cultured using a non-serum media formulation. In many cases, the population of cells is cultured using a mushroom-based media formulation.

[038] Disclosed herein, in some aspects, are cultured food products for human consumption, comprising the cultured tissue produced according to the methods of any one of the foregoing methods. Sometimes, the cultured food product comprises packaging having a label indicating the cultured tissue was produced in a pathogen-free environment, a toxin-free environment, without force-feeding an animal, or any combination thereof. In certain instances, the cultured tissue is processed into a plurality of slices and packaged to form the cultured food product.

[038a] Disclosed herein are sushi grade-salmon composition comprising cultured adipocyte and myocyte cells isolated from salmon fingerlings.

BRIEF DESCRIPTION OF THE DRAWINGS

[039] A better understanding of the features and advantages of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized, and the accompanying drawings of which:

[040] **FIG. 1** shows a flow chart for a process of producing cultured cells having lipid accumulation for human consumption.

[041] **FIG. 2** shows a flow chart for a process of producing cultured meat comprising myocytes and adipocytes for human consumption.

[042] **FIG. 3** shows an overview of an exemplary process for culturing meat.

[043] **FIG. 4A** shows a diagram illustrating methods of generating steatotic hepatocytes for producing cultured foie gras. **FIG. 4B** shows a diagram illustrating methods of producing cultured fish tissue for consumption.

[044] **FIG. 5A** shows isolated trout myosatellite cells. **FIG. 5B** shows expression of genetic markers in the isolated trout myosatellite cells. **FIG. 5C** shows mature myotubes formed by differentiating the myosatellite cells. **FIG. 5D** shows a sheet of myotubes following differentiation from the myosatellite cells.

[045] **FIG. 6A** shows a co-culture of salmon myosatellite cells (arrowheads) and salmon pre-adipocytes (arrows). The pre-adipocytes can be differentiated into adipocytes, and the myosatellite cells differentiated into myocytes (arrowhead) as shown in **FIG. 6B**.

[046] **FIG. 7A** shows salmon fibroblasts induced to form spheroids for propagation in a bioreactor. **FIG. 7B** shows confirmation of the viability of these spheroids upon returning them to 2-D culture conditions and observing that the fibroblasts migrated circumferentially to form colonies.

CLAIMS

WHAT IS CLAIMED IS:

1. A method of producing cultured tissue for human consumption, the method comprising:
    a) obtaining a population of self-renewing cells;
    b) culturing the population of self-renewing cells;
    c) inducing differentiation in the population of self-renewing cells to form cultured tissue; and
    d) processing the cultured tissue for human consumption.
2. The method of claim 1, wherein inducing differentiation in the population of self-renewing cells comprises inducing transdifferentiation of cells in the population into myocytes, adipocytes, or a combination thereof.
3. The method of claim 1, wherein culturing comprises seeding the population of self-renewing cells on 3-dimensional micro-scaffolds.
4. The method of claim 3, wherein the 3-dimensional micro-scaffolds are conjugated to at least one factor promoting cell growth, adhesion, differentiation, or a combination thereof, wherein the micro-scaffolds comprise at least one of hydrogel, chitosan, polyethylene terephthalate, collagen, elastin, heparan sulfate, chondroitin sulfate, keratan sulfate, hyaluronic acid, laminin, fibronectin, cellulose, hemicellulose, pectin, lignin, alginate, glucomannan, polycaprolactone (PCL), textured vegetable protein (TVP), textured soy protein (TSP), and acrylates.
5. The method of claim 1, wherein the at least one cell has been modified to incorporate:
    a) a first genetic construct comprising an open reading frame (ORF) of at least one pluripotency gene; and
    b) a second genetic construct comprising an open reading frame (ORF) of a regulatory factor configured to inactivate the at least one pluripotency gene.
6. The method of claim 5, wherein the regulatory factor is a recombinase, and the open reading frame (ORF) of at least one pluripotency gene is flanked by recombination

sequences recognized by the recombinase such that expression of the recombinase catalyzes excision of the open reading frame (ORF) of at least one pluripotency gene.

7. The method of claim 5, wherein the second genetic construct comprises an ORF of at least one hepatocyte differentiation factor selected from Hepatocyte Nuclear Factor 1 Alpha (HNF1A), Forkhead Box A2 (FOXA2), and Hepatocyte Nuclear Factor 4 Alpha (HNF4A).
8. The method of claim 5, wherein the second genetic construct comprises at least one myogenic factor selected from Myogenin (MyoG), Myogenic Differentiation 1 (MyoD), Myogenic Factor 6 (MRF4), and Myogenic Factor 5 (MYF5); or wherein the second genetic construct comprises at least one adipogenic factor selected from Fatty Acid Binding Protein 4 (FABP4), Insulin-Responsive Glucose Transporter Type 4 (GLUT4), Adiponectin, C1Q And Collagen Domain Containing (ADIPOQ), 1-Acylglycerol-3-Phosphate O-Acyltransferase 2 (AGPAT2), Perilipin 1 (PLIN1), Leptin (LEP), and Lipoprotein Lipase (LPL).
9. The method of claim 5, wherein the second genetic construct further comprises:
    a) an open reading frame (ORF) of at least one differentiation gene; and
    b) an inducible promoter controlling expression of:
        i. the open reading frame (ORF) of the at least one differentiation gene; and
        ii. the open reading frame (ORF) of the regulatory factor.
10. The method of claim 9, wherein inducing differentiation comprises exposing the at least one cell to an induction agent to induce expression of the ORF of at least one cell lineage gene and the ORF of the regulatory factor, and further comprising removing the induction agent after the population of self-renewing cells has been treated with the induction agent and before being processed for human consumption in step d).
11. The method of claim 1, wherein inducing differentiation comprises at least one of generating myotubes within the population of self-renewing cells or generating adipocytes within the population of self-renewing cells.
12. The method of claim 1, wherein the population of self-renewing cells comprises multipotent cells that are induced to differentiate into myocytes and adipocytes during

step c) or a first subpopulation of myosatellite cells and a second subpopulation of pre-adipocytes.

13. The method of claim 1, wherein inducing differentiation comprises generating hepatocytes within the population of self-renewing cells and optionally inducing steatosis within at least one of the hepatocytes.
14. The method of claim 13, wherein the population of self-renewing cells comprises at least one cell modified to express at least one gene for enhancing steatosis upon treatment with an induction agent.
15. The method of claim 14, wherein the at least one cell is stably transformed using a construct comprising an open reading frame (ORF) encoding ATF4, ZFP423, LPIN1, PPAR, APOC3, APOE, ORL1, PEMT, MTTP, SREBP, STAT3, or KLF6.
16. The method of claim 15, wherein inducing steatosis comprises incubating the hepatocytes in a culture medium comprising at least nutritional supplement, wherein the at least one nutritional supplement optionally comprises palmitic acid, oleic acid, docosahexaenoic acid, stearic acid, linoleic acid, linolenic acid, arachidonic acid, eicosapentaenoic acid, or a combination thereof.
17. The method of claim 1, wherein the cultured tissue comprises fish muscle tissue, octopus muscle cells, squid muscle cells, or cuttlefish muscle cells.
18. The method of claim 1, wherein the population of cells is cultured using a non-serum media formulation.
19. A culinary foie gras composition comprising tissue cultured hepatocytes having high lipid content and processed for human consumption.
20. A sushi grade-salmon composition comprising cultured adipocyte and myocyte cells isolated from salmon fingerlings.