Supporting Information for:
PolyJet 3D-Printed Enclosed Microfluidic Channels without Photocurable Supports

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Table of Contents

The supporting information also contains a second file, which is a compressed (Zip) folder that includes the relevant STLs for the ATP mixing device (shown in Figures 3 and 4) as well as the Y flow channel device (shown in Figure 6)

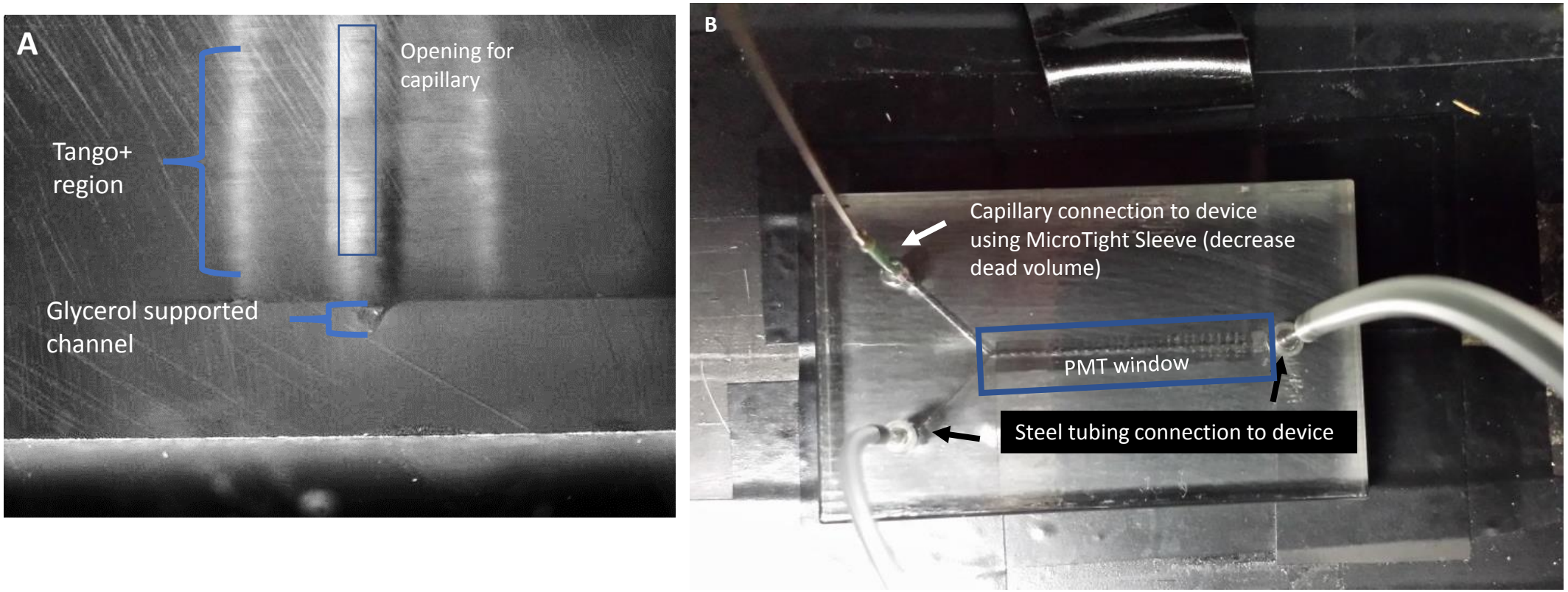


Figure S1. Insertion of tubing into device: (A) Cross-section of the channel and how the connection port meets up to it. (B) Shows how a capillary can be connected to the device using the MicroTight Sleeve or tubing can be connected using a steel pin and tygon tubing. Device is placed over opening for PMT.

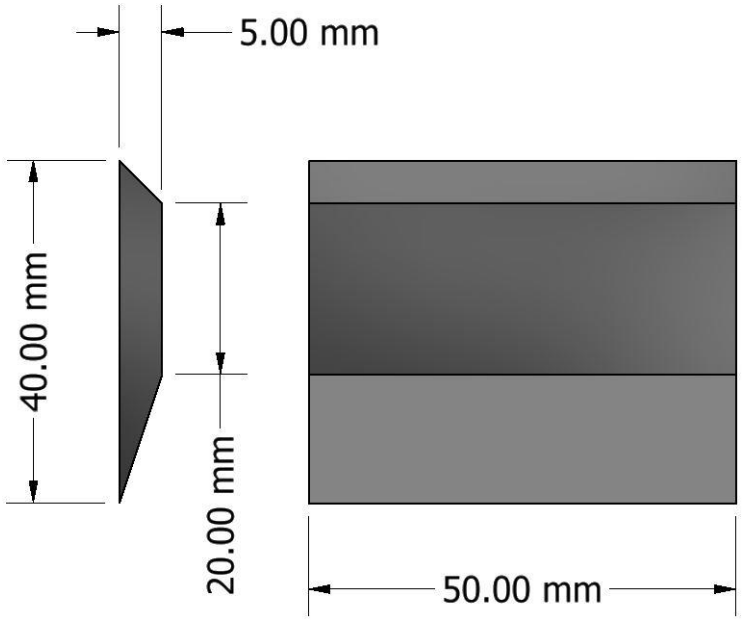
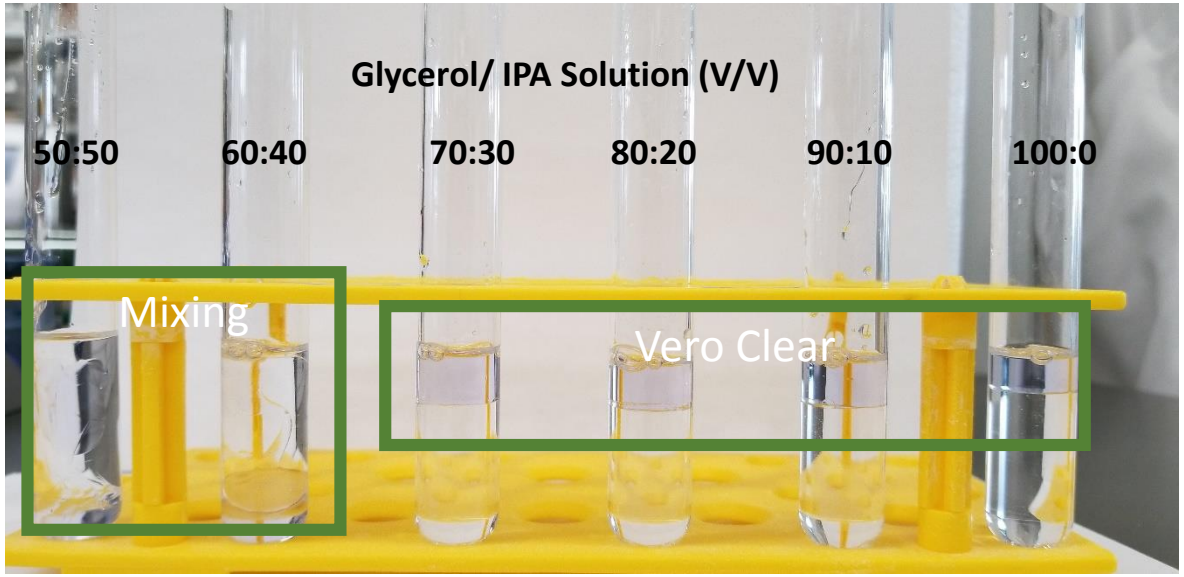
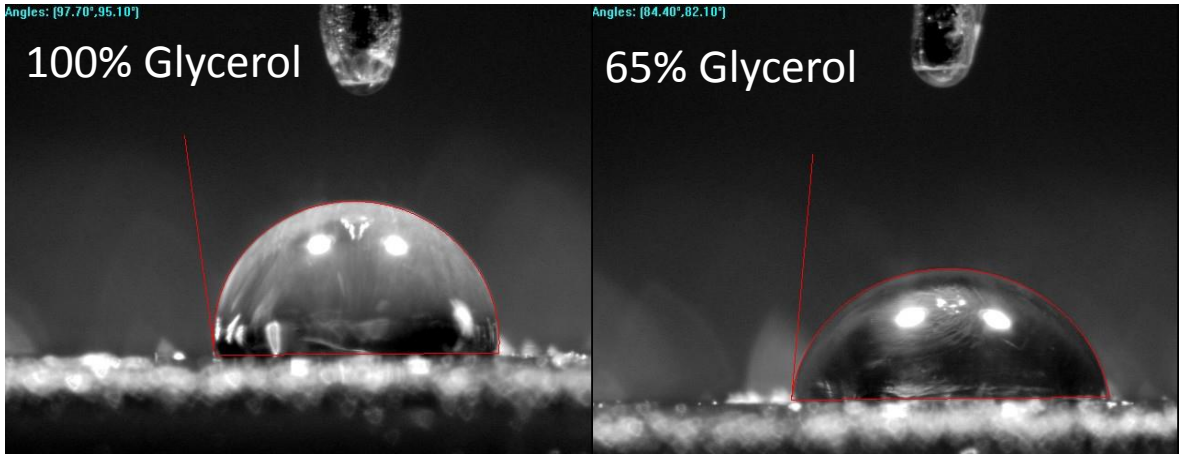


Figure S2. Squeegee device. Rendering and dimensions of the squeegee printed at a shore value of 50 to aid in the removal of excess glycerol/IPA for the liquid support method.

A



B



% Glycerol (v/v)	Mean Contact Angle	Std. Dev.
60.0	71.3	2.0
65.0	82.0	2.6
70.0	95.2	2.6
100.0	99.8	3.5

Figure S3. Analysis of optimal ratio of glycerol: isopropanol to be used as a liquid support. (A) The relative density of different ratiometric mixtures of glycerol/isopropanol solutions compared to non cured printer resin. Defined layering seen in when glycerol/IPA is 70:30 to 100:0 while less than 60:40 no layering is seen. (B) Contact angle measurements showing that surface wetting of the material increases with increasing proportions of isopropanol.

TITLE	
PART NO	Channel imported
REVISION	
DESIGNER	Andre
ENGINEER	

NOTES

Figure S4. MicroCT 3D rendering of void space within the ATP mixing device.

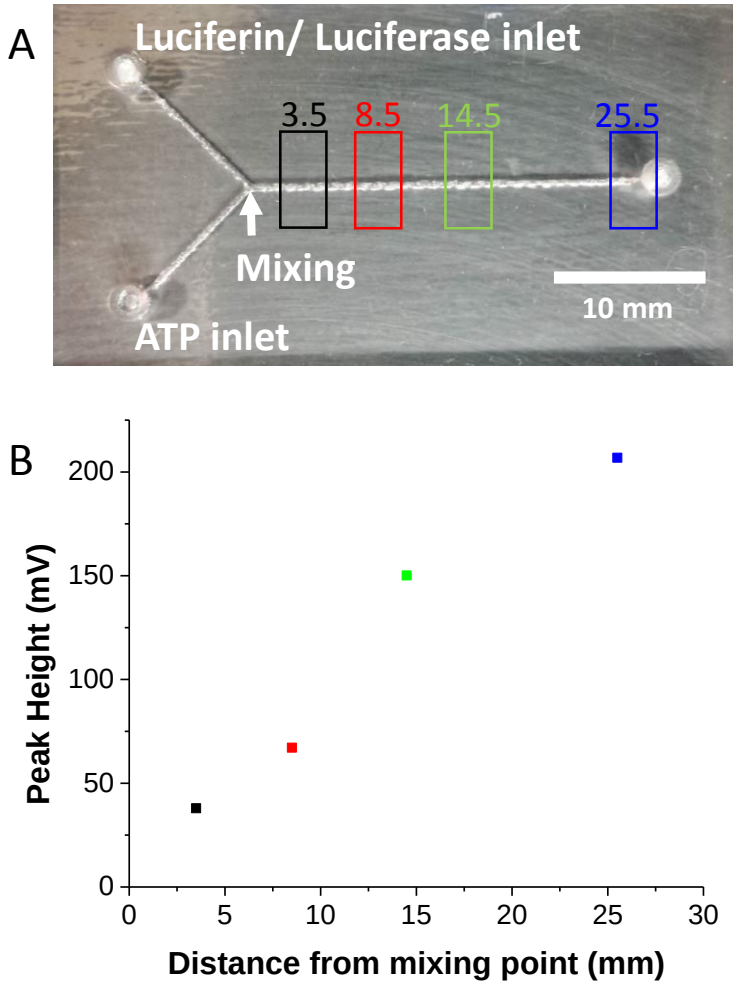


Figure S5. Characterization of mixing in the ATP device A) To characterize the mixing down the channel 2 µL plugs of 1 µM ATP were injected (flow rate = 10 µL/min) through the ATP inlet. This plug was mixed on-chip with a 10 µL/min stream of Luciferin/Luciferase solution (solution details in the experimental section). Utilizing a 3 mm wide window to the PMT (drawn to scale) four spots down the channel were measured. B) Plot of peak intensity as a function of distance from point of mixing to the middle of the window.

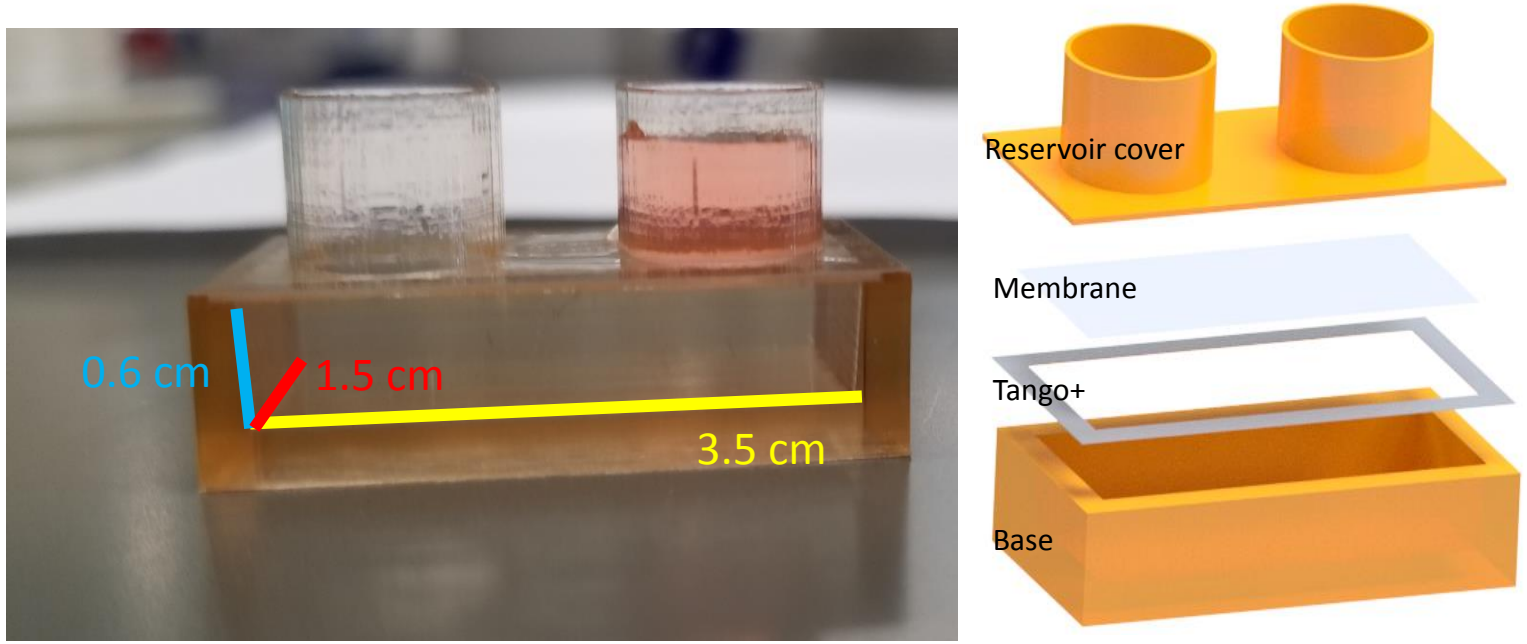


Figure S6. Large void printed utilizing the membrane support. (A) Cell migration device with an internal void of 0.6 cm x 1.5 cm x 3.5 cm. Reservoir for cell growth media is supported by a membrane and the membrane is intact after printing. (B) Exploded view of the cell growth device. In this case a tango+ layer was used to aid in adhesion of the membrane to the base layer.