CLAIMS

1. A microfluidic biomimetic fiber for cultured meat production, wherein the microfluidic biomimetic fiber has a shell-core structure; and an outer shell of the microfluidic biomimetic fiber is formed by cross-linking a polymer solution with cell non-adhesion, and an inner core wrapped by the outer shell is a hydrogel solution mixed with a seed cell;

wherein the hydrogel solution comprises a biomaterial, a cross-linking agent, and a basic culture medium containing a calcium salt and a seed cell; each 1 mL of the hydrogel solution contains 290-699 μL of 4-8 mg/mL of the biomaterial, 1-10 μL of 1-2 mol/L of the cross-linking agent, and 300-700 μL of the basic culture medium containing 15-25 mg/mL of the calcium salt and 1×107-1×108 seed cells; the biomaterial is one or more of collagen, recombinant collagen, gelatin, matrigel, hyaluronic acid, and silk fibroin; the cross-linking agent is one or more of NaOH, KOH, and NaHCO3; the calcium salt is one or more of calcium chloride, calcium carbonate, calcium sulfate, and calcium nitrate; the basic culture medium is one or more of F-10, DMEM, MEM, F-12, and DMEM/F-12; and the seed cell is one or more of a muscle stem cell, a myoblast, a muscle satellite cell, and a muscle precursor cell of a pig, cattle, sheep, a chicken, and a duck.

2. The microfluidic biomimetic fiber for cultured meat production according to claim 1, wherein the polymer solution with cell non-adhesion is any one or more of sodium alginate, chitosan, pectin, carrageenan, and gellan gum; and the concentration of the polymer solution with cell non-adhesion is 10-50 mg/mL.

3. A method for preparing the microfluidic biomimetic fiber for cultured meat production according to claim 1, comprising the following steps:

(1) preparing microfluidic inner and outer phase fluids: preparing the polymer solution with cell non-adhesion as an outer phase fluid and preparing the hydrogel solution containing a seed cell as an inner phase fluid; and

(2) preparing a biomimetic fiber: respectively introducing the inner and outer phase fluids prepared in step (1) into inner and outer phase channels of a microfluidic device, enabling the two phase fluids in the channels of the microfluidic device to form a stable laminar flow structure by adjusting the flow velocities of the inner and outer phases, extruding same by the microfluidic device, and then treating same by a collection medium to obtain the biomimetic fiber.

4. The preparation method according to claim 3, wherein the microfluidic device in step (2) is made of one or more of crystalline silicon, polydimethoxysiloxane, glass, quartz, polyphthalamide, polymethyl methacrylate, polycarbonate, polystyrene, epoxy resin, acrylic acid, rubber, and fluoroplastic.

5. The preparation method according to claim 3, wherein a channel structure of the microfluidic device in step (2) is in a form that an inner phase channel and an outer phase channel are coaxially nested; or a coaxially nested form constructed by a collection phase channel and an observation phase channel on the basis of the coaxial nesting of the inner phase channel and the outer phase channel.

6. The preparation method according to claim 3, wherein in step (2), the two phase fluids in the channels of the microfluidic device are enabled to form a stable laminar flow structure by adjusting the flow velocities of the inner and outer phases and extruded into the collection medium, and the biomimetic fiber is obtained after the residual collecting

liquid is washed away; or in step (2), the two phase fluids in the channels of the microfluidic

device are enabled to form a stable laminar flow structure by adjusting the flow velocities of the inner and outer phases, and the extruded biomimetic fiber is directly organizationally integrated and then is soaked in the collection medium to form a biomimetic fiber three-dimensional tissue; and the collection medium is one or more of a calcium salt solution, a sodium salt solution, a potassium salt solution, and a magnesium salt solution.

7. Use of the microfluidic biomimetic fiber for cultured meat production according to claim 1 in the cultured meat production.

8. The use according to claim 7, wherein the cultured meat production comprises the following steps:

transferring the biomimetic fiber into a proliferation culture medium for proliferation culture and replacing the proliferation culture medium with a differentiation culture medium after the seed cells are fused in the biomimetic fiber to form a fiber structure; and collecting the biomimetic fiber which is proliferated, differentiated and cultured to be a mature biomimetic fiber for producing cultured meat after organizational integration and food processing.

9. The use according to claim 8, wherein the proliferation culture medium comprises 79%-89% by volume of a basic culture medium, 10%-20% by volume of fetal bovine serum, and 1% by volume of penicillin-streptomycin, and contains 1-10 ng/mL of a basic fibroblast growth factor; and the differentiation culture medium comprises 94%-97% by volume of a basic culture medium, 2%-5% by volume of horse serum, and 1% by volume of penicillin-streptomycin.

10. The use according to claim 8, wherein the organizational integration is performed in a manner of stacking, weaving, winding, binding, or folding.

11. The use according to claim 8, wherein the food processing comprises pretreatment and cooking, wherein the pretreatment comprises one or more of washing, seasoning, color

enhancement, shaping, or sensory quality modification, and the cooking comprises decocting, frying, boiling, steaming, or baking.

12. The use according to claim 8, wherein a polymer part of the mature biomimetic fiber can be removed to obtain a pure cell fiber, a lysis solution is used in the removing method, and the lysis solution comprises an alginate lyase, sodium citrate, ethylene diamine tetraacetic acid, a chitosanase, a pectinase, or a carrageenase.