
Asia 3 Roundtable on Nucleic Acids 2024

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| 1992- Present | Founder, CEO & Chairman, BIONEER Corporation |
| 2023- Present | President, Korea R&D Industry Association |
| 2022- Present | Co-chair, Korean Society for Synthetic Biology |
| 2021- Present | Member, The National Academy of Engineering of Korea |
| 2019-2022 | President, Korea Analytical and Scientific Instruments Association |
| 2013-2014 | Committee Member, Presidential Advisory Council on Science & Technology |
| 2011- Present | Vice President, Korean Society of Chemical, Biological and Radiological Defense |
| 2006-2010 | Adjunct Professor, Dept. Bio & Brain Engineering, KAIST |
| 2001- Present | Vice President, Korea Biotechnology Industry Organization |
| 1986-1992 | Senior Researcher, Department of Molecular Cell Biology,
Korea Research Institute of Bioscience & Biotechnology (KRIBB) |
| 1992 PhD | Department of Chemistry, KAIST, Daejeon, Korea |
| 1986 MS | Department of Chemistry, KAIST, Daejeon, Korea |
| 1984 BS | Department of Chemistry, Seoul National University, Seoul, Korea |

Research Interests:

DNA synthesis, Molecular Diagnostics (PCR, Real-Time PCR), Drug development (siRNA), Instrument development.

Selected Publications:

1. Yun SI, Lee SK, Goh EA, Kwon OS, Choi W, Kim J, Lee MS, Choi SJ, Lim SS, Moon TK, Kim SH, Kyong K, Nam G, **Park HO***, Weekly treatment with SAMiRNA targeting the androgen receptor ameliorates androgenetic alopecia, *Scientific Report*, 2022 Jan 31;12(1):1607
2. Kim TR, Kim HY, Kim IH, Kim KC, Park JH, Yun S, Lee IC, Kim SH, **Park HO***, Four-Week Repeated Intravenous Dose Toxicity of Self-Assembled-Micelle Inhibitory RNA-Targeting Amphiregulin in Mice, *International Journal of Toxicology*, 2021 Oct;40(5):453-465
3. Kim TR, Kim HY, Kim KC, Ko Y, Park JH, Yun S, Lee IC, Kim SH, **Park HO***, Safety pharmacology of self-assembled-micelle inhibitory RNA-targeting amphiregulin (SAMiRNA-AREG), a novel siRNA nanoparticle platform, *Toxicology Reports*, 2021 Mar 8:839-845

Revolutionizing Hair Loss Treatment: A Safe and Highly Effective Solution for Androgenetic Alopecia

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Abstract

Androgenetic alopecia (AGA), commonly known as male or female pattern hair loss, affects up to 80% of men and 50% of women by age 70. AGA is primarily caused by an exaggerated response to androgens, particularly dihydrotestosterone (DHT).

Current treatments, such as finasteride and dutasteride, inhibit 5 α -reductase to reduce DHT levels. However, these systemic treatments can cause side effects, including decreased libido and, in some cases, suicidal ideation and psychological distress.

We developed CosmeRNA ARI, a novel SAMiRNA (self-assembled micelle inhibitory RNA) that is selectively delivered to hair follicles and suppresses androgen receptor (AR) expression in hair follicle tissue. This approach inhibits DHT-AR signaling locally within hair follicles, offering a more targeted treatment for AGA without systemic side effects. We synthesized and screened 547 SAMiRNA candidates, and the most potent SAMiRNA-AR68 (AR68) was selected.

In vitro. studies demonstrated that SAMiRNA-AR68 efficiently delivered to human follicle dermal papilla cells (HFDPs) and hair follicles, decreasing AR mRNA and protein levels. Safety studies confirmed no innate immune response up to 10 μ M in human PBMCs and no cytotoxicity up to 20 μ M in HFDP and HaCaT cells.

Two randomized, double-blind clinical studies were conducted:

Low dose (0.5 mg/ml) applied thrice weekly for 24 weeks

High dose (5 mg/ml) applied once weekly for 24 weeks

Quantitative analysis using phototrichograms showed increases in total hair counts. The high-dose study demonstrated an average additional hair growth of 1.3-1.9 hairs/cm² per month, comparable to finasteride. No side effects were observed in either study. In human clinical trials in Europe, weekly and bi-weekly applications showed statistically significant improvements in both efficacy and safety. Based on the above results, Bioneer has completed the notification of CosmeRNA ARI on CPNP in Europe.

These results suggest that weekly or bi-weekly topical application of CosmeRNA ARI is a safe and convenient treatment for AGA, offering comparable efficacy to daily α -reductase pill treatments.