WHAT IS CLAIMED IS:

1. A gene expression system comprising
(a) a vector that comprises a bacteriophage promoter, an alphavirus replicon operatively linked to the bacteriophage promoter, a first capping sequence, a subgenomic promoter, a second capping sequence, and a gene of interest, and
(b) an exogenous RNA polymerase which transcribes the alphavirus replicon, wherein the exogenous RNA polymerase is co-delivered with the alphavirus vector into a cell, and wherein the gene of interest is expressed in the cytoplasm of the cell.

2. The gene expression system of claim 1, wherein the alphavirus replicon is derived from an alphavirus, wherein the alphavirus is selected from the group consisting of Sindbis virus (SIN), Semliki Forest virus (SFV), and Venezuelan equine encephalitis virus (VEE).

3. The gene expression system of claim 1, wherein the alphavirus replicon is noncytopathic.

4. The gene expression system of claim 3, wherein the alphavirus replicon has one or more mutations in the nsp2 subunit.

5. The gene expression system of claim 1, wherein the bacteriophage promoter is selected from the group consisting of T7, T3, and SP6 promoters.

6. The gene expression system of claim 1, wherein both the first and second capping sequences are the internal ribosome entry site sequence derived from encephalomyocarditis virus.

7. The gene expression system of claim 1, wherein the gene of interest encodes for an antigen.

8. The gene expression system of claim 7, wherein the antigen is selected from the group consisting of a viral antigen, a bacterial antigen, and a cancer antigen.

9. The gene expression system of claim 1, wherein the subgenomic promoter is derived from an alphavirus.

10. The gene expression system of claim 1, wherein the bacteriophage promoter is T7 promoter and the exogenous RNA polymerase is T7 RNA polymerase.

11. A vector comprising a bacteriophage promoter, an alphavirus replicon operatively linked to the bacteriophage promoter, a first capping sequence, a subgenomic promoter, a second capping sequence, and a gene of interest.

12. The vector of claim 11, wherein the bacteriophage promoter is T7 promoter.

13. The vector of claim 11, wherein both the first and second capping sequences are the internal ribosome entry site sequence derived from encephalomyocarditis virus.

14. The vector of claim 11, wherein the gene of interest encodes an antigen.

15. The vector of claim 14, wherein the antigen is selected from the group consisting of a viral antigen, a bacterial antigen, and a cancer antigen.

16. The vector of claim 15, wherein the antigen is influenza hemagglutinin (HA).

17. An induced pluripotent stem cell for use in the treatment of cancer,
wherein a gene expression system comprising a vector is to be used for producing the induced pluripotent stem cell, the vector, including an alphavirus forming part of a sequence that encodes one or more mammal-derived reprogramming factor, and an exogenous RNA polymerase co-delivered with the alphavirus vector, andwherein the gene expression system is to be introduced into a mammalian somatic cell and
the subsequently transduced somatic cell is to be cultured in the presence of a cytokine on a fibroblast feeder layer or an extracellular matrix under a condition for maintaining pluripotency and self-renewal in order to produce the induced pluripotent stem cell.

18. Use of an induced pluripotent stem cell in the manufacture of a medicament for the treatment of cancer,
wherein a gene expression system comprising a vector is to be used for producing the induced pluripotent stem cell, the vector, including an alphavirus forming part of a sequence

that encodes one or more mammal-derived reprogramming factor, and an exogenous RNA polymerase co-delivered with the alphavirus vector, and
wherein the gene expression system is to be introduced into a mammalian somatic cell and the subsequently transduced somatic cell is to be cultured in the presence of a cytokine on a fibroblast feeder layer or an extracellular matrix under a condition for maintaining pluripotency and self-renewal in order to produce the induced pluripotent stem cell.

19. The use of claim 18, wherein the sequence encodes reprogramming factors Oct 4, Sox3/4, Klf4, and c-Myc, wherein the four reprogramming factors are expressed simultaneously.

20. The use of claim 18, wherein the method is carried out in the presence of a substance for improving the efficiency of establishing the pluripotent stem cell.

21. The method of claim 20, wherein the substance for improving the efficiency of establishing the pluripotent stem cell is selected from the group consisting of a histone deacetylase (HDAC) inhibitor, a histone methyltransferase (G9a) inhibitor, and a DNA methylase (Dnmt) inhibitor.

22. A vaccine comprising the gene expression system of claim 1, wherein the gene of interest encodes an antigen.

23. The vaccine of claim 22, wherein the antigen is selected from the group consisting of a viral antigen, a bacterial antigen, and a cancer antigen.

24. The vaccine of claim 23, wherein the antigen is influenza hemagglutinin (HA).

25. A therapeutic composition, comprising a dendritic cell transfected with the gene expression system of claim 1, wherein the gene of interest encodes an antigen capable of being displayed on the surface of the dendritic cell, wherein the therapeutic composition is capable of producing an immune response in a subject.

26. The therapeutic composition of claim 25, wherein the antigen is a tumor antigen.

27. The therapeutic composition of claim 26, wherein the tumor antigen is one or more proteins selected from the group consisting of tyrosinase, tyrosine-related protein 1 (TRP-1), and tyrosine-related protein 2 (TRP-2).

28. Use of a therapeutic composition as claimed in claim 25 in the manufacture of a medicament for the treatment of cancer.

29. The use of claim 28, wherein the cancer is melanoma, and the antigen is tyrosinase.

30. The use of claim 28, wherein the cancer is melanoma, and the antigen is tyrosine-related protein 1 (TRP-1).

31. The use of claim 28, wherein the cancer is melanoma, and the antigen is tyrosine-related protein 2 (TRP-2).

32. A therapeutic composition, for use in the treatment of cancer wherein the composition comprises a dendritic cell transfected with the gene expression system of claim 1, and wherein the gene of interest encodes an antigen capable of being displayed on the surface of the dendritic cell, and the composition is capable of producing an immune response in a subject.