produced in the method can transiently express one or more copies of selected potency-determining factors during their derivation.

[0011a] In one aspect, the present disclosure refers to an enriched population of primate induced pluripotent cells, wherein the primate induced pluripotent cells express pluripotent cell-specific markers, have a cell morphology characteristic of undifferentiated cells, and can differentiate into cells of all three germ layers, wherein at least some of the primate induced pluripotent cells comprise one or more extra-chromosomal copies of a non-viral episomal vector associated with induction of pluripotency, wherein the population is produced according to a method comprising the steps of: (a) introducing at least one non-viral episomal vector encoding one or more potency-determining factors into primate somatic cells under in vitro conditions in which the somatic cells are receptive to take up non-viral vectors and sufficient to express the potency-determining factors such that the somatic cells are reprogrammed into primate pluripotent cells, wherein the at least one vector encodes at least potency-determining factors OCT4, SOX2, and at least one of LIN28 and NANOG, wherein the cells express the introduced OCT4, SOX2, and at least one of LIN28 and NANOG, and further comprise SV40 T Antigen.

[0012] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure belongs. Although suitable materials and methods for the practice or testing of the present disclosure are described below, other materials and methods similar or equivalent to those described herein, which are well known in the art, can be used.

[0013] Other objectives, advantages and features of the present disclosure will become apparent from the following specification taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0014] FIG. 1A-B illustrate the effect on reprogramming efficiency of different nucleotide sequences that link transgenes on the vector(s) delivered during the reprogramming methods.

[0015] FIG. 2A-C illustrate the effect on reprogramming efficiency of *c-Myc*, *KLF-4*, and SV40 large T antigen gene expression in human newborn foreskin fibroblasts.

[0016] FIG. 3A-C illustrate a suitable construct for carrying transgenes into somatic cells in accord with the method, temporal expression of an episomal vector-mediated transgene, and the effect of vector quantity on cell survival after nucleofection.

[0017] FIG. 4A-D illustrate reprogramming of human newborn foreskin fibroblasts with episomal vector-mediated transgene expression.

[0018] FIG. 5A-B illustrate related constructs harboring an expression cassette useful in the reprogramming methods of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0019] The present invention broadly relates to novel methods for reprogramming differentiated primate somatic cells into reprogrammed primate cells that are substantially free of the vectors used in their production by introducing potency-determining factors on a non-viral vector that is present during reprogramming, but is substantially absent from the reprogrammed cells. As used herein, "reprogramming" refers to a genetic process whereby differentiated somatic cells are converted into de-differentiated cells having a higher potency than the cells from which they were derived.

CLAIM OR CLAIMS

WE CLAIM:

1. An enriched population of primate induced pluripotent cells, wherein the primate induced pluripotent cells express pluripotent cell-specific markers, have a cell morphology characteristic of undifferentiated cells, and can differentiate into cells of all three germ layers, wherein at least some of the primate induced pluripotent cells comprise one or more extra-chromosomal copies of a non-viral episomal vector-associated with induction of pluripotency, wherein the population is produced according to a method comprising the steps of:

(a) introducing at least one non-viral episomal vector encoding one or more potency-determining factors into primate somatic cells under *in vitro* conditions in which the somatic cells are receptive to take up non-viral vectors and sufficient to express the potency-determining factors such that the somatic cells are reprogrammed into primate pluripotent cells,

wherein the at least one vector encodes at least potency-determining factors OCT4, SOX2, and at least one of LIN28 and NANOG, wherein the cells express the introduced OCT4, SOX2, and at least one of LIN28 and NANOG, and further comprise SV40 T Antigen.

2. The population of Claim 1, wherein the primate somatic cells are obtained from a fetal or post-natal individual.

3. The population of Claim 1, wherein the primate is a human.

4. The population of Claim 1, wherein the one or more potency-determining factors comprise human OCT-4, human SOX2, human LIN28, human NANOG, human c-Myc, and human KLF4, wherein when the vector comprises c-Myc, the method further comprises the step of exposing the primate somatic cells to SV40 T Antigen.

5. The population of Claim 1, wherein OCT4 and SOX2 are from human.

6. The population of Claim 4, wherein LIN28, NANOG, c-Myc, and KLF4 are from human.