

# WCHR 2017

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Book of Abstracts

Honorary-President:  
Hideoki OGAWA

Co-President:  
Ryoji Tsuboi (SHSR),  
Satoshi ITAMI (JSCHR)

Kyoto,  
Japan

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07. Hair and Regenerative Medicine

**P-105**

**Tafloprost, a prostaglandin F2 $\alpha$  analog, has therapeutic potential for alopecia**

Kahori KINOSHITA<sup>1)</sup>, Kenzo KOIKE<sup>2)</sup>,  
Koji KANAYAMA<sup>1,3)</sup>, Takako SHIRADO<sup>3)</sup>, Satoshi ITAMI<sup>4)</sup>,  
Kotaro YOSHIMURA<sup>1,3)</sup>

1) The University of Tokyo, Japan  
2) Beauty Research Center, KAO Corp.  
3) Department of Plastic Surgery, Jichi Medical University  
4) Department of Regenerative Dermatology, Osaka University

**PURPOSE:**

Prostaglandin (PG) F2 $\alpha$  was reported to promote hair growth in these years. Tafloprost, one of the PGF2 $\alpha$  analogs was evaluated in this research.

**METHODS:**

Seven different concentrations of tafloprost were applied topically once daily on either telogen skin or depilation-induced anagen skin of C57BL/6 mice. Hair growth was examined until Day 42. The mechanism was examined in vitro and in vivo experiments.

**RESULTS:**

Topical application on telogen skin promoted telogen-to-anagen conversion mostly at the same concentration as a commercial eye-drop. Hair protrusion in tafloprost groups was much earlier than control group. Tafloprost prolonged early anagen phase in depilation-induced anagen mice, but didn't prolong mid-late anagen. In organ culture of human scalp hair and mice vibrissa follicles, hair shaft growth wasn't accelerated by tafloprost, and cultured human dermal papilla cells (hDPCs) didn't proliferate by tafloprost in BrdU-incorporation analysis. Angiogenesis by tafloprost wasn't seen in chick chorioallantoic membrane assay. Microarray of hDPCs and human keratinocytes (hKCs) revealed that IL-1 $\beta$ , known to induce catagen, and inflammatory cytokines such as IL-6, IL-8 and CXCL2 were downregulated in tafloprost-treated hDPCs, whereas growth factors related to hair-cycle such as FGF-1, 2, and 7 were stable. Genes related to keratinization were upregulated in tafloprost-treated hKCs.

**CONCLUSIONS:**

Tafloprost modulates hair cycle such as anagen induction and elongation of early anagen. These effects lead to therapeutic potentials for alopecia.

07. Hair and Regenerative Medicine

**P-106**

**Effect of a Combination of Pidioxidil and IP-PA1 on Growth of Human and Murine Hair**

Koji WAKAME<sup>1)</sup>, Hiroshi OKAWA<sup>2)</sup>

1) Hokkaido Pharmaceutical University School of Pharmacy, Japan  
2) Hakuryu-Dou Co., Ltd.

**Objective**

Pidioxidil (4-pyrrolidine-2,6-diaminopyrimidine-1-oxide) is a compound similar to chemical structure of minoxidil, and both these compounds have vasodilatory effects. Pidioxidil is used as an ingredient in cosmetics and is intended to promote hair growth. In this study, we developed a new liquid formulation containing pidioxidil and fermented wheat extract (IP-PA1) and reported its effect pertaining to promoting hair growth.

**Methods**

1) IP-PA1 was added to cultured human hair follicle dermal papilla cells (HFDC), and the cells were incubated for 2 h. Using RNA obtained from the cells, the expression of FGF-7 and VEGF mRNA was determined by real-time PCR, and comprehensive analysis of the expression of other genes was conducted using focused DNA arrays.  
2) A liquid formulation containing approximately 20 ingredients, including pidioxidil, IP-PA1 and herb extracts and functional materials, was applied to back of C3H/HeN mice every day. Images of all mice were obtained after 2 weeks, and hair growth was evaluated.

**Results**

In HFDC, addition of IP-PA1 (2 or 10  $\mu$ g/mL) significantly increased the expression of both FGF-7 and VEGF mRNA. Hair growth on the backs of mice was significantly increased when the liquid formulation containing multiple ingredients, including pidioxidil, IP-PA1 and some herb extracts and functional materials, was applied.

**Conclusion**

These results indicate that IP-PA1 participated in the activation of human hair follicle dermal papilla cells and promoted blood flow to the cells. In addition, by applying the formulation containing pidioxidil and IP-PA1, a strong promoting effect pertaining to hair growth was observed on mice model. Future clinical studies are planned to further demonstrate stimulation of hair growth in humans.