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TATK FUSION PROTEINS OF OCT-3/4, KLF4 AND SOX2 FOR SAFER GENERATION OF IPSC

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SUMMARY

In this medical revolutionary era induced Pluripotent Stem Cell (iPSC) holds a great promise towards regenerative medicine. Its resolves the diminished availability of adult stem cells which is a major drawback to their use both in regenerative medicine and in the treatment of malignant disease. Series of researches have proven enforced expression of transcription factors including OCT3/4, KLF4, and SOX2, can induce the reprogramming of previously differentiated cells, to generate iPSC. However, the conventional method using viral vectors leads to genetic modification and subsequently to tumorigenicity which is unsafe for clinical application. Therefore, an improved and novel protein transduction domain, trans-activator of transcription known as TATk a synthetic TAT-HIV, utilized as a delivery system for an alternative safety method. In this study, we aimed to establish stable clone of 293T cells expressing TATk fusion proteins of Oct-3/4, KLF4, and Sox2, which further transduced into target cell for the generation of hiPSC. Preliminary data have shown, cells transiently transfected with recombinant protein vector TATk expressed the respective proteins intracellularly after 72 hours. However, except for GFP protein, no secretion of OCT3/4, SOX2 and KLF4 protein were observed. In protein transduction study, TATk-GFP protein was successfully transduced in Jurkat cells. Therefore, other novel TATk fusion proteins can be potentially used in further transduction studies. This finding will lay a foundation for safer delivery of fusion proteins for iPSC reprogramming.