CLAIMS

[1] A method of improving iPS cell establishment efficiency, comprising contacting a protein selected from the group consisting of Foxh1, brachyury, Foxa2, LHX1, Foxb1, Foxf2 and Foxg1 or a nucleic acid that encodes the same with a somatic cell in a nuclear reprogramming step.

[2] The method according to claim 1, wherein the protein is Foxh1.

[3] The method according to claim 1 or 2, wherein the somatic cell is further contacted with Glis1 or a nucleic acid that encodes the same and/or a p53 inhibitor in a nuclear reprogramming step.

[4] An agent for improving iPS cell establishment efficiency comprising a protein selected from the group consisting of Foxh1, brachyury, Foxa2, LHX1, Foxb1, Foxf2 and Foxg1 or a nucleic acid that encodes the same, and further comprising Glis1 or a nucleic acid that encodes the same and/or a p53 inhibitor.

[5] The agent according to claim 4, wherein the protein is Foxh1.

[6] A method of producing an iPS cell, comprising contacting a protein selected from the group consisting of Foxh1, brachyury, Foxa2, LHX1, Foxb1, Foxf2 and Foxg1 or a nucleic acid that encodes the same, and nuclear reprogramming substances with a somatic cell, wherein the nuclear reprogramming substances comprise any of the following (a) to (d):

(a) Oct3/4, Sox2 and Klf4;

(b) (i) Oct3/4;

(ii) a member of the Sox family selected from the group consisting of Sox1, Sox2, Sox3, Sox15, Sox17 and Sox18;

(iii) a member of the Klf family selected from the group consisting of Klf1, Klf2, Klf4 and Klf5; and

(iv) a member of the Myc family selected from the group consisting of c-Myc, L-Myc and n-Myc;
(c) Oct3/4, Sox2, and Nanog and/or Lin28; and
(d) nucleic acids that encode any of (a) to (c) above.

[7] The method according to claim 6, wherein the nuclear reprogramming substances are Oct3/4, Sox2 and Klf4, or nucleic acids that encode the same.

[8] The method according to claim 6, wherein the nuclear reprogramming substances are Oct3/4, Sox2, Klf4 and L-Myc or c-Myc, or nucleic acids that encode the same.

[9] The method according to any one of claims 6 to 8, wherein the protein is Foxh1.

[10] The method according to any one of claims 6 to 9, wherein the somatic cell is further contacted with Glis1 or a nucleic acid that encodes the same and/or a p53 inhibitor.

[11] An agent for inducing an iPS cell from a somatic cell, comprising a protein selected from the group consisting of Foxh1, brachyury, Foxa2, LHX1, Foxb1, Foxf2 and Foxg1 or a nucleic acid that encodes the same, and nuclear reprogramming substances, wherein the nuclear reprogramming substances comprise any of the following (a) to (d):
(a) Oct3/4, Sox2 and Klf4;
(b) (i) Oct3/4;
(ii) a member of the Sox family selected from the group consisting of Sox1, Sox2, Sox3, Sox15, Sox17 and Sox18;
(iii) a member of the Klf family selected from the group consisting of Klf1, Klf2, Klf4 and Klf5; and
(iv) a member of the Myc family selected from the group consisting of c-Myc, L-Myc and n-Myc;
(c) Oct3/4, Sox2, and Nanog and/or Lin28; and
(d) nucleic acids that encode any of (a) to (c) above.

[12] The agent according to claim 11, wherein the nuclear reprogramming substances are Oct3/4, Sox2 and Klf4, or nucleic acids that encode the same.

[13] The agent according to claim 11, wherein the nuclear reprogramming substances are Oct3/4, Sox2, Klf4 and L-Myc or c-Myc, or nucleic acids that encode the same.

[14] The agent of any one of claims 11 to 13, comprising Foxh1 or a nucleic acid that encodes the same.

[15] The agent of any one of claims 11 to 14, further comprising Glis1 or a nucleic acid that encodes the same and/or a p53 inhibitor.

[16] An iPS cell containing an exogenous nucleic acid that encodes Foxh1.

[17] The iPS cell according to claim 16, wherein the exogenous nucleic acid is integrated in the genome.

[18] A method of producing a somatic cell, comprising performing a differentiation induction treatment on the iPS cell according to claim 16 or 17 to cause the iPS cell to differentiate into a somatic cell.

[19] A method of producing a somatic cell, comprising the steps of:

(1) producing an iPS cell by the method according to any one of claims 6 to 10, and

(2) performing a differentiation induction treatment on the iPS cell obtained through the step (1) to cause the iPS cell to differentiate into a somatic cell.

[20] A use of a protein selected from the group consisting of Foxh1, brachyury, Foxa2, LHX1, Foxb1, Foxf2 and Foxg1 or a nucleic acid that encodes the same in combination with nuclear reprogramming substances in the manufacture of an agent for producing an iPS cell, wherein the nuclear reprogramming substances comprise any of the following (a) to (d):
(a) Oct3/4, Sox2 and Klf4;
(b) (i) Oct3/4;
(ii) a member of the Sox family selected from the group consisting of Sox1, Sox2, Sox3, Sox15, Sox17 and Sox18;

(iii) a member of the Klf family selected from the group consisting of Klf1, Klf2, Klf4 and Klf5; and

(iv) a member of the Myc family selected from the group consisting of c-Myc, L-Myc and n-Myc;

(c) Oct3/4, Sox2, and Nanog and/or Lin28; and

(d) nucleic acids that encode any of (a) to (c) above.

[21] The use according to claim 20, wherein the nuclear reprogramming substances are Oct3/4, Sox2 and Klf4, or nucleic acids that encode the same.

[22] The use according to claim 20, wherein the nuclear reprogramming substances are Oct3/4, Sox2, Klf4 and L-Myc or c-Myc, or nucleic acids that encode the same.

[23] The use according to any one of claims 20 to 22, wherein the protein is Foxh1.

[24] A use of the iPS cell according to claim 16 or 17 in producing a somatic cell.

[25] The iPS cell according to claim 16 or 17 as a source of cells for producing a somatic cell.