BIOPRINTING PROTOCOL FOR HUMAN EAR WITHOUT CELLS

Overview: This protocol is a specific way to a human ear from an MRI scan using CELLINK Start bioink.

Materials:
Human ear MRI Scan at a scale of 35% of original size[1]
Slic3r Software (v1.2.9)
CELLINK Start bioink
INKREDIBLE 3D Bioprinter by CELLINK
Straight tip, 22 GA
Conical tip, 27 GA
Conical tip, 25 GA
Conical tip, 22 GA

Protocol:

1. The first step is to upload the human ear MRI 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:
    - Layer height = 0.40mm
    - External perimeters extrusion width = 0.45mm
    - Perimeters = 1
    - Infill density = 30%
    - Infill Pattern = Rectilinear
    - Printing speed, F = 600mm/min

    Upload the bioprinting protocol with the following name:
    "HumanEar_Scale35_LH04_Infill30_F600.gcode"

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

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- Printing pressure for PH1: 100-110 kPa (Nozzle: Straight tip, 22 GA)
- Printing pressure for PH1: 50-60 kPa (Nozzle: Conical tip, 27 GA)
- Printing pressure for PH1: 30-35 kPa (Nozzle: Conical tip, 25 GA)
- Printing pressure for PH1: 25 kPa (Nozzle: Conical tip, 22 GA)
- Printing speed: 600 mm/min
- Printhead temperature: Room temperature (22°C)
- Printbed temperature: Room temperature (22°C)

3. Bioprinting metrics
    a. Time for bioprinting: 5 minutes and 51 seconds per construct
    b. Volume of bioink per construct: 1.2 mL

G-codes:
HumanEar_Scale35_LH04_Infill30_F600.gcode

Further Information:
human ear.stl

References:
N/A