CLAIMS

1. A method to treat a cell selected from the group consisting of fibroblast, endothelial cell, connective tissue cell, chondrocyte, skeletal muscle stem cell, muscle cell, nervous system cell, keratinocyte, mesenchymal stem cell, blood cell, and corneal epithelial cell, comprising:

exposing in vitro or ex vivo the cell to a messenger RNA (mRNA) encoding one or more reprogramming factors selected from the group consisting of Oct4, Sox2, Klf4, cMyc, Lin28, and NANOG,

whereby said exposing achieves expression of the one or more reprogramming factors in the cell to obtain a rejuvenated cell with retention of cellular identity.

2. The method of claim 1, wherein said exposing comprises providing a composition comprising the mRNA, wherein the composition comprises an excipient for transfection.

3. The method of claim 2, wherein said composition comprises liposomes, wherein the mRNA is encapsulated in the liposomes.

4. The method of claim 1, wherein said exposing achieves transfection of the mRNA encoding one or more reprogramming factors into the cell.

5. The method of claim 1, wherein said exposing is ex vivo and the obtained rejuvenated cell is further to be used for transplanting into a subject.

6. The method of claim 1, wherein said cell is a human cell.

7. The method of claim 1, wherein said blood cell is a macrophage, an erythrocyte, a monocyte, a neutrophil, or an eosinophil.

8. The method of claim 6, wherein said human cell is from a tissue or an organ.

9. The method of claim 8, where the tissue or organ is skin, hair, lung, cartilage, or eye.

10. The method of claim 1, wherein said exposing comprises exposing the cell to the mRNA once daily for not more than 5 consecutive days.

11. The method of claim 10, further comprising interrupting said exposing after a once daily exposure within the not more than 5 consecutive days.

12. The method of claim 1, wherein said exposing comprises exposing the cell to the mRNA once daily for between 2-5 consecutive days.

13. The method of claim 12, further comprising interrupting said exposing after a once daily exposure within the between 2-5 consecutive days.

14. A messenger RNA (mRNA) encoding one or more reprogramming factors selected from the group consisting of Oct4, Sox2, Klf4, cMyc, Lin28, and NANOG for use in rejuvenative therapy, wherein the mRNA is for treating a cell selected from the group consisting of fibroblast, endothelial cell, connective tissue cell, chondrocyte, skeletal muscle stem cell, muscle cell, nervous system cell, keratinocyte, mesenchymal stem cell, blood cell, and corneal epithelial cell to obtain a rejuvenated cell, the cell after exposure to the mRNA is capable of expression of the one or more reprogramming factors with retention of cellular identity.

15. The mRNA for use of claim 14, wherein said cell is a human cell.

16. The mRNA for use of claim 14, wherein said blood cell is a macrophage, an erythrocyte, a monocyte, a neutrophil, or an eosinophil.

17. The mRNA for use of claim 15, wherein said human cell is within a tissue or an organ.

18. The mRNA for use of claim 17, where the tissue or organ is skin, hair, lung, cartilage, or eye.

19. The mRNA for use of claim 14, wherein the cell is exposed to the mRNA once daily for not more than 5 consecutive days.

20. The mRNA for use of claim 14, wherein said exposing comprises exposing the cell to the mRNA once daily for between 2-5 consecutive days.

21. The mRNA for use of claim 19 or claim 20, wherein exposure of the cell to the mRNA is interrupted after a once daily exposure within not more than 5 consecutive days.

22. An mRNA encoding one or more reprogramming factors selected from the group consisting of Oct4, Sox2, Klf4, cMyc, Lin28, and NANOG for use in rejuvenative therapy, wherein the mRNA is for treating a differentiated cell to obtain a rejuvenated cell, and wherein the differentiated cell after introduction of the mRNA is capable of expression of the one or more reprogramming factors with retention of its cellular differentiation.

23. An mRNA encoding one or more reprogramming factors selected from the group consisting of Oct4, Sox2, Klf4, cMyc, Lin28, and NANOG for use in treating an age-related disease or condition in a subject with differentiated cells, wherein the differentiated cells after exposure to the mRNA is capable of expression of the one or more reprogramming factors to thereby obtain rejuvenated cells with retention of cellular differentiation.

24. The mRNA for use of claim 23, wherein the age-related disease or condition is a dermatologic disease or condition, an eye disease or condition, a respiratory disease or condition, or a musculoskeletal disease or condition.

25. The mRNA for use of claim 24, wherein the dermatologic disease or condition is dermal atrophy, dermal elastolysis, skin wrinkling, sebaceous gland hyperplasia, sebaceous gland hypoplasia, senile lentigo, a pigmentation abnormality, graying hair, hair loss, hair thinning or a chronic skin ulcer.

26. The mRNA for use of claim 24, wherein the eye disease or condition is age-related macular degeneration, glaucoma, a cataract, dry eye, diabetic retinopathy, or vision loss.

27. The mRNA for use of claim 24, wherein the respiratory disease or condition is pulmonary fibrosis, chronic obstructive pulmonary disease, asthma, chronic bronchitis, pulmonary embolism, lung cancer or a lung infection.

28. The mRNA for use of claim 24, wherein the musculoskeletal disease or condition is arthritis, osteoporosis, myeloma, gout, Paget’s disease, bone fracture, bone marrow failure syndrome, ankylosis, diffuse idiopathic skeletal hyperostosis, hematogenous osteomyelitis, muscle atrophy, peripheral neuropathy, multiple sclerosis, amyotrophic lateral sclerosis, Duchenne muscular dystrophy, primary lateral sclerosis, or myasthenia gravis.

29. The mRNA for use of claim 23, wherein the differentiated cells are exposed to the mRNA once daily for not more than 5 consecutive days.

30. The mRNA for use of claim 29, wherein exposure of the differentiated cells is interrupted after a once daily exposure within not more than 5 consecutive days.

31. An mRNA encoding one or more reprogramming factors selected from the group consisting of Oct4, Sox2, Klf4, cMyc, Lin28, and NANOG for use in treating a cartilage degeneration disorder in a subject, wherein chondrocytes associated with the cartilage degeneration disorder are exposed to the mRNA, and wherein the chondrocytes after exposure is capable of expression of the one or more reprogramming factors to obtain rejuvenated chondrocytes with retention of cellular differentiation.

32. The mRNA for use of claim 31, wherein the cartilage degeneration disorder is arthritis.

33. The mRNA for use of claim 32, wherein the arthritis is osteoarthritis or rheumatoid arthritis.

34. The mRNA for use of claim 31, wherein exposure of the chondrocytes to the mRNA is in vivo or ex vivo.

35. The mRNA for use of claim 34, wherein exposure of the chondrocytes to the mRNA is ex vivo and the exposed chondrocytes are transplanted into the subject.

36. The mRNA for use of claim 31, wherein the chondrocytes are exposed to the mRNA once daily for not more than 5 consecutive days.

37. The mRNA for use of claim 36, wherein the exposure is interrupted after a once daily exposure within not more than 5 consecutive days.

38. Use of a composition comprising messenger RNA (mRNA) encoding one or more reprogramming factors selected from the group consisting of Oct4, Sox2, Klf4, cMyc, Lin28, and NANOG in the manufacture of a medicament for treating an age-related disease or condition, wherein the medicament is configured for application to a cell selected from the group consisting of fibroblast, endothelial cell, connective tissue cell, chondrocyte, skeletal muscle stem cell, muscle cell, nervous system cell, keratinocyte, mesenchymal stem cell, blood cell, and corneal epithelial cell to express the mRNA for rejuvenation of the cell with retention of cellular identify.

39. The use of claim 38, wherein the age-related disease or condition is a dermatologic disease or condition, an eye disease or condition, a respiratory disease or condition, or a musculoskeletal disease or condition.