CLAIMS

We Claim:

1. A method of growing a cell mass, comprising:

a) grown the cell mass on a substrate of an apparatus, wherein the substrate: is spiral in shape or perpendicular to a ground surface or planar and oriented to the ground surface at an angle of 85°-90°; and

b) separating the cell mass from the substrate in a continuous sheet of cells held together by one or more of cell-to-cell interactions and extracellular matrix generated by the cells.

2. The method of claim 1, wherein the substrate is angled at 85° relative to the ground surface.

3. The method of claim 1, wherein the substrate is curved around a longitudinal axis.

4. The method of claim 3, wherein the substrate is angled relative to the longitudinal axis by 5 or more degrees.

5. The method of claim 3, wherein growing the cell mass includes delivering fluid substantially parallel to the longitudinal axis.

6. The method of claim 1, further comprising delivering fluid between adjacent substrates.

7. The method of claim 1, wherein separating the cell mass comprises directing fluid at an angle relative to the substrate.

8. The method of claim 7, further comprising removing the fluid from the apparatus prior to separating the cell mass from the substrate.

9. The method of claim 1, further comprising delivering fluid through a fluid diffuser.

10. The method of claim 9, wherein the fluid diffuser is configured to deliver a substantially uniform or laminar flow across a surface of the substrate.

11. The method of claim 9, wherein the fluid diffuser comprises one or more openings.

12. The method of claim 9, wherein delivering the fluid includes distributing the fluid to the substrate in a predetermined flow pattern using a tapered surface of the fluid diffuser.

13. The method of claim 12, wherein the tapered surface comprises a conical shape.

14. The method of claim 1, wherein the substrate includes one or more channels, one or more grooves, one or more recessions, or a combination thereof.

15. The method of claim 1, wherein the substrate includes a coating to improve cell behavior including adhesion, proliferation, differentiation, and maturation.

16. The method of claim 1, wherein the substrate is textured, coated, porous, circular, nested, comprised of a plurality of turns, or some combination thereof.

17. The method of claim 1, wherein the substrate comprises a three-dimensional lattice.

18. The method of claim 1, wherein the cell mass comprises a comestible, cell-based meat product.

19. The method of claim 1, wherein the cell mass comprises bovine, porcine, ovine, caprine, poultry, aquatic cells, or some combination thereof.