

CLAIMS

WHAT IS CLAIMED IS:

1. A method for differentiating or transdifferentiating cells to produce an edible meat product, the method comprising:
 - (a) delivering nucleic acid molecules comprising one or more ribonucleic acid (RNA) molecules into said cells;
 - (b) modulating gene expression of said cells with aid of said nucleic acid molecules or expression products thereof, to differentiate or transdifferentiate at least a subset of said cells to generate one or more target cells following delivery of said nucleic acid molecules, wherein upon said modulating, said nucleic acid molecules are not integrated into a genome of said cells; and
 - (c) producing said edible meat product using at least partially said one or more target cells generated in (b).
2. The method of claim 1, wherein said nucleic acid molecules comprise two or more different RNA molecules.
3. The method of claim 1 or 2, wherein said cells comprise animal derived stem cells.
4. The method of any one of claims 1-3, wherein said cells comprise porcine cells.
5. The method of any one of claims 1-4, wherein (c) comprises producing a tissue from said one or more target cells.
6. The method of claim 5, wherein said one or more target cells comprise at least two different types of cells.
7. The method of claim 6, further comprising co-culturing said at least two different types of cells to generate a three-dimensional tissue.

8. The method of any one of claims 1-7, wherein said one or more RNA molecules encode MYOD1, MYOG, MYF5, MYF6, PAX3, or PAX7, or any combination or variant thereof.
9. The method of any one of claims 1-8, wherein at least one of said RNA molecules is chemically modified to improve its stability.
10. The method of any one of claims 1-9, wherein said nucleic acid molecules are delivered to said cells with neutral or anionic liposomes, cationic liposomes, lipid nanoparticles, ionizable lipids, or any combination or variation thereof.
11. The method of any one of claims 1-10, wherein said nucleic acid molecules are delivered in a single dose to said cells.
12. The method of any one of claims 1-11, wherein said nucleic acid molecules are delivered in at least two doses to said cells.
13. The method of claim 12, wherein individual doses of said at least two doses are delivered at least 3 days apart.
14. The method of any one of claims 1-13, wherein said nucleic acid molecules are delivered at a concentration of at most 500 nM.
15. The method of any one of claims 1-14, wherein said nucleic acid molecules comprise silencing RNA (siRNA) targeting POU5F1 (OCT3/4), KLF4, SOX2, or any combination or variant thereof.
16. The method of any one of claims 2-15, wherein said two or more different RNA molecules comprise messenger ribonucleic acid (mRNA), microRNA (miRNA), transfer RNA (tRNA), or said siRNA.

17. The method of claim 16, wherein said two or more different RNA molecules comprise said mRNA and said siRNA.
18. The method of claim 17, wherein said mRNA encodes MYOD1, MYOG, MYF5, MYF6, PAX3, PAX7, or any combination or variant thereof.
19. The method of any one of claims 1-18, wherein a chemical modification of said at least one of said RNA molecules comprise anti-reverse cap analogues, 3'-globin untranslated regions, poly-A tail modifications.
20. The method of any one of claims 1-19, wherein said one or more RNA molecules comprise unlocked nucleic acids.