CLAIMS

WHAT IS CLAIMED IS:

1. An in-vitro cultured meat product, comprising: a population of cells comprising fibroblasts, myoblasts, or a combination thereof, the population of cells being transdifferentiated to express lipid accumulation; wherein the transdifferentiation occurs in adipocyte differentiation media supplemented with a fatty acid and involves transfection to induce lipid accumulation via an overexpression of CEBPalpha, CEBPgamma, PPARgamma, SREBP1, SREBP2 or a combination thereof;

wherein the population of cells is transfected to downregulate at least one of OSR1, PRRX1, LHX9, TWIST2, and INSIG2;

wherein transdifferentiation occurs without endogenous hormones or small molecules recognized to transdifferentiate cells to express lipid accumulation; and

wherein the transdifferentiated population of cells retains proliferative capacity at late passage.

2. The in-vitro cultured meat product of claim 1, wherein the transdifferentiated population of cells exhibits a stable phenotype at late passage.

3. The in-vitro cultured meat product of claim 1, wherein the transdifferentiation further involves transfection of the population of cells to overexpress HNF4alpha.

4. The in-vitro cultured meat product of claim 1, wherein the transdifferentiation further involves transfection of the population of cells to express hepatocyte phenotypes.

5. The in-vitro cultured meat product of claim 1, wherein late passage comprises undergoing at least 60 population doublings.

6. The in-vitro cultured meat product of claim 1, wherein the population of cells avoid a pluripotent state.

7. The in-vitro cultured meat product of claim 1, wherein the transdifferentiated population of cells exhibits lipid droplet formation in a cytoplasm.

8. The in-vitro cultured meat product of claim 7, wherein the lipid droplet formation occurs in a bioreactor.

9. An in-vitro cultured meat product, comprising: a population of cells comprising fibroblasts, myoblasts, or a combination thereof, the population of cells being transdifferentiated to express lipid accumulation; wherein the transdifferentiation occurs in adipocyte differentiation media supplemented with a fatty acid and involves transfection to induce lipid accumulation via an overexpression of CEBPalpha, CEBPgamma, PPARgamma, SREBP1, SREBP2 or a combination thereof; wherein the population of cells is transfected to overexpress HNF4alpha; and

wherein the transdifferentiated population of cells retains proliferative capacity at late passage.

10. The in-vitro cultured meat product of claim 9, wherein the transdifferentiation further involves transfection of the population of cells to downregulate OSR1, PRRX1, LHX9, TWIST2, INSIG2 or a combination thereof.

11. The in-vitro cultured meat product of claim 9, wherein the transdifferentiation further involves transfection of the population of cells to overexpress CYP3A.

12. The in-vitro cultured meat product of claim 9, wherein the transdifferentiation further involves transfection of the population of cells to overexpress FABP4.

13. The in-vitro cultured meat product of claim 9, wherein the transdifferentiation further occurs without addition of small molecules recognized to transdifferentiate cells to express lipid accumulation.

14. The in-vitro cultured meat product of claim 9, wherein the population of cells avoid a pluripotent state.

15. An in-vitro cultured meat product, comprising: a population of cells comprising fibroblasts, myoblasts, or a combination thereof, the population of cells being transdifferentiated to express lipid accumulation; wherein the transdifferentiation occurs in adipocyte differentiation media supplemented with a fatty acid and involves transfection

to induce lipid accumulation via an overexpression of CEBPalpha, CEBPgamma, PPARgamma, SREBP1, SREBP2 or a combination thereof;

wherein the population of cells includes myoblasts having wildtype MyoD;

wherein the wildtype MyoD is overexpressed; and

wherein the transdifferentiated population of cells retains proliferative capacity at late passage.

16. The in-vitro cultured meat product of claim 15, wherein the transdifferentiation further involves transfection of the population of cells to overexpress HNF4alpha.

17. The in-vitro cultured meat product of claim 15, wherein the transdifferentiation further involves transfection of the population of cells to overexpress CYP3A.

18. The in-vitro cultured meat product of claim 15, wherein the transdifferentiation further involves transfection of the population of cells to overexpress FABP4.

19. The in-vitro cultured meat product of claim 15, wherein the transdifferentiation further involves transfection of the population of cells to overexpress HNF4alpha and FABP4.

20. The in-vitro cultured meat product of claim 15, wherein the transdifferentiation further involves transfection of the population of cells to overexpress HNF4alpha, CYP3A4, or FABP4.