

PROTOCOL

VasKit Perfusion Device

This is a suggested procedure, please adjust according to your experimental needs.

Protocol aim

The aim of this protocol is to provide instructions for how to use the VasKit Perfusion Device. The device has bounding box dimensions of 36x85x19 mm³, a maximal build volume of 6 CC, the distance between the channels and glass of 1 mm. It is made of USP Class VI Biocompatible SLA resin, glass, EPDM 70, stainless steel, medical device grade silicone and nylon.

Materials needed

Kit components:

- VasKit device
- 2 x Luer lock adaptors
- Bioprinting nozzles

Other components needed:

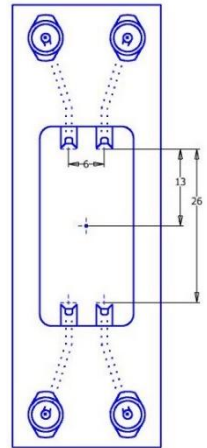
- 1.5 mm Allen Key
- Stopcocks (4 pcs)
- Luer plugs (4 pcs)
- Luer female to barb connectors
- BIO X*, BIO X6* or INKREDIBLE-series* 3D bioprinter

*The product can be purchased in the CELLINK shop at www.cellink.com/shop.

Protocol

The VasKit Perfusable Device is a bioreactor developed for channel perfusion and visual inspection of fully or partially bioprinted tissues. It has four female Luer lock connectors serving as either inlet or outlet points, each leading to a gel connector (Figure 1).

Figure 1. Illustration of the VasKit including the distance between channels.



1. Preparing the VasKit

DESCRIPTION

- The VasKit device is reusable. Sterilization methods: UV, 70% EtOH, autoclaving at 121°C for 15 minutes.
- Before start, make sure to sterilize nozzles, Luer plugs and Luer female to barb connectors.

2. Printing tips

DESCRIPTION

Printing of the channels

- To print channels, a sacrificial bioink such as Pluronics* can be easily printed at room temperature, then liquefied below 4°C and removed by suction. See *Printing Protocol Pluronics 40%* for instructions on how to print Pluronics.

Printing of infill:

- For the infill material around the channels, we recommend GelMA FIBRIN*, a GelMA-based bioink that promotes vascularization and can be easily photocrosslinked. Other materials of choice can be also used for printing the infill.

Printing Pluronics on GelMA FIBRIN:

- When using a 3D bioprinter, it can be a challenge to precisely layer a Pluronics filament on top of a hydrogel. The Pluronics display a slippery behaviour that would sometimes result in failure in achieving the desired geometry. It is therefore extra important that the casted bottom layer is as flat as possible and to position the nozzle at correct height.
- A way of printing channels embedded in GelMA FIBRIN is to cast a thin gel layer (at least 500 µL) of GelMA FIBRIN pre-warmed to 37°C on the bottom of the flow device and knock it gently to generate a flat surface. Let the bioink cool for a short while to gel. Then print Pluronics channels between two inlets/outlets. Cast another layer of warm GelMA FIBRIN in order to cover the Pluronics. Photocrosslink the GelMA and evacuate the Pluronics by gently flushing with chilled water. Gravity is often enough to pull cold liquefied out when tilting the device. Make sure not to use excessive forces.

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