

## BIOPRINTING PROTOCOL FOR BLOOD VESSELS

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**Overview:** This protocol is a specific way to create blood vessels using CELLINK Start bioink and different nozzle sizes.

### **Materials:**

Autodesk® 123D Design software  
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 design a blue print for the structure. Using Autodesk® 123D Design software, create the 3D model of a tube geometry with the dimensions of 6mm x 10 mm (ODxH)
2. Using Slic3r (v1.2.9), convert the 3D model to a bioprinting protocol and toolpath with the following parameters:
  - Layer height = 0.30mm
  - External perimeters extrusion width = 0.30mm
  - Printing speed, F = 600mm/min

Upload the bioprinting protocol with the following name: "*Blood Vessel\_D6xH10\_LH\_F600.gcode*"

3. The following bioprinting parameters can be used with the INKREDIBLE 3D Bioprinter by CELLINK using the pneumatic-driven micro-extrusion technology:
  - Printing pressure for PH1: 100-110 kPa (Nozzle: [Straight tip, 22 GA](#))
  - Printing pressure for PH1: 50-60 kPa (Nozzle: [Conical tip, 27 GA](#))

CELLINK AB  
Arvid Wallgrens Backe 20  
SE 413 46 Gothenburg  
Sweden  
Phone +46 732 67 00 00

CELLINK LLC  
675 W Kendall St.  
Cambridge, MA 02142  
USA  
Phone +1 650 515 5566

- 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)

#### 4. Bioprinting metrics

- a. Time for bioprinting: 2 minutes per construct
- b. Dimensions of bioprinted construct: OD: *6.1mm*, H: *10mm*

#### **G-codes:**

Blood Vessel\_D6xH10\_LH03\_F600.gcode

#### **Further Information:**

blood vessel.stl

#### **References:**

N/A