

# Episomal iPSC Reprogramming

Non-viral, non-integrating plasmid system for clean iPSCs

## Generate Transgene-free iPSC Cell Lines Rapidly

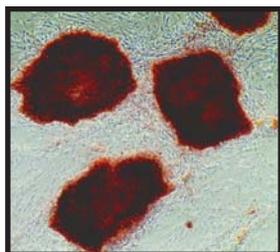
The use of four reprogramming factors delivered via retroviral transduction of cells was initially established as a powerful way to reprogram any somatic cell into an ES-like state. These reprogrammed cells are capable of differentiating into any cells representing the three germ lines, presenting a system that mirrors human ES cells. While such systems are quite useful for *in vitro* studies of differentiation, the challenge of adapting these virally-derived iPSCs for *in vivo* applications (e.g. cell therapy) is quite high, owing to the potential for random integration and subsequent risk of mutagenesis from viral-mediated delivery of reprogramming factors.

SBI has developed and validated a system that uses a non-viral, non-integrating, plasmid-based reprogramming technology and is a unique alternative to traditional retroviral-based reprogramming of cells. SBI's Episomal iPSC Reprogramming system, is based on the Epstein-Barr Nuclear Antigen-1 (*oriP/EBNA-1*) that has been proven to generate iPSCs very efficiently without the risk of transgenic sequences inserted into the target cell genome.

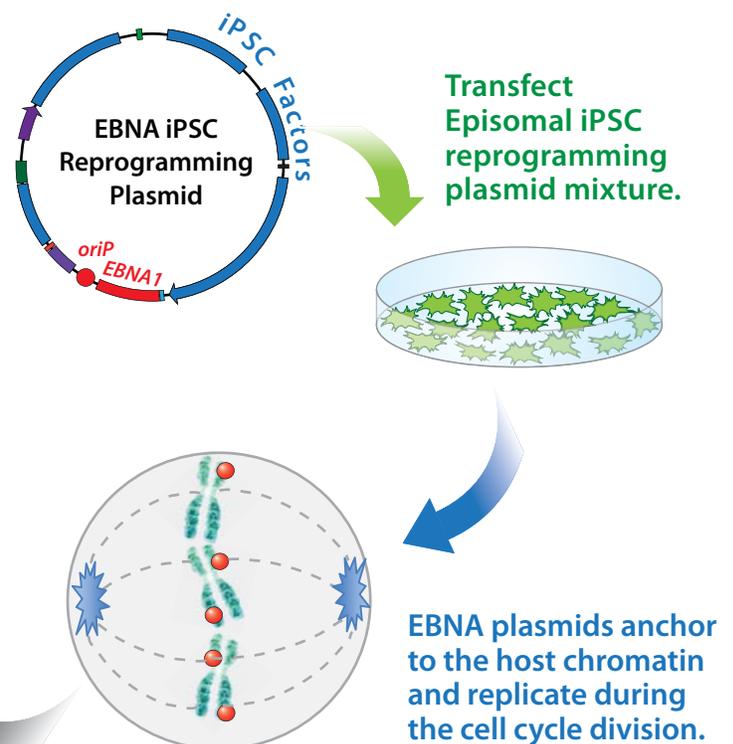
## How the *oriP/EBNA-1* Technology Works

Unlike traditional plasmid systems, the *oriP/EBNA-1* system replicates in synchrony with the host genome by anchoring itself to the host chromatin and replicating during the cell cycle divisions. The episomal plasmids are naturally lost at up to 5% per cell division cycle. SBI's episomal reprogramming kit contains Oct4, Sox2, Klf4, L-myc, Lin28, shRNA-p53, miR302/367 cluster and GFP. These transgene-free iPSCs have the capability to be utilized for a broader range of applications, including pre-clinical research and human gene therapy, thus further delivering on the promise of iPSC cells.

The Episomal iPSC reprogramming kit generates numerous, transgene-free iPSC cells.

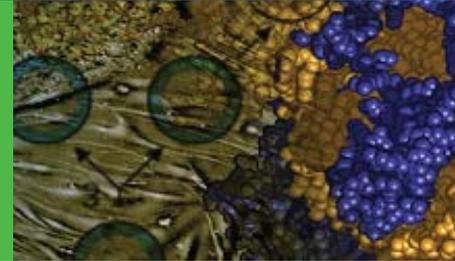


Episomal plasmids are active long enough to reprogram and then are lost.



## Highlights

- High reprogramming efficiency
- Monitor successful transfection using GFP co-expressed marker
- Works efficiently with difficult-to-reprogram cells (old patient fibroblasts)
- Compatible with both feeder-dependent and feeder-free conditions
- Clean, transgene-free iPSC Cells generated rapidly

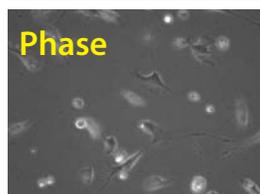
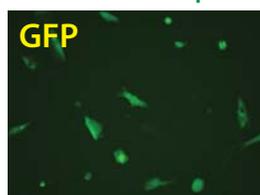


## Episomal iPSC Reprogramming

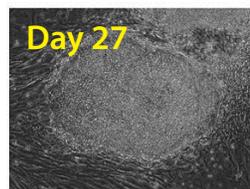
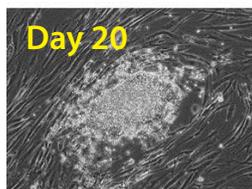
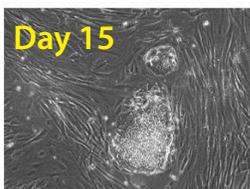
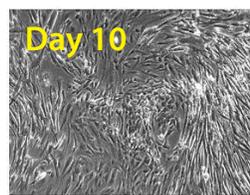
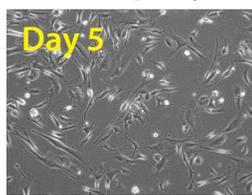
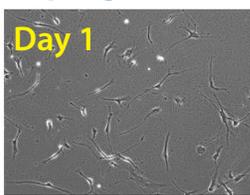
### The Episomal iPSC *oriP/EBNA-1* Plasmids Work Fast and Even Reprograms Older Fibroblasts

Transfect your target cells only once with the Episomal Reprogramming mixture catalog# SC900A-1. Transfection efficiency can be monitored using the co-expressed GFP marker. Visible iPSC colony formation can be observed in as little as two weeks and is complete in 25 days with 70% more iPSC colonies generated compared to standard OSKM methods. The data below in the left panel show the GFP signals in Human adult primary dermal fibroblasts one day after electroporation. The progression and derivation of validated iPSC cells under feeder-free conditions with SBI's PSGro<sup>®</sup> Human ESC/iPSC Growth Medium (for feeder-free conditions) plus SBI's PGen<sup>®</sup> Reprogramming Supplement (catalog #SC551M-1) can be viewed in the central panels. The Episomal *oriP/EBNA-1* reprogramming mix also works on difficult-to-reprogram source cells. The panels to the far right show successful iPSC generation using a passage 8 human dermal fibroblasts from a 60 year- old patient sample, where as standard Yamanaka OSKM factors failed to induce any iPSC formation.

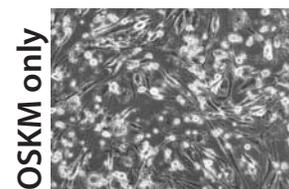
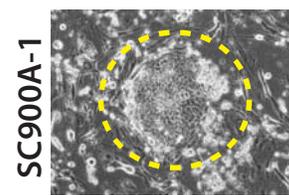
24 h after electroporation



### Reprogram Fibroblasts Rapidly with SC900A-1



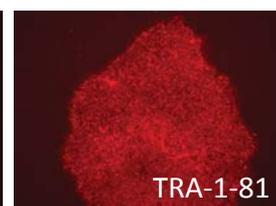
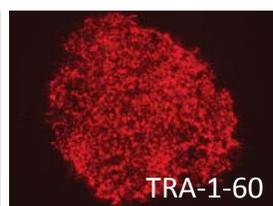
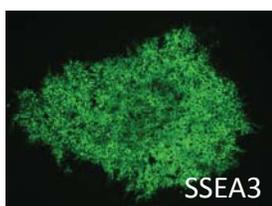
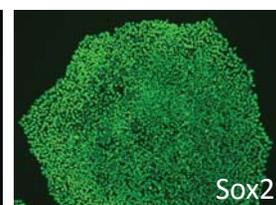
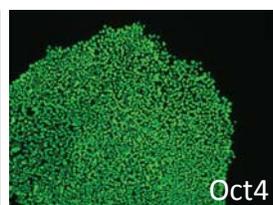
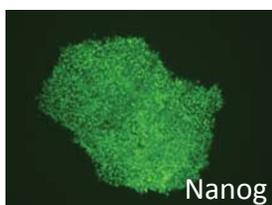
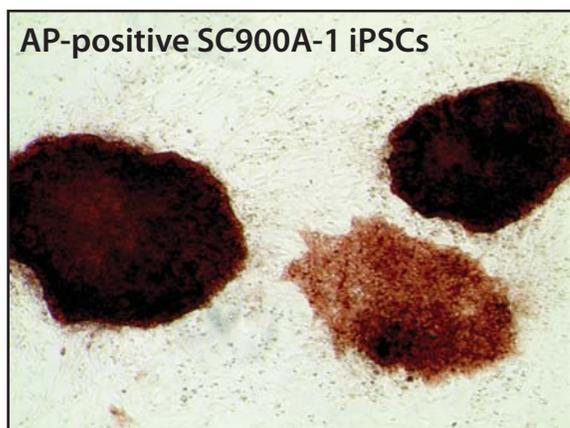
### Reprogram Old Fibroblasts



### Generate Robust and Healthy iPSCs with the SC900A-1 Episomal iPSC *oriP/EBNA-1* System

The iPSC colonies generated using SC900A-1 have clear morphology of reprogrammed cells and express stem cell-specific markers. The data below depict the characterization of SC900A-1 iPSC cell colonies by Alkaline phosphatase (AP) staining and immuno-staining of pluripotency markers, Nanog, Oct4, Sox2, SSEA3, TRA-1-60 and TRA-1-81 (Using SBI's complete Antibody and AP staining Kit, catalog# SAB-KIT-1).

#### Stem cell marker Validation of SC900A-1 iPSCs



## We Also Offer Custom Services - have SBI make custom, transgene-free iPSC cell lines for you.

System Biosciences offers a wide-range of custom services to support your research, allowing you to spend less time making tools, and more time making discoveries. To learn more, visit our website at [www.systembio.com/service](http://www.systembio.com/service) or call us at 888-266-5066.



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