HAIR DISORDERS

GENERATION OF INDUCED PLURIPOTENT STEM CELLS FROM SCALP FIBROBLASTS OF AN ANDROGENETIC ALOPECIA PATIENT

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Background: Induced pluripotent stem cells (iPSCs) are pluripotent stem cells derived from reprogramming somatic cells. Nowadays, iPSC lines have been generated from somatic cells with various underlying diseases for in vitro pathogenesis study and development of cell-based therapy. However, the derived iPSCs from scalp fibroblasts of androgenetic alopecia (AGA) has never been proposed.

Objective: To generate an AGA iPSC line by reprogramming scalp fibroblasts from a male AGA patient using Sendai virus (SeV)-based reprogramming method.

Materials and Methods: Scalp fibroblasts obtained from an AGA patient who underwent hair transplantation surgery. Scalp fibroblasts were reprogrammed with SeV carrying OCT4, SOX2, KLF4 and C-MYC reprogramming factors. The characterizations of iPSCs were demonstrated.

Results: Forty iPSC clones were isolated. The SFAGA-02.08 iPSC line was selected for further characterization. Pluripotency of the SFAGA-02.08 line was confirmed by Immunofluorescence staining that showed an expression of pluripotent markers (NANOG, OCT4, SSEA4, TRA-1-60, and TRA-1-81). The differentiation ability of the SFAGA-02.08 into cells of the three embryonic germ layers in vitro as demonstrated by a presence of a neuronal-specific marker beta III tubulin, a smooth muscle-specific marker SMA and a hepatocyte-specific marker AFP, indicated pluripotency of the line. The SFAGA-02.08 demonstrated a normal karyotype (46, XY). The short tandem repeat analysis showed identical profile between the iPSC line and its parental fibroblasts. Mycoplasma detection by quantitative polymerase chain reaction analysis was negative. No expression of SeV

genome and transgenes was detected in the iPSC line at passage 17.

Conclusion: This study demonstrated an effective reprogramming of fibroblasts into iPSCs by SeV- method. These iPSCs derived from scalp fibroblast of AGA patient are proposed as an efficient novel in vitro model of AGA and could potentially to further develop cell-based therapy of AGA.