produced by an analogous procedure, pooled with the vector PCR products and transformed into DH5α bacteria by heat shock to clone gene- specific constructs (pIVT-KLF4, etc.). The resulting plasmids were used to template PCR reactions to make linear IVT templates incorporating a T7 promoter, UTR-flanked ORF and a T120 tail (SEQ ID NO:1) to drive addition of a polyA tail, as described in Warren *et al*, Cell Stem Cell, 2010. The T120 tail (SEQ ID NO:1) region was introduced through the use of a tailed reverse primer (T120CTTCCTACTCAGGCTTTATTCAAAGACCA) (SEQ ID NO: 2). For the M3O and VPx3 fusion constructs, the transactivating domain-encoding sequences were appended to the ORFs by PCR using tailed primers. PCR product template stocks were maintained at a concentration of ~100 ng/uL.

EXAMPLE 2 – Production of mRNA Cocktails

[0081] The mRNA synthesis process is summarized in **Figure 5**. Synthetic mRNA was generated in IVT reactions using a 4:1 ratio of ARCA cap analog to GTP to generate a high percentage of capped transcripts. Full substitution of 5m-CTP for CTP and Pseudo-UTP for UTP in the nucleotide triphosphate (NTP) mix was employed to reduce the immunogenicity of the RNA products. Cap analog and modified NTPs were purchased from Trilink Biotechnologies. A 2.5x NTP mix was prepared (ARCA:ATP:5m- CTP:GTP:Pseudo-UTP at 15:15:3.75:3.75:3.75 mM) to replace the standard NTPs provided with the MEGAscript T7 Kit (Ambion) used to perform IVT reactions. Each 40 uL IVT reaction comprised 16 uL NTP mix, 4 uL 10x T7 Buffer, 16 uL DNA template and 4 uL T7 enzyme. Reactions were incubated 4-6 hours at 37°C and then treated with 2 uL TURBO DNase for a further 15 minutes at 37°C before being purified on MEGAclear (Ambion) spin columns, the RNA products being eluted in a volume of 100 uL. To remove immunogenic 5' triphosphate moieties from uncapped transcripts, 10 uL of Antarctic Phosphatase reaction buffer and 3 uL of Antarctic Phosphatase (NEB) was added to each prep. Phosphatase reactions were incubated for 30 minutes at 37°C and the IVT products were repurified. RNA yield was quantitated by Nanodrop (Thermo Scientific), and the preps were consequently adjusted to a standardized working concentration of 100 ng/uL by addition of TE pH 7.0 (Ambion). RNA cocktails were assembled by pooling preps representing the various RFs in the desired stoichiometric ratios. The fraction of each RF used took into account the predicted molecular weight of the respective transcript, all RFs being equimolar except for Oct4 and its derivatives, which were included at 3x molar concentration. A 10% spike of mRNA encoding a short-lived nuclearized monomeric LanYFP fluorescent protein was added to the

22. The method of claim 1 wherein the somatic cells are selected from the group consisting of unipotent, multipotent, pluripotent, and differentiated cells.

23. The method of claim 1 wherein the one or more RNAs induces de- differentiation of the somatic cells to unipotent, multipotent, or pluripotent cells.

24. The method of claim 4 wherein at least one of the factors is selected from the group consisting of OCT4, SOX2, NANOG, LIN28, KLF4 and MYC mRNA.

25. The method of claim 4 wherein OCT4, SOX2, NANOG, and LIN28 mRNA are administered in combination.

26. The method of claim 4 wherein OCT4, SOX2, KLF4 and MYC mRNA are administered in combination.

27. The method of claim 1 wherein the transfected cells are maintained in culture as induced pluripotent stem (iPS) cells.

28. The method of claim 1, where in wherein the transfected cells form induced pluripotent stem cells further comprising inducing the iPS cells to form differentiated cells.

29. A method for treating or inhibiting one or more symptoms of a disease or disorder in a patient comprising de-differentiating cells in vitro according to the method of claim 1, and administering the cells to the patient.

30. The method of claim 2, wherein the composition further comprises Rarg and LrH-1 transaction activation domains.

31. A method of claim 1, wherein the composition comprises Oct4 fused to a VP16 transactivation domain.

22. The method of claim 1 wherein the somatic cells are selected from the group consisting of unipotent, multipotent, pluripotent, and differentiated cells.

23. The method of claim 1 wherein the one or more RNAs induces de- differentiation of the somatic cells to unipotent, multipotent, or pluripotent cells.

24. The method of claim 4 wherein at least one of the factors is selected from the group consisting of OCT4, SOX2, NANOG, LIN28, KLF4 and MYC mRNA.

25. The method of claim 4 wherein OCT4, SOX2, NANOG, and LIN28 mRNA are administered in combination.

26. The method of claim 4 wherein OCT4, SOX2, KLF4 and MYC mRNA are administered in combination.

27. The method of claim 1 wherein the transfected cells are maintained in culture as induced pluripotent stem (iPS) cells.

28. The method of claim 1, where in wherein the transfected cells form induced pluripotent stem cells further comprising inducing the iPS cells to form differentiated cells.

29. A composition comprising an effective amount of a fusion product suitably formulated to de-differentiate cells in vitro wherein one or more of the compound in the composition is selected from one or more of a synthetic mRNA reprogramming factor Oct4, Sox2, Klf4, cMyc, Nanog, and/or Lin28 and a transactivation domains for use in the treatment of disease and/or disorder.

30. The use of a composition comprising an effective amount of a fusion product suitably formulated to de-differentiate cells in vitro wherein one or more of the compound in the composition is selected from one or more of a synthetic mRNA reprogramming factor Oct4, Sox2, Klf4, cMyc, Nanog, and/or Lin28 and a transactivation domains in the manufacture of a medicament for the treatment of disease and/or disorder.

31. The method of claim 2, wherein the composition further comprises Rarg and LrH-1 transaction activation domains.

32. A method of claim 1, wherein the composition comprises Oct4 fused to a VP16 transactivation domain.