CLAIMS

1. A process for *in vitro* producing a nutritive food product for human or animal consumption comprising culturing an avian cell line in suspension, in which the avian cell line is (i) derived from avian embryonic stem cells, (ii) capable of proliferating in a basal culture medium in the absence of exogenous growth factors, feeder cells and/or animal serum, and iii) capable of growing continuously in suspension.

2. A process according to Claim 1, in which the avian cell line is obtained by the process comprising the steps:

(a) isolating avian embryonic stem cells from an embryo(s) at a developmental stage around oviposition;

(b) culturing said cells in a basal culture medium containing at least one exogenous growth factors SCF, IGF-1, bFGF, IL-6, IL-6R and/or CNTF, a layer of feeder cells and an animal serum for at least twenty passages;

(c) modifying said culture medium by progressive deprivation of said growth factors, feeder cells and an animal serum and further culturing the cells for at least several passages; and

(d) adapting the cells of step (c) to suspension,

thereby obtaining the established avian cell line capable of proliferating in a basal culture medium in the absence of exogenous growth factors, feeder cells and/or animal serum for at least 50 days.

3. A process according to Claim 1 or 2, in which the avian cell line is obtained by the process comprising the steps:

(a) isolating the avian embryonic stem cells from an embryo(s) at a developmental stage around oviposition;

(b) culturing said cells in a basal culture medium containing the exogenous growth factor IGF-1 and CNTF, a layer of feeder cells and an animal serum for at least one passage;

(c) progressively withdrawing said growth factors from the culture of step (b) and further growing for at least one passage;

(d) progressively withdrawing the feeder cells from the culture of step (c) and further growing for at least one passage;

(e) progressively withdrawing the animal serum from the culture of step (d) and further growing for at least one passage; and

(f) adapting the cells of step (e) to suspension,

thereby obtaining the continuous avian cell line capable of proliferating in a basal medium in the absence of exogenous growth factors, feeder cells and/or animal serum.

4. A process according to Claim 1, 2 or 3, in which the avian cell line is free of functional endogenous retroviral or other viral particles.

5. A process according to any preceding claim, in which the avian cell line is derived from chicken or duck embryonic stem cells.

6. A process according to Claim 5, in which the chicken cell line is DL43 or DL46, and the duck cell line is EB24 or EB26.

7. A process according to any preceding claim, in which the basal culture medium is a synthetic or chemically defined (CD) medium, preferably additionally supplemented with one or more ingredient(s) selected from the group consisting of amino acids, nucleotides, vitamins, saccharides, fatty acids, beta-mercapto-ethanol, insulin, glycine, choline, pluronic acid F-68, sodium pyruvate and L-glutamine.

8. A process according to any preceding claim, in which the cell line is cultured under fed-batch conditions.

9. A process according to any of Claims 1 to 7, in which the cell line is cultured under perfusion conditions.

10. A process according to any preceding claim, in which the cell line is cultured in a bioreactor with a volume equal or larger than 30 litres, 50 litres, 100 litres, 1000 litres, preferably 10,000 litres and in which the culturing temperature is around 37°C, pH 7.2, pO_2 about 30%, and the stirring speed about 40 rpm or higher.

11. A process according to any preceding claim, in which the cell line is cultured until the cell density has reached about or more than 10^7 cells/mL, preferably about or more than 10^8 cells/mL.

12. A process according to any preceding claim, in which the yield of the cell culturing is at least about 0.5 to 1 g biomass per g medium.

13. A process according to any preceding claim, further comprising a step of harvesting a cell biomass by sedimentation and decantation, in which cell sedimentation is performed by addition of a calcium salt to a cell suspension at a final concentration from 10 to 500 mg/L, preferably from 50 to 300 mg/L, more preferably 50 mg/L.

14. A process according to any preceding claim, further comprising a step of adding to the cell biomass one or more ingredient(s) increasing nutritional value of the food product selected from the group comprising vitamins, co-vitamins, minerals, essential amino acids, essential fatty acids, enzymes, antioxidants, flavourants, flavour aromatics and colorants.

15. A process according to any preceding claim, further comprising one or more food processing step(s) selected from cooling, freezing, solidifying, drying, pickling, boiling, cooking, baking, frying, smoking, 3D printing and packing.

16. A cell biomass produced by a process according to any preceding claim.

17. A nutritive food product produced by a process according to any of Claims 1 to 15.

18. A nutritive food product according to Claim 18, further comprising other cells such as non-human muscle cells, fat cells or cartilage cells, or their combinations, that are grown *in vitro* together with the avian cells or added after the avian cells harvesting.

19. A nutritive food product according to Claim 18 or 19, in which the nutritive food product is processed to any of the consumption form selected from the group comprising paste, puree, soup, pie, powder, granules, chip, tablet, capsule, spread and sausage.

20. Use of a cell biomass produced by the process of any of Claims 1 to 15 or a nutritive food product according to Claim 17, 18 or 19 for human or animal consumption.

CLAIMS

1. A nutritive food product produced by a process for *in vitro* producing a nutritive food product for human or animal consumption comprising culturing an avian cell line in suspension, in which the avian cell line is (i) derived from avian embryonic stem cells, (ii) capable of proliferating in a basal culture medium in the absence of exogenous growth factors, feeder cells and/or animal serum, and iii) capable of growing continuously in suspension.

2. A nutritive food product according to Claim 1, in which the avian cell line is obtained by the process comprising the steps:

(a) isolating avian embryonic stem cells from an embryo(s) at a developmental stage around oviposition;

(b) culturing the cells in a basal culture medium containing at least one exogenous growth factors SCF, IGF-1, bFGF, IL-6, IL-6R and/or CNTF, a layer of feeder cells and an animal serum for at least twenty passages;

(c) modifying the culture medium by progressive deprivation of the growth factors, feeder cells and animal serum and further culturing the cells for at least several passages; and

(d) adapting the cells of step (c) to suspension,

thereby obtaining the established avian cell line capable of proliferating in a basal culture medium in the absence of exogenous growth factors, feeder cells and/or animal serum for at least 50 days.

3. A nutritive food product according to Claim 1 or 2, in which the avian cell line is obtained by the process comprising the steps:

(a) isolating the avian embryonic stem cells from an embryo(s) at a developmental stage around oviposition;

(b) culturing the cells in a basal culture medium containing the exogenous growth factor IGF-1 and CNTF, a layer of feeder cells and an animal serum for at least one passage;

(c) progressively withdrawing the growth factors from the culture of step (b) and further growing for at least one passage;

(d) progressively withdrawing the feeder cells from the culture of step (c) and further growing for at least one passage;

(e) progressively withdrawing the animal serum from the culture of step (d) and further growing for at least one passage; and

(f) adapting the cells of step (e) to suspension,

thereby obtaining the continuous avian cell line capable of proliferating in a basal medium in the absence of exogenous growth factors, feeder cells and/or animal serum.

4. A nutritive food product according to Claim 1, 2 or 3, in which the avian cell line is free of functional endogenous retroviral or other viral particles.

5. A nutritive food product according to any preceding claim, in which the avian cell line is derived from chicken or duck embryonic stem cells.

6. A nutritive food product according to Claim 5, in which the chicken cell line is DL43 or DL46, and the duck cell line is EB24 or EB26.

7. A nutritive food product according to any preceding claim, in which the basal culture media are a synthetic or chemically defined (CD) medium, preferably additionally supplemented with one or more ingredient(s) selected from the group consisting of amino acids, nucleotides, vitamins, saccharides, fatty acids, beta-mercapto-ethanol, insulin, glycine, choline, pluronic acid F-68, sodium pyruvate and L-glutamine.

8. A nutritive food product according to any preceding claim, in which the cell line is cultured under fed-batch conditions.

9. A nutritive food product according to any of Claims 1 to 7, in which the cell line is cultured under perfusion conditions.

10. A nutritive food product according to any preceding claim, in which the cell line is cultured in a bioreactor with a volume equal or larger than 30 litres, 50 litres, 100 litres, 1000 litres, preferably 10,000 litres and in which the culturing temperature is around 37°C, pH 7.2, pO_2 50%, and the stirring speed about 40 rpm or higher.

11. A nutritive food product according to any preceding claim, in which the cell line is cultured until the cell density has reached than 10^7 cells/mL or more, preferably 10^8 cells/mL or more.

12. A nutritive food product according to any preceding claim, in which the yield of the cell culturing is at least 0.5 to 1 g biomass per g medium.

13. A nutritive food product according to any preceding claim, further comprising a step of harvesting a cell biomass by sedimentation and decantation, in which cell sedimentation is performed by addition of a calcium salt to the cell suspension at a final concentration from 10 to 500 mg/L, preferably from 50 to 300 mg/L, more preferably 50 mg/L.

14. A nutritive food product according to Claim 13, further comprising a step of adding to the cell biomass one or more ingredient(s) increasing nutritional value of the food product selected from the group comprising vitamins, co-vitamins, minerals, essential amino acids, essential fatty acids, enzymes, antioxidants, flavourants, flavour aromatics and colorants.

15. A nutritive food product according to any preceding claim, further comprising one or more food processing step(s) selected from cooling, freezing, solidifying, drying, pickling, boiling, cooking, baking, frying, smoking, 3D printing and packing.

16. A nutritive food product according to any preceding claim, further comprising other cells such as non-human muscle cells, fat cells or cartilage cells, or their combinations, that are grown *in vitro* together with the avian cells or added after the avian cells harvesting.

17. A nutritive food product according to any preceding claim, in which the nutritive food product is processed to any of the consumption form selected from the group comprising paste, puree, soup, pie, powder, granules, chip, tablet, capsule, spread and sausage.

18. Use of a nutritive food product according to any preceding claim for human or animal consumption.