of hair loss in each patient. Previous classifications for AA are limited for its extent of scalp lesion, not descriptive for comprehensive patients' condition regarding AA.

**Objective:** To develop a method for describing patterns and distribution of AA and to investigate whether such clinical conditions possess prognostic value.

**Methods:** Scalp patterns were categorized as AP (patchy AA), AR (alopecia reticularis), AO (alopecia ophiasis), AS (alopecia sisaipho), and AD (diffuse AA). Extra-scalp sites were categorized as E (eyebrow), L (eyelash), M (mustache), B (beard) and O (other sites). Extent of scalp and extra-scalp alopecia were graded into six grades (G0-5; 0, 1–24, 25–49, 50–74, 75–99, 100%). In G0 or G5 scalp lesions, the scalp pattern and extent was replaced by NL (normal) or AT. The final description was determined using the combination of the scalp pattern and grade, followed by the each extra-scalp site and grade, if any. (e.g. AD4M5B5, ATE2) Odds ratio (OR) of poor treatment response according to the such clinical conditions were calculated using our retrospective data.

**Results:** Larger ORs were determined for scalp pattern AT, scalp extent G3-4, one or more sites of extra-scalp lesions, and maximal extra-scalp extent G3-5.

**Conclusion:** This method also addresses scalp AA pattern and the distribution of extra-scalp lesions. This could help physicians characterize AA patients. Furthermore, such clinical conditions have prognostic value.

# P9
# Applications of platelet-rich plasma in a case of refractory alopecia areata

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Platelet-rich plasma (PRP) is a platelet concentrate obtained from blood centrifugation. PRP can be used in chronic ulcer, burn and hair loss. Especially, PRP has been used as treatment for non-scarring alopecia with improvement such as the hair growth, increase in hair thickness. Herein, we report a case of refractory alopecia areata which shows improvement on PRP treatment. A 30-year-old man presented with hair loss patch on the frontal area for 2 years. He had been treated with 2 months of topical minoxidil but there was no improvement. Physical examination revealed asymptomatic, solitary, 7x3cm-sized, erythematous hair loss patch on the frontal area. Dermoscopic examination revealed multiple yellowish spots and tiny upright hairs. The patient was diagnosed with alopecia areata and initially treated with 2.5mg/dl triamcinolone intralesional injection for 1 year, but lesion shows little improvement. So he was treated with 5.0mg/dl triamcinolone injection and topical desoxymethasone gel for 6 months, but there was also little effect. Then he was treated with PRP injection 4 times for 4 months. After treatment, hair loss stopped and new hair growth was seen. Mechanism of action of PRP is not clear, but growth factors like fibroblastic growth factor-basic act at the bulb of follicle joining to primitive stem cell receptors. They activate proliferative phase of the hair originating a new follicular unit through extracellular signal-regulated kinase pathway. Though further research is needed, PRP treatment would be a good option in treating refractory alopecia areata.

# P10
# Unusual pattern of alopecic patch distribution : A case of alopecia areata of supra-auricular area

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Alopecia areata (AA) is a nonscarring hair loss disorder that can affect scalp, body hair, eyebrows and eyelashes. The typical AA patient most often presents with one or several, nonscarred, round or oval, sharply demarcated alopecic patches. Herein, we report a case of uncommon pattern of alopecic patch distribution localized to both supra-auricular area. A 63-year-old woman presented with 6 months history of hair loss on the both supra-auricular area. She had not any history of pressure, trauma or hair pin use and many yellow dots were showed on the dermoscopic examination. The patient was diagnosed with not cicatricial alopecia but AA and she have been treated with 5mg/dl triamcinolone intralesional injection for 6 months. There are many different forms of AA and its variants involving scalp entirely or patterned like sisaipho and ophiasis type are not common. Sometimes, supra-auricular area can be affected with occipital regions in rectangular occipital AA. To our knowledge, there have been no literally reported cases involving only both supra-auricular areas. It should be distinguished from other forms of hair loss including frontal fibrosing alopecia and traction alopecia.

# P11
# The study of characteristics of ADTA : histopathologic and dermoscopic findings and cytokine profile

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**Background:** Acute diffuse and total alopecia (ADTA) is a type of alopecia areata (AA) and it is characterized by rapid hair loss and rapid recovery unlike alopecia totalis (AT). Cytokine profile of ADTA has not been studied yet. And histopathologic examination may be necessary because it can be confused with other sudden hair loss disease, such as acute telogen effluvium. Although a number of studies have been reported on dermoscopic finding of AA, studies on ADTA are extremely limited.
**Objective:** To determine the characteristics of Th17 and Treg cytokines, and to evaluate the characteristic dermoscopic and histopathologic findings of ADTA.
**Methods:** Scalp skin and serum of ADTA patients were obtained for real-time quantitative PCR and ELISA for IFN-$\gamma$, TNF-$\alpha$, TGF-$\beta$, IL-1, IL-2, IL-4, IL-10, IL-12A, IL-13, IL-17, IL-22 and IL-23. The biopsy specimens were taken from the scalp in areas of recent, active hair loss or marginal areas and the specimens were sectioned by Tyler technique. The scalp skins were examined by dermoscopy (Dermlite DL3N) and photographed.
**Results:** The lesional and serum IL-17 and IL-22 levels were significantly higher in AA than control group, and lower in ADTA than in other types of AA. Yellow dots, black dots, broken hairs, short vellus hairs and tapering hairs were observed at a higher rate than other types of AA,
**Conclusion:** Although we failed to find any typical significant cytokine profile of ADTA, it is meaningful finding that Th17 cytokine levels were decreased in ADTA compared to other types of AA.

# P12
# The effects of synthetic ceramide on dandruff, erythema, sebum secretion and water loss of scalp

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**Background:** Ceramide is important in barrier function of epidermis. It can reduce epidermal water loss and inhibit producing dandruff. Ceramide is an essential component in protecting hair and can be used as a cosmetic ingredient to improve seborrheic dermatitis and subjective symptoms like pruritis.

**Objectives:** We aimed to evaluate the efficacy of synthetic ceramide on dandruff, erythema, sebum secretion and water loss of scalp.

**Methods:** Total of 20 subjects, 10 were randomly assigned to group using ceramide-containing shampoo and other 10 were assigned to group using controlled shampoo. The subjects had received the evaluation of scalp before the trial and after using shampoo 15ml once a day for 4 weeks. Scores were assessed subjectively about dandruff, erythema and pruritus. Sebum was collected using sebumeter and sebum secretion was recorded at 4 parts (frontal, vertex, both temporal area). Trans-epidermal water loss was measured using corneometer at same sites.

**Results:** 8 patients (80%) had favorable outcomes with ceramide shampoo in dandruff, erythema compared with 5 patients (50%) in control group. Sebum secretion increased in ceramide group and decreased in control group, but not statistically significant. Water content showed a tendency to increase in ceramide group, whereas water content significantly decreased in control group. After 4 weeks, there was no pruritis in ceramide group and 2 patients (20%) have pruritis in control group.

**Conclusion:** These results indicate that synthetic ceramide is effective in improving dandruff, erythema and reducing water loss.

# P13
# Effect of iontophoresis with growth factor cocktail containing fibroblast growth factor 5-short applied on the scalp in the patients with androgenetic alopecia - a split study

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**Background:** Growth factor cocktail (GFC) in combination with microneedling is an effective and safe treatment for patients with androgenetic alopecia (AGA). However, there is a lack of studies on the absorption effect of the GFC in the scalp through iontophoresis.
**Objective:** This study aimed to evaluate the effect of iontophoresis with GFC including Fibroblast growth factor 5-short (FGF5s) on hair growth in patients with AGA.
**Methods:** The study was performed on patients with AGA who were treated with topical GFC including FGF5s using iontophoresis headset once in day for 12 weeks. The scalp was divided into right and left sides, and treated with GFC including FGF5s (right side) and normal saline (left side). The effect of the iontophoresis by head set was applied to the scalp every 15 minutes a day. A total of 20 patients (9 males and 11 females) were enrolled. Treatment efficacy was evaluated through phototrichogram and digital photograph analyses every 4 weeks for 12 weeks.
**Results:** Phototrichogram images showed that 12 weeks of treatment with GFC including FGF5s through iontophoresis increased hair density from $165.5 \pm 21.0/cm^2$ to $169.7 \pm 21.1/cm^2$ and diameter from $54.7 \pm 10.7$ $\mu$m to $56.0 \pm 10.9$ $\mu$m. These results were statistically significant in difference ($p < 0.05$). The phototrichogram images of the region treated with saline after 12weeks showed that hair density from $165.7 \pm 23.3/cm^2$ to $164.9 \pm 22.6/cm^2$ and diameter from $53.4 \pm 10.9$ $\mu$m to $53.9 \pm 11.0$ $\mu$m. The results treated with saline after 12 weeks were not significant in difference from baseline in both hair density and diameter.
**Conclusion:** Absorption of GFC including FGF5s through iontophoresis showed its effect for patients with AGA in the time frame of 12 weeks. However, further study is needed on the long term efficacy of absorption of GFC through iontophoresis.
Keywords: Androgenetic alopecia, Iontophoresis, Growth factor cocktail, Fibroblast growth factor 5-short

# P14
# Temporal hair loss is common in female pattern hair loss: Retrospective phototrichogram analysis in Korean patients

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**Background:** Female pattern hair loss (FPHL) affects the central scalp sparing the frontal hairline. The temporal area also can be affected by hair loss.

**Objective:** To investigate the degree of temporal hair loss and correlation of other sites of scalp hair loss in Korean FPHL patients

**Methods:** A total of 109 women with FPHL were enrolled in this retrospective analysis. We measured hair density and thickness in five scalp sites including the frontal, vertex, occipital and bilateral temporal areas by phototrichogram. Frontal (F) and vertex (V) area hair loss was classified according to the specific types of the Basic and Specific (BASP) classification, and temple (T) and occiput (O) areas were also assessed.

**Results:** Eighty-nine out of 109 patients showed temporal hair loss. Hair density was lowest in the temporal area. Total and thick hair densities of the frontal scalp were correlated with those of the vertex, temple and occiput in decreasing order, and hair thickness was more correlated with that of the temple than the vertex.

**Limitations:** The subjects were outpatients in one university dermatologic center who complained about hair loss, and not from the general population in Korea.

**Conclusion:** This study shows that temporal involvement is evident in FPHL. We suggest that temporal involvement should be added to pattern hair loss classification, especially BASP classification.

# P15
# Efficacy of adipocyte-derived stem cell conditioned media on chronic refractory alopecia areata : Retrospective study of 9 patients

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Department of Dermatology, Inha University School of Medicine

**Background:** Management of Alopecia Areata (AA) is often challenging as patients may be unresponsive to conventional treatments such as corticosteroids, contact immunotherapy, minoxidil, phototherapy and systemic therapy. Because adipocyte derived stem cell media contains several growth factors which can activate hair follicles and regenerate hair growth, it can be alternative therapeutic option for chronic refractory AA.

**Objective:** This study aimed to evaluate the efficacy of Adipocyte-derived stem cell conditioned media (SCM2®-Black) for chronic refractory AA.

**Methods:** Nine male patients (26~46 years old, mean age 36.8 years) with chronic, treatment-refractory AA who were treated with adipocyte-derived stem cell conditioned media from March 2017 were evaluated retrospectively. The extent of hair regrowth expressed as percentage of the bald area was used to evaluate the effectiveness of the therapy.

**Results:** Hair regrowth over 50% of scalp was observed in 6 patients (67% of the patients), with five complete hair regrowth (56% of the patients). 2 patients showed no more than 25% of response, and 1 patients had no response among them.

**Conclusion:** This study suggests that adipocyte-derived stem cell conditioned media could be effective treatment option for chronic refractory AA.

# 대한모발학회 회칙

## 제 1 장 총 칙

제 1 조 (명칭) 본회는 대한모발학회(The Korean Hair Research Society)라 하며 대한피부과학회의 산하학회이다.

제 2 조 (구성) 본회는 모발 및 모발과 관련된 질환을 다루고 연구하는 사람으로 구성한다.

제 3 조 (목적) 본회는 모발에 대한 연구, 교육 및 학술활동을 수행하고 회원 간의 친목을 도모함을 목적으로 한다.

제 4 조 (사업) 본회는 전항의 목적을 달성하기 위하여 다음과 같은 사업을 수행한다.

1. 총회 및 학술대회 개최
2. 초록집, 학술지 및 소식지의 발간
3. 모발 및 모발질환에 대한 연구, 교육 등 제 문제에 대한 사업
4. 국내외 관련 학술단체와의 교류 및 제휴
5. 기타 본 학회 목적 달성에 필요한 사업

## 제 2 장 회 원

제 5 조 (자격) 본회의 회원은 모발 관련 진료 및 연구에 종사하거나 관심을 가지고 본 학회의 취지에 찬동하는 자로서 소정의 입회 수속을 밟고 이사회의 의결을 거쳐 총회에서 인준을 받은 자로 한다.

제 6 조 (구분) 본회의 회원은 다음과 같이 구분한다.

1. 정회원: 대한피부과학회 정회원 자격자로 본 회 목적에 찬동하는 자로한다.
2. 명예회원: 모발 관련 진료 및 연구 업적이 탁월하고 본 회 발전에 공헌이 지대한 자로 한다.
3. 연구회원: 생명과학 관련분야에 종사하는 박사학위 소지자이거나 이 에 준하는 경력자로 본 회 목적에 찬동하는 자로 한다.
4. 전공의준회원: 대한피부과학회 준회원 자격자로 피부과 수련병원에서 수련 받는 전공의로 한다.
5. 연구준회원: 정회원 또는 연구회원의 지도를 받거나 생명과학 관련분야에 종사하는 연구원 또는 이에 준하는 경력자로 본 회 목적에 찬동 하는 자로 한다.

제 7 조 (의무) 회원은 본 회의 회칙, 제 규정 및 결의 사항을 준수하여야 하고, 정회원, 명예회원 및 연구회원은 회비 및 기타의 부담금을 납부할 의무가 있다.

제 8 조 (권리) 모든 회원은 본회에서 발간하는 소식지 및 학회지를 배부 받을 권리가 있으며 정회원은 선거권, 피선거권 및 기타 소정의 의결권을 가진다.

제 9 조 (제명) 본회의 의무를 준수하지 않거나 명예를 훼손한 회원은 이사회를 거쳐 총회의 인준을 받아 제명할 수 있다.

## 제 3 장 임 원

제 10 조 (임원) 본회는 회장, 부회장 3명 이내, 총무, 학술, 교육, 재무, 홍보, 간행정보, 기획, 의무, 무임소 상임이사, 감사 2명 및 약간 명의 고문을 두며 이사의 정원은 30명 내외로 한다. 무임소 상임이사는 2-5명으로 한다.

제 11 조 (선임)

1. 회장, 감사는 총회에서 선출한다.
2. 부회장, 상임이사는 회장이 위촉한다.
3. 이사는 상임이사회에서 추천하여 회장이 위촉한다.
4. 고문은 회장이 위촉한다.

제 12 조 (임기) 임원의 임기는 2년으로 하며 연임할 수 있다.
전임자의 유고로 인해 보선된 임원의 임기는 전임자의 잔여 임기로 한다.

제 13 조 (직무)

1. 회장은 본회를 대표하여 업무를 총 관리하고 총회, 이사회의 의장이 된다.
2. 부회장은 회장의 유고시 그 직무를 대행하며, 본 회 운영의 주요한 사항을 심의하고 제반 업무를 집행한다.
3. 총무이사는 본회 운영의 주요한 사항을 심의하고 제반 업무를 집행한다.
4. 학술이사는 학술 모임에 관한 업무를 집행한다.
5. 교육이사는 회원 교육에 관한 업무를 집행한다.
6. 재무이사는 재무에 관한 업무를 집행한다.
7. 홍보이사는 홍보 및 대중 매체에 다루어지는 업무를 집행한다.
8. 간행정보이사는 간행 및 정보에 관한 업무를 집행한다.
9. 기획이사는 기획에 관한 업무를 집행한다.
10. 의무이사는 의무에 관한 업무를 집행한다.
11. 무임소이사는 특정 사업이나 지속적 업무를 집행한다.
12. 간사는 상임이사의 업무를 보좌한다.
13. 감사는 본 학회의 재산 상황과 사업과 관련된 사항을 감사하고 이를 총회에 보고한다.
14. 이사는 이사회를 구성하여 본 학회 운영의 주요 사항을 심의 의결한다.
15. 고문은 본 학회의 운영 전반에 대한 자문을 한다.

## 제 4 장 회 의

제 14 조 (구분) 본회에는 총회와 이사회, 상임이사회를 둔다.

제 15 조 (총회)

1. 정기총회는 연 1 회 회장이 소집한다. 단 정회원 5분의 1이상의 요구나 이사회의 요청이 있으면 임시 총회를 소집하여야 한다.
2. 총회는 출석 정회원으로 성립되고 재석 인원 과반수로 의결한다.
3. 총회는 다음과 같은 사항을 의결한다.

(1) 회장, 감사 선출
(2) 예산과 결산의 인준
(3) 회칙 개정의 인준
(4) 기타 이사회에서 제출한 사항

제 16 조 (이사회)

1. 이사회는 임원과 이사로 구성하며 회장이 의장이 되어 회의를 진행한다.
2. 이사회는 과반수 출석으로 성립하고 재석 인원 과반수로 의결한다.
3. 이사회는 총회에 제출하여 인준 또는 의결할 사항, 제 규정의 제정과 개정, 회원의 자격과 제명 및 기타 필요한 사항에 대하여 심의 의결 또는 인준한다.

제 17 조 (상임이사회)

1. 상임이사회는 상임이사로 구성하며 회장이 의장이 되어 회의를 진행한다.
2. 상임이사회는 이사회 및 총회에 제출하여 인준 또는 의결할 사항을 포함하여 회무 전반에 관한 사항을 심의 의결 또는 인준하여 집행한다.

제 18 조 (각종 위원회)

1. 이사회의 의결을 거쳐 각종 위원회를 둘 수 있다.

## 제 5 장 재 정

제 19 조 (재원) 본 회의 재원은 회비, 입회비, 찬조금 및 기타 수입금으로 한다.

제 20 조 (회계년도) 본 회의 회계연도는 매년 정기 총회 일에서 다음 정기 총회 전일까지로 한다.

제 21 조 (임기) 본 회의 수지 결산은 감사의 감사를 거쳐 차기 정기 총회에 보고한다.

## 제 6 장 부 칙

제 22 조 본 회칙에 규정되지 않은 세칙은 일반 관례에 준한다.

제 23 조 본 회칙의 개정은 이사회의 심의를 거쳐 총회의 인준을 받아야 한다.

제 24 조 본 회칙은 공포일로부터 시행한다.

2004. 7. 1. 제정
2006. 5. 28 개정
2009. 5. 24 개정
2010. 10. 16 개정
2012. 6. 3 개정
2012. 10. 20 개정
2014. 10. 18 개정
2016. 10. 15 개정

# 대한모발학회 임원명단

(2018년 6월 - 2020년 5월)

- **고 문** 노병인, 박장규, 임철완, 강진수, 김도원, 심우영, 이원수
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- **부 회 장** 최광성

- **총무이사** 김문범
- **기획이사** 권오상
- **학술이사** 허창훈
- **재무이사** 유박린
- **교육이사** 이양원
- **간행정보이사** 김상석
- **홍보이사** 이상훈
- **대회협력이사** 이 영
- **의무이사** 조성빈
- **무임소이사** 박병철
- **무임소이사** 김정은
- **무임소이사** 김범준
- **무임소이사** 김도영
- **총무간사** 최지웅
- **학술간사** 박 진
- **감 사** 이동윤, 강광영

- **이 사** 계영철, 김규한, 김기호, 김성진, 김정철, 김창덕, 김효진, 민복기, 박성욱, 박현선, 방철환, 서구일, 서수홍, 성영관, 신기식, 신정원, 원종현, 윤태영, 이승호, 이인준, 이종록, 임이석, 장승호, 장용현, 전지현, 조성환, 조항래, 최유성, 홍창권, 황성주

# 대한모발학회 연혁

## ● 대한모발학회 소개 ●

대한모발학회는 1998년 10월 29일 대한피부과학회 내에 모발연구분과위원회를 설립하기 위한 발기인 모임을 가진 것을 시작으로 하여 태동이 되었습니다. 이후 모발연구분과위원회의 주도로 매년 대한피부과학회 춘추계학술대회 때마다 모발심포지엄을 개최하여 왔습니다. 이후 기존의 모발연구분과위원회를 확대 개편하여 대한모발학회를 창립하기로 하고 2004년 7월 11일 제주도 샤인빌 호텔에서 창립총회를 가졌습니다. 초대회장으로 노병인 교수를 비롯한 임원진이 선출되었고, 이후 본격적인 활동을 시작하였습니다.

현재 대한모발학회는 북미모발학회, 유럽모발학회, 일본모발학회 및 호주모발학회와 함께 세계모발연구학회를 구성하는 5대 학회로서 당당히 어깨를 겨루는 세계 속의 학회로 성장하게 되었으며 2006년 5월 28일 제2대 회장으로 박장규 교수, 2008년 5월 25일 제3대 회장으로 임철완 교수, 2010년 6월 13일 제4대 회장으로 강진수 원장, 2012년 6월 3일 제5대 회장 김도원 교수, 2014년 5월 17일 제6대 심우영 교수, 2016년 5월 29일 제7대 이원수 교수가 선출되어 임기동안 학회를 훌륭히 이끌었습니다. 현재는 2018년 5월 27일 연세의료원에서 개최된 제14차 대한모발학회 학술대회에서 제8대 강훈 교수가 회장으로 선출되어 제8기 집행부를 구성하여 회무를 담당하고 있습니다.

## ● 학술활동 소개 ●

### 1. 대한모발학회 학술대회

대한모발학회 학술대회는 1년에 한 번 개최되며, 해외학자 초청강연, 특강 및 교육 강연, 각종 구연 및 포스터 연제 발표 등으로 이루어지는 대한모발학회의 꽃이라고 할 수 있습니다. 제 1차 및 제 2차 심포지엄을 거쳐 2006년 제 3차 대회 때부터 정식 학술대회의 면모를 갖추게 되었습니다.

1) 제1차 대한모발학회 심포지엄
- 2004년 11월 7일 밀레니엄 힐튼 호텔
- 탈모에서 Mesotherapy 외 9 강좌

2) 제2차 대한모발학회 심포지엄
- 2005년 6월 19일 밀레니엄 힐튼 호텔
- 탈모증의 진단 외 12강좌

3) 제3차 대한모발학회 학술대회
- 2006년 5월 28일 밀레니엄 힐튼 호텔
- 원형탈모증의 임상적 특징 외 8강좌 및 일반연제

4) 제4차 대한모발학회 학술대회
- 2007년 5월 27일 밀레니엄 힐튼호텔
- 원형탈모증의 원인과 발생기전 외 10강좌 및 일반연제

5) 제5차 대한모발학회 학술대회
- 2008년 5월 25일 밀레니엄 힐튼호텔
- 모낭과 안드로겐 외 15강좌 및 일반연제

6) 제6차 대한모발학회 학술대회
- 2009년 5월 24일 밀레니엄 힐튼 호텔
- 모낭의 발생 외 12 강좌 및 일반연제

7) 제7차 대한모발학회 학술대회
- 2010년 6월 13일 밀레니엄힐튼호텔
- New insights into hair biology 외 14 강좌 및 일반연제

8) 제8차 대한모발학회 학술대회
- 2011년 9월 18일 코엑스 회의실 Hall E (3층)
- Current and new aspects of female pattern hair loss 외 23 강좌 및 일반연제

9) 제9차 대한모발학회 학술대회
- 2012년 6월 3일 백범김구기념관
- Defining the function of genes in differentiation of hair follicle stem cells 외 13 강좌 및 일반연제

10) 제10차 대한모발학회 학술대회
- 2013년 5월 26일 백범김구기념관
- Latest news about the genetics of alopecia areata 외 18 강좌 및 일반연제

11) 8th World Congress for Hair Research
- May 14 (Wed) ~ 17 (Sat), 2014 Jeju Island, Korea

12) 제11차 대한모발학회 학술대회
- 2015년 5월 31일 가톨릭대학교 서울성모병원 지하1층 대강당
- Wnt/β-catenin signaling controls proliferation but not survival of hair follicle stem cells외 14 강좌 및 일반연제

13) 제12차 대한모발학회 학술대회
- 2016년 5월 29일 가톨릭대학교 서울성모병원 지하1층 대강당
- Clinical aspect of alopecia areata on pathogenic factors and treatment외 10 강좌 및 일반연제

14) 제13차 대한모발학회 학술대회
- 2017년 5월 28일 연세의료원 종합관 337호, 331호
- Noncoding dsRNA induces hair follicle neogenesis외 31 강좌 및 일반연제

15) 제14차 대한모발학회 학술대회
- 2018년 5월 27일 연세의료원 종합관 337호, 211호
- Harnessing the hair follicle to promote healing외 34 강좌 및 일반연제

## 2. Hair Forum

2001년 시작하여 해마다 참석하는 인원이 늘어나고 있는 Hair Forum은 모발학회 회원들 간의 격식 없는 모임입니다. 이는 자유로운 토론과 회원 상호간의 친목도모를 위하여 마련되고 있으며, 주로 진단 및 치료가 어려운 증례에 대한 토론, 그동안 연구했던 내용 발표, 해외모발학회 참관기 소개 등 다른 회원들과의 의견공유를 위해서 밤늦은 시간까지 진행됩니다. 최근에 개최된 Hair Forum 현황은 다음과 같습니다.

1) 2004년 8월 28일 대전 유성 스파피아 호텔
모낭유래세포에서의 androgen receptor, estrogen receptor의 발현 양상 외 13건 발표

2) 2005년 8월 20일 대전 유성 스파피아 호텔
원형탈모증 환자 400명의 임상적 고찰 외 8건 발표

3) 2006년 8월 19일 대전 유성 레전드호텔
Acute diffuse alopecia areata 외 11건 발표

4) 2007년 8월 18일 대전 유성 리베라 호텔
모낭유래세포의 특성분석 외 13건 발표

5) 2008년 8월 23일 대전 유성 리베라호텔
전두탈모증 환자에서 모반 제거후 모발재생의 치료 경험 외 18 건 발표

6) 2009년 8월 22일 대전 유성 리베라 호텔
원형 탈모증 환자에서 스트레스 평가에 대한 예비 연구 외 9건 발표

7) 2010년 8월 21일 대전 유성 리베라호텔
Effect of radiofrequency radiation on human hair follicle cells 외 16건 발표

8) 2011년 8월 27일 대전 유성 호텔아드리아
Uitraviolet radiation alters lipid metabolism in human hair follicle 외 11건 발표

9) 2012년 8월 18일 대전 유성 호텔아드리아
Effects of Mycophenolic acid and Rapamycin on hair growth외 12건 발표

10) 2013년 8월 17일 대전 유성 호텔아드리아
How can we enhance follicular penetration? 외 14건 발표

11) 2014년 7월 26일 대전 호텔 리베라 유성
털껍질(hair-cuticle)이 모발색조에 미치는 영향 외 6건 발표

12) 2015년 8월 22일 대전 호텔리베라 유성
Hair graying: Clinical features & significance 외 8건 발표

13) 2016년 8월 27일 대전 유성호텔
HMGB1 and hair growth: a potential role of prostaglandin metabolism 외 10건 발표

14) 2017년 8월 26일 대전 유성호텔
Recent trends in experimental hair research 외 6건 발표

15) 2018년 8월 18일 대전 유성호텔

The effect of ceramide-based essence cream for the damaged hair shaft 외 8건 발표

### 3. 대한피부과학회 학술대회 시 모발심포지엄 개최

대한모발학회는 대한피부과학회 산하의 모발연구분과위원회이기도 하므로, 1999년부터 매년 대한피부과학회의 춘추계 학술대회에서 모발심포지엄을 진행하고 있습니다. 2009년부터는 대한피부과학회 춘추계학술대회시 한 번에 한해 분과심포지엄을 개최할 수 있는 대한피부과학회의 새로운 자체 규정에 따라 추계학술대회에서 모발심포지엄을 개최해 오고 있습니다.

# 대한모발학회 학술대회 전시 및 광고회사

[ 전시회사 ]

| No. | 회사명 | 연락처 | No. | 회사명 | 연락처 |
|---|---|---|---|---|---|
| 1 | MSD | 02-331-2000 | 13 | 동화약품 | 02-2021-9495 |
| 2 | GSK | 02-709-4114 | 14 | 바름메디 | 02-733-2900 |
| 3 | 갈더마코리아 | 02-6717-2000 | 15 | 대웅제약 | 02-550-8800 |
| 4 | 존슨앤드존슨 | 080-023-1414 | 16 | 코오롱제약 | 02-2120-8457 |
| 5 | 한국노바티스 | 02-768-9000 | 17 | 사노피젠자임 | 02-2136-9000 |
| 6 | 종근당 | 02-6200-3117 | 18 | 한림제약 | 02-3489-6000 |
| 7 | 동아ST | 02-920-8286 | 19 | 리드엠 | 02-599-4929 |
| 8 | 후파마 | 02-447-8060 | 20 | 보령제약 | 02-708-8075 |
| 9 | 현대약품 | 02-2600-3833 | 21 | 동구바이오제약 | 02-2684-5421 |
| 10 | 한국얀센 | 02-2094-4500 | 22 | 정우의학 | 02-822-1361 |
| 11 | 한국릴리 | 02-3459-2676 | 23 | 원형탈모환우회 | 02-3407-8680 |
| 12 | 한미약품 | 02-410-9114 | | | |

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| No. | 회사명 | 연락처 | No. | 회사명 | 연락처 |
|---|---|---|---|---|---|
| 1 | MSD | 02-331-2000 | 6 | 한국콜마 | 02-3485-1076 |
| 2 | GSK | 02-709-4114 | 7 | 아이칸 | 031-705-8841 |
| 3 | 한국노바티스 | 02-768-9000 | 8 | 메디유 | 010-3756-9213 |
| 4 | 라로슈포제 | 02-3497-9189 | 9 | 유한양행 | 02-828-0181 |
| 5 | 안국약품 | 02-3289-4200 | | | |

The Korean Hair Research Society

# 2019년 제15차 대한모발학회 학 술 대 회


인 쇄 2019년 5월 23일
발 행 2019년 5월 26일

발행처 **대 한 모 발 학 회**

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