BIOPRINTING PROTOCOL FOR SHEEP MENISCUS WITHOUT CELLS

Overview: This protocol is a specific way to a sheep meniscus from a CT scan using CELLINK Start bioink.

Materials:
Sheep meniscus CT Scan
Slic3r Software (v1.2.9)
CELLINK Start bioink
CELLINK Support bioink
INKREDIBLE 3D Bioprinter by CELLINK
Straight tip, 410µm ID (22 GA)
Straight tip, 410µm ID (22 GA)

Protocol:

1. The first step is to upload the sheep meniscus CT image to the Slic3r software to create an STL file. Using Slic3r (v1.2.9), convert the 3D model to a bioprinting protocol and toolpath with the following parameters:
    - Print setting: Organ Support
    - Layer height = 0.40mm
    - External perimeters extrusion width = 0.45mm
    - Perimeters = 1
    - Infill density = 35%
    - Infill Pattern = Concentric
    - Support material overhang threshold = 25°
    - Printing speed, F = 600mm/min (Printheads 1 and 2)

    Upload the bioprinting protocol with the following name: *"Sheep Meniscus_LH04_Infill35_F600.gcode"*

2. The CELLINK Start bioink is used to print the perimeter and the infill with PH1. The CELLINK Support bioink is used to print the supporting structures with PH2.

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3. The following bioprinting parameters can be used with the INKREDIBLE 3D Bioprinter by CELLINK using the pneumatic-driven micro-extrusion technology.

    - Nozzle type and size for PH1: Straight tip, 410µm ID (22 GA)
    - Nozzle type and size for PH2: Straight tip, 410µm ID (22 GA)
    - Printing pressure for PH1: 100-110 kPa
    - Printing pressure for PH2: 50-60 kPa
    - Printing speed, PH1 and PH2: 600 mm/min
    - Printhead temperature: Room temperature (22°C)
    - Printbed temperature: Room temperature (22°C)

4. Bioprinting metrics
    a. Time for bioprinting: 13 minutes per construct

G-codes:
Sheep Meniscus_LH04_Infill35_F600.gcode

Further Information:
sheep meniscus.stl

References:
N/A

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