CLAIMS

What is claimed is:

1. A method for meat production by in vitro cell culture, comprising:

isolating tissue from an animal or plant source and making a cell suspension of cells;

increasing expression of a protein in the isolated cells by altering a level of one or more micro RNAs that regulate the expression of the protein; and

growing the cells on a food grade scaffold in a culture medium, the cells growing into a solid or semi-solid structure that mimics an animal organ.

2. The method of claim 1, wherein isolating the tissue comprises isolating organ tissue from a fish.

3. The method of claim 2, wherein the organ tissue is derived from fish swim bladder of a fish from the Osteichthyes class.

4. The method of claim 3, wherein the protein is collagen I.

5. The method of claim 4, wherein the micro RNAs are micro RNA21 (miR-21), micro RNA 133 (miR133) inhibitor or combination thereof.

6. A method for meat production by in vitro cell culture, comprising:

isolating tissue from an animal or plant source and making a cell suspension of cells;

growing the cells on a food grade scaffold in a culture medium, the cells growing into a solid or semi-solid structure that mimics an animal organ; and

co-culturing the cells with bioengineered cells that secrete nutrients, growth factors, and cytokines that support the growth of the cells.

7. The method of claim 6, wherein isolating the tissue comprises isolating organ tissue from a fish.

8. The method of claim 7, wherein the organ tissue is derived from fish swim bladder of a fish from the Osteichthyes class.