Supplementary Information (SI) for Lab on a Chip.

Tables S1 to S10

Table S1. Specifications of XFAB 2000 and Sonic Mini 8k 3D printers.

Specifications / Printer	Technology	Resolution (µm)	Printer size (cm)	Weight (kg)	Printing volume (mm)	UV source	Layer thickness (µm)	Retail price ($)
DWS XFAB 2000	Laser SLA	10	40x60.6x64.2	31	18x18x18	Solid State BlueEdge ®	10-100	5000.00
Phrozen Sonic Mini 8K	LCD SLA	22	29x29x43	13	16.5x7.2x18	405 nm	10-300	484.99

Table S2. Physical properties of the photosensitive resins studied provided by suppliers.

Properties / Resins	Density (g/cm^3)	Viscosity (mPa.s)	Surface Hardness (Shore D)	Tensile Stress at Break (MPa)	Elongation at Break (%)	Tensile Modulus (MPa)	Heat Deflection Temperature (°C)	Flexural Strength (MPa)	Flexural Modulus (MPa)	Price ($/kg)
Precisa 780	1.12	1500 - 2200	82 - 85	35 - 45	6 - 7	1700 - 2000	48 - 53	60 - 80	1500 - 1850	160
TR300	1.17	123.6	80	59.9	3.9	3443.7	160	x	x	94.22
Aqua-Clear	1.11	50 - 100	74	22	14	735	49.3	29	701	46.56
Bio-Med Clear	1.18	475	85	55	5 - 10	2000	62	78	2200	122

Table S3. Viability of HPAC-eGFP and PS-1-TD Tomato cells in contact with different resins.

Resin / Cells	Control (%)	Bio-Med Clear (%)	Aqua-Clear (%)	TR300 (%)
HPAC - eGFP	100.00	77.79±14.47	3.42±0.39	26.73±13.41
PS-1 - TD Tomato	100.00	82.01±1.24	1.98±0.28	9.36±8.10

Table S4. Viability of HPAC-eGFP and PS-1-TD Tomato cells in contact with untreated and treated Bio-Med Clear resin.

Resin / Cells	Control (%)	Untreated Bio-Med Clear (%)	Bio-Med Clear + SBB (%)	Bio-Med Clear + parylene (%)	Bio-Med Clear + SBB + parylene (%)
HPAC-eGFP	100.00	77.79±14.47	70.07±20.36	88.87±1.37	90.45±3.71
PS-1-TD Tomato	100.00	82.01±1.24	77.96±7.24	93.86±3.06	96.80±1.73

Table S5. Flow velocity speed in culture chamber of the device depending on microfluidic channel dimensions and flow rate setting for the 3 applications (2D cell culture, parasite culture, 3D co-culture).

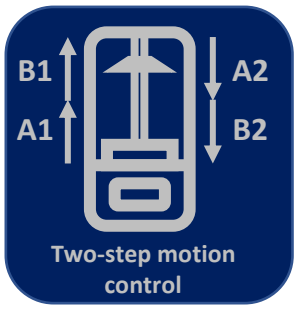
Application / Dimensions	2D cell culture (600 µm)	2D cell culture (2400 µm)	parasite culture	3D co-culture
h (mm)	0.60	2.40	1.60	2.00
w (mm)	3.00	3.00	3.00	6.00
S (mm^2)	1.80	7.2	4.80	12.00
q (µL/min)	3.74	3.74	73.90	3.74
v (µm/s)	34.63	8.66	275.70	5.19

Table S6. Scoring scale criteria used to evaluate the cultivated schistosome adult worm condition.

		Description			
Score	**Condition**	**Mobility**	**Suckers**	**Tegument**	**Morphology**
4	Normal	Active movements	Active and correct adhesive capacity	Healthy, uninjured and transparent	No changes
3	Reduced	Reduced or abnormal movements	Loss of activity and adhesive capacity		Visible changes
2	Degraded	Only occasional head and tail movements			
1	Minimal	No external movement, only internal intestinal movements			
0	Dead	Absence of internal and external movement	No movement	Darkening of tegument and tissues	

Table S7. Printing parameters used on the Phrozen Sonic Mini 8k LCD printer for the 4 resins studied.

Parameters \ Resins	Precisa 780	TR300	AquaClear	BIOMED - Liqcreate
Layer Height (mm)	0.050	0.050	0.050	0.050
Bottom Layer Count	6	6	6	6
Exposure Time (s)	60	1.75	10.5 s	12
Bottom Exposure Time (s)	150	25	60	60
Transition Layer Count	6	6	6	6
Transition Type	linear	linear	linear	linear
Transition Time Decrement	x	3.320	7.07	6.860
Waiting Mode during Printing	resting time	resting time	resting time	resting time
Rest Time Before Lift (s)	0	0	0	0
Rest Time After Lift (s)	0	0	0	0
Rest Time After Retract (s)	6	2	3	2
Bottom Lift Distance (mm)	6	6	6	6
Lifting Distance (mm)	6	6	6	6
Bottom Retract Distance (mm)	6	6	6	6
Retract Distance (mm)	6	6	6	6
Bottom Lift Speed (mm/min)	15	30	25	25
Lifting Speed (mm/min)	15	30	25	25
Bottom Retract Speed (mm/min)	35	75	65	65
Retract Speed (mm/min)	35	75	65	65
Anti-Aliasing	no	no	no	no
Shrinkage Compensation	no	no	no	no
Tolerance Compensation	no	no	no	no
Bottom Tolerance Compensation	no	no	no	no
Print Time Compensation	no	no	no	no



A1: Bottom Lift
B1: Lifting
A2: Bottom Retract
B2: Retract

Table S8. Post-process cleaning and curing steps based on manufacturer's protocol.

Protocol \ Resin	Liqcreate Bio-Med Clear	Phrozen TR300 Ultra-High Temp	Phrozen Aqua Clear	DWS Precisa 780
Cleaning the uncured resin	**2 x 3 min IPA ultrasonic bath**, the second IPA bath must be **clean IPA**. The resin is dried with compressed air after each cleaning.	**IPA propeller bath for 60 s**. The resin is dried with compressed air.	**IPA propeller bath for 60 s**. The resin is dried with compressed air.	**2 x 2 min IPA ultrasonic bath**. The resin is dried with compressed air after each cleaning.
Final curing	The resin is left to **rest for 30 min** before being placed in an UV oven at **60°C for 30 min**.	The resin is left to **rest for 30 min** before being placed in a UV oven at **room temperature for 60 min**. The part is then placed in an **oven at 150°C for 1 h**.	The resin is left to **rest for 30 min** before being placed in a UV oven at **room temperature for 60 min**.	UV oven at **room temperature for 20 min**.

Table S9. Pattern types and dimension ranges featured on the characterization platform.

Feature	Measurement	Series	Schematic
Protrusion	Height (µm)	50, 100, 250, 500, 1000, 1500, 2000, 3000, 4000, 5000	
Cavity			
Cylinder	Diameter (µm)	50, 100, 250, 500, 1000, 2000, 3000, 4000, 5000	
Punch			
Angle	Angle (°)	100, 110, 120, 130, 140, 150, 160	
Inverted angle		20, 30, 40, 50, 60, 70, 80	

Table S10. Nomenclature for the four indicators used to characterise the dimensional precision of the printing process.

	Printing orientation	
	Horizontal	Vertical
Protrusions	Z+	XY+
Cavities	Z-	XY-

Figures S1 to S14

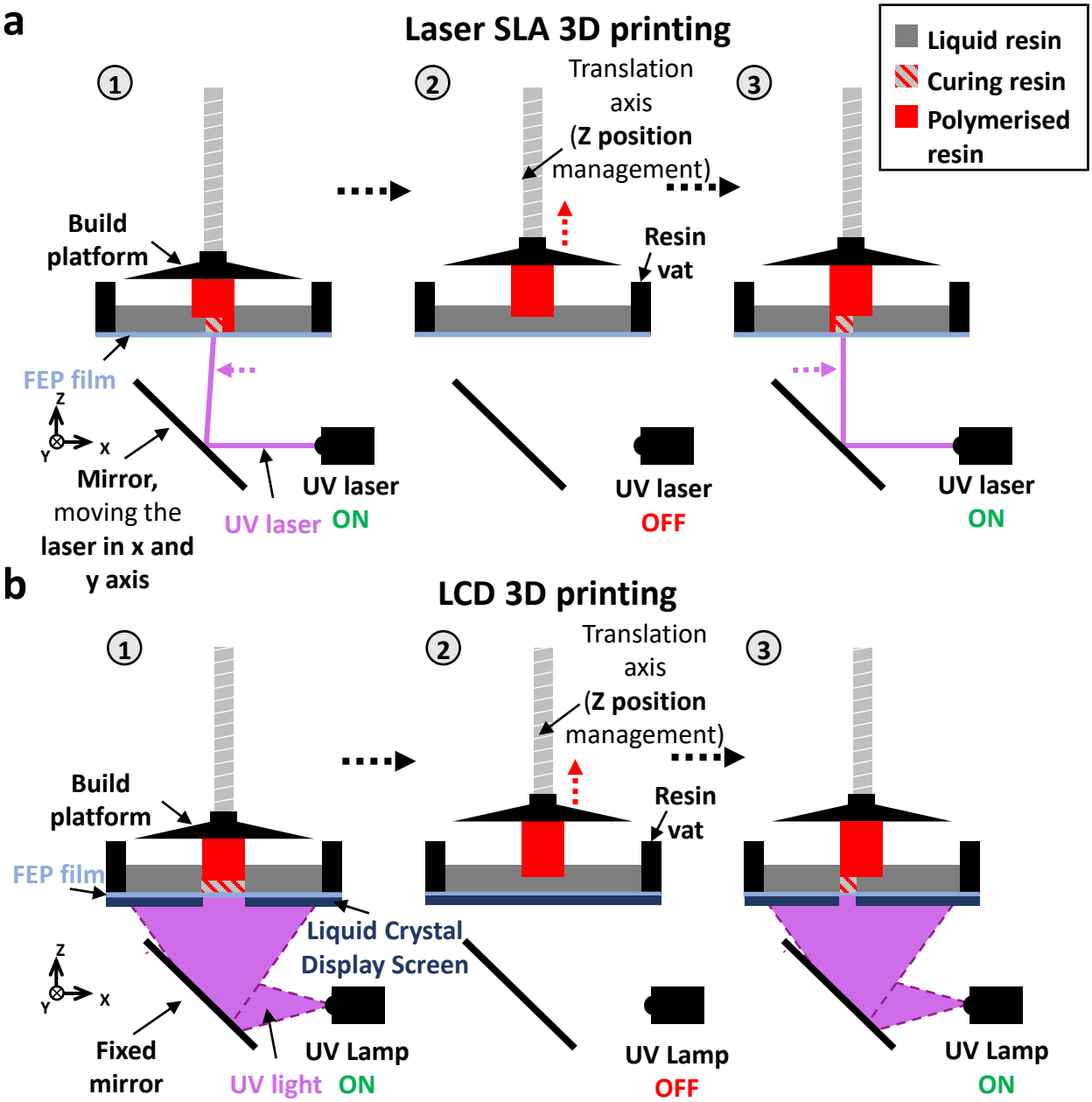


Figure S1. Description of the laser stereolithography and liquid crystal display 3D printing techniques. After designing a component in STL format using CAD software (Autodesk Fusion 360) and slicing the object, the print file is loaded onto the printer. The two printers consist of a building platform, a resin vat with fluorinated ethylene propylene (FEP) film at the bottom, filled with resin and a translation axis connected to a motor that controls the Z position of the platform. Steps involved in SLA (XFAB 2000, DWS) (**a**) and LCD (Sonic Mini 8K, Phrozen) (**b**) 3D printing technology. (a1) The laser points at a mirror that controls the X and Y positions of the curing. The reflected laser moves and cures the resin layer according to the design of the file. (a2) The laser is switched off and the printing platform is raised, allowing the resin to disperse in the reservoir. (a3) The laser is switched back on and polymerises the next layer. (b1) The printer consists of an LCD screen and a UV lamp. The lamp is switched on, the UVs are reflected on a fixed mirror and the screen is switched on to form a mask with the pixels that allow the UVs to pass through and polymerise the entire desired layer. (b2) The UV lamp is switched off and the printing platform is raised, allowing the resin to disperse in the reservoir. (b3) The process is repeated but the screen lights up differently to cure the next layer. For both printers, the process is carried out until all layers forming the object have been polymerised.

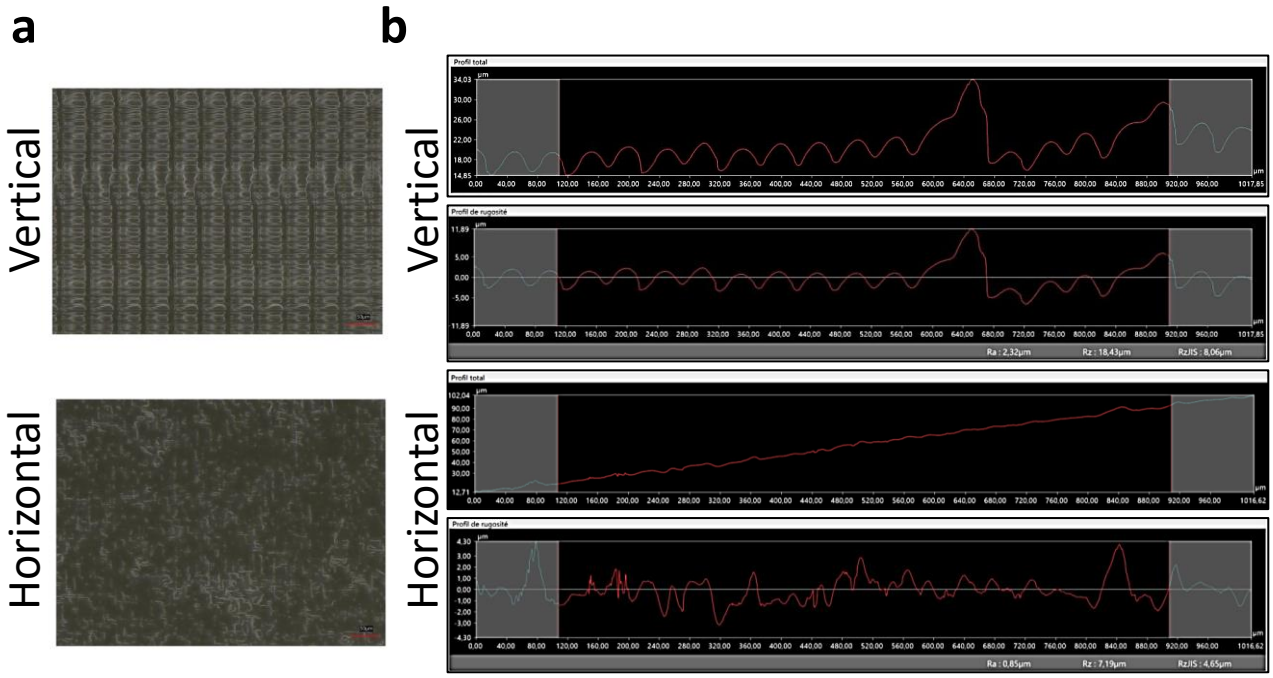


Figure S2. Surface roughness imaging and profiling using digital microscopy depending on printing orientation, showing the printing resins layers (example of AquaClear printed with LCD printer). **(a)** Images at 500X magnification. **(b)** Surface height profile, raw and corrected.

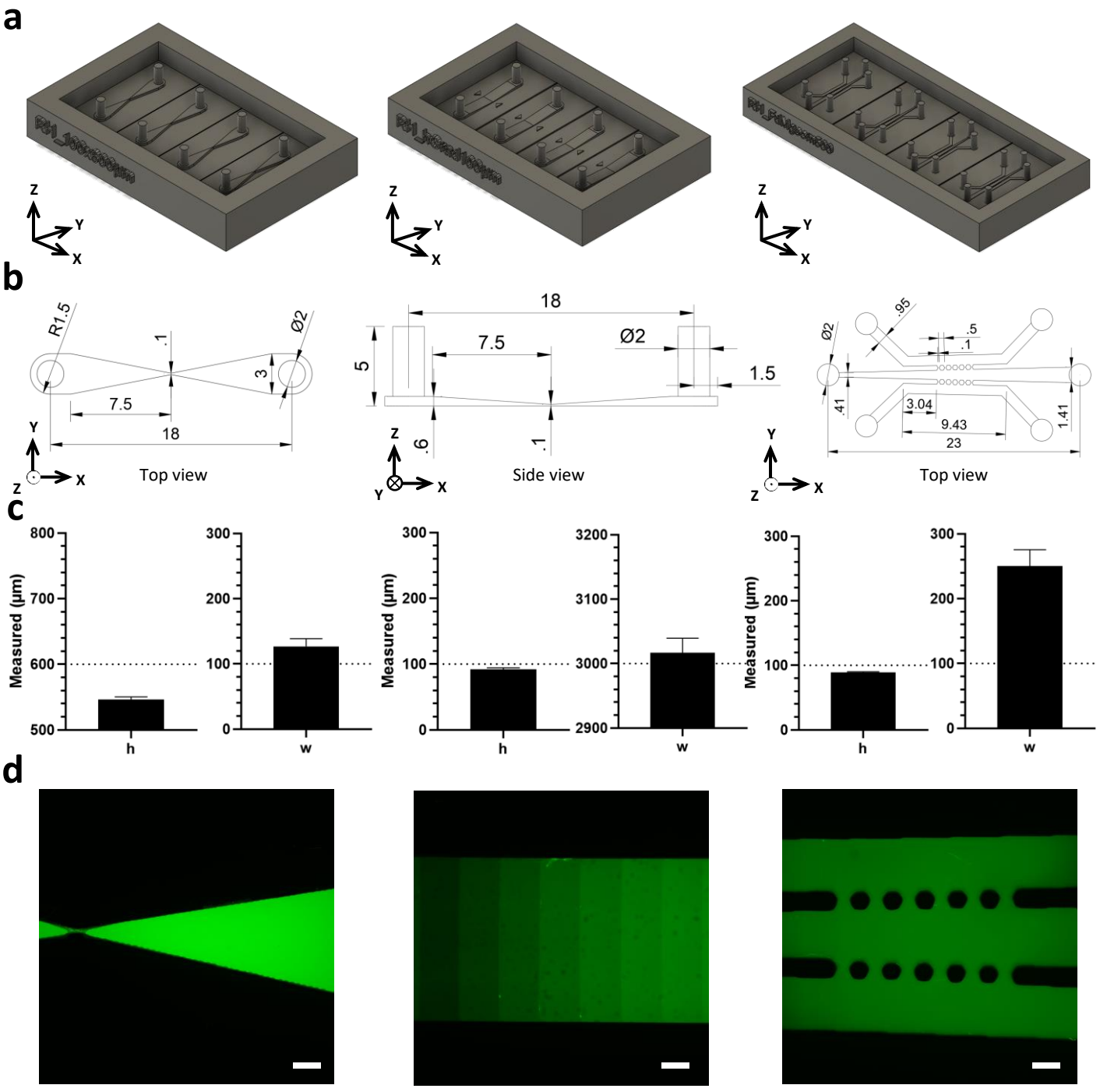


Figure S3. Design, fabrication, characterisation and use of 3 different geometries using the developed protocol. (a) Design of the moulds on Fusion360 for LCD printing fabrication. **(b)** Schematic of the geometries dimensions. The two first geometries are based on a straight single channel that is 3 mm wide for 600 µm high, with the first one featuring a gradient in width down to 100 µm in the channel centre, and similarly for the second one with a gradient in height. The third geometry is a classical three-channel microfluidic design, with 500 µm large and 100 µm spaced hexagonal pillars separating the channels. All values in mm. **(c)** Characterisation of the dimensions of the produced moulds for each geometry. For the first two geometries, the characteristic height and width of the channel centre are considered. For the third geometry, the height of the channels and the inter-pillar width are characteristic. **(d)** Microfluidic functionality test of the 3 fabricated geometries using fluorescein filling the channels at 30 min with a 3.74 µL/min flow rate, demonstrating the integrity of the microfluidic channels. Scale bars represent 500 µm.

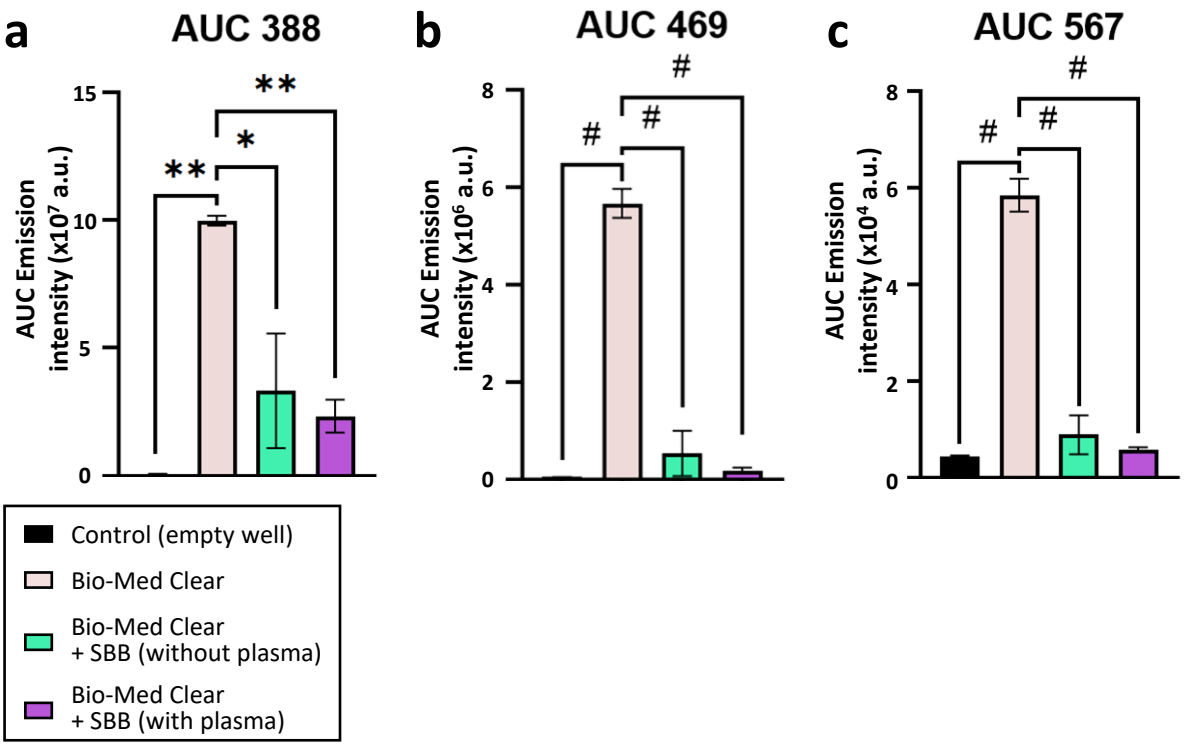


Figure S4. Area Under the Curve (AUC) measurements based on Excitation – Emission spectra of untreated and treated 3D-printed Bio-Med Clear. 3D-printed inserts of untreated or SBB and SBB + plasma O_2 treated Bio-Med Clear were excited at **(a)** 388 nm, **(b)** 469 nm and **(c)** 567 nm.

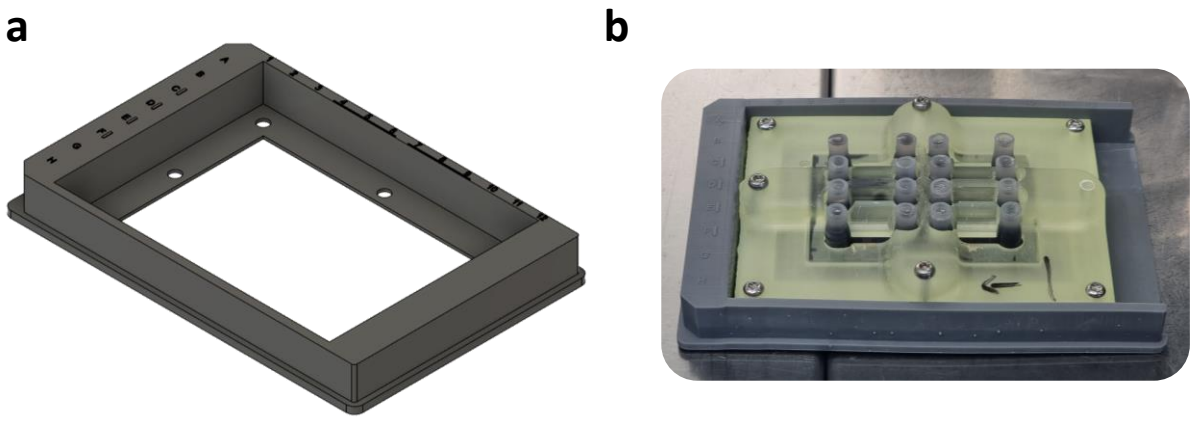


Figure S5. Custom plate adaptor for positioning the microfluidic chip in 96-well format for robotic use or automated microscopy. (a) Design of the plate adapter and **(b)** microfluidic chip inserted in the plate adapter.

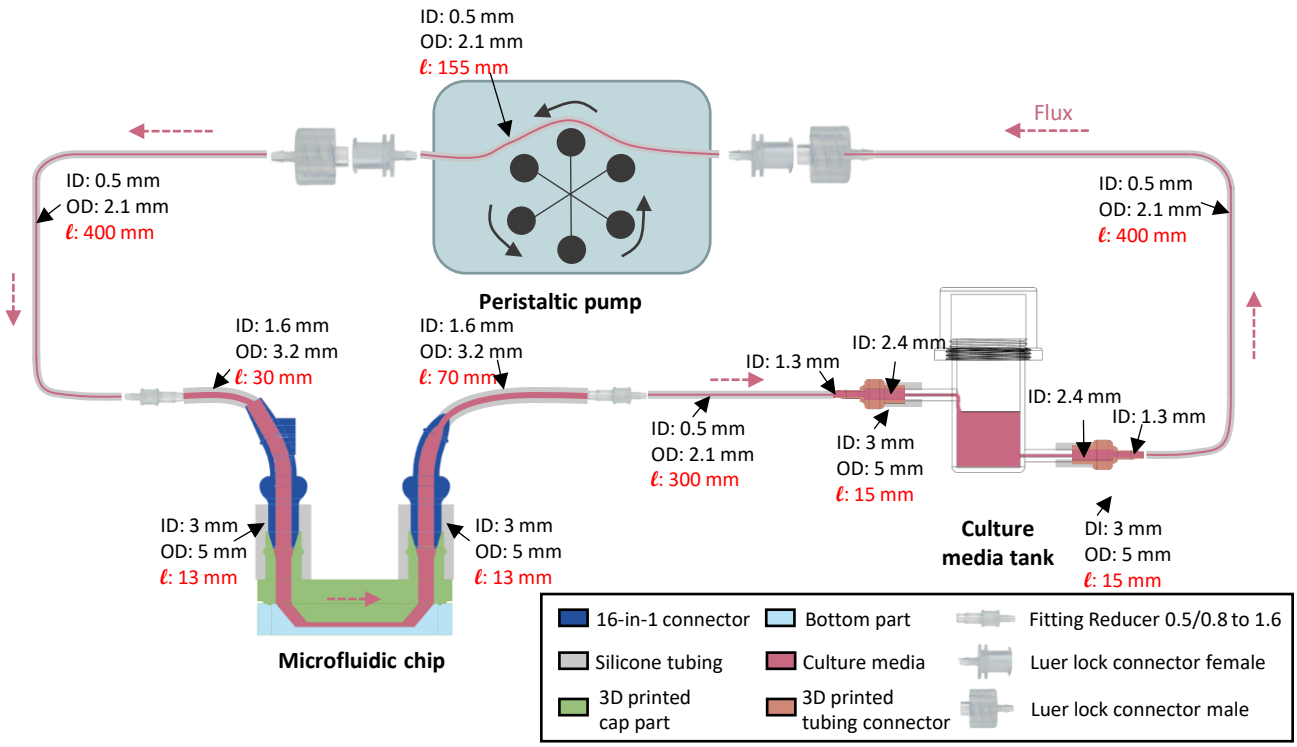
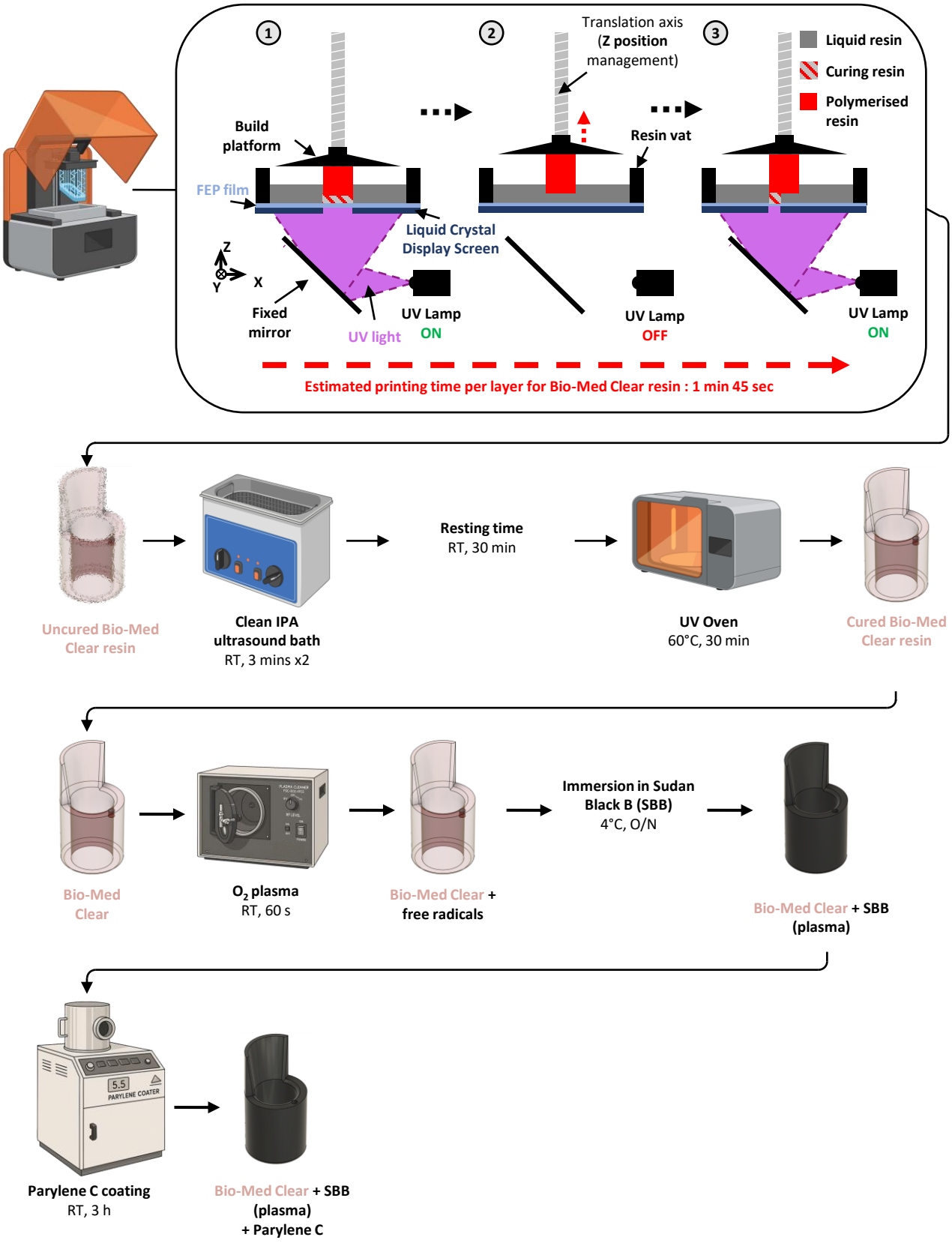


Figure S6. Functional representation of 1 of the 8 independent microfluidic circuit of a culture chamber. The culture chamber, formed by closing the different parts, is surrounded by inlets and outlets. These inlets and outlets are connected to the 16-in-1 connector by silicone tubes. The connector is then connected to the rest of the circuit by 1.6 mm ID tubes and connected to the 0.5 mm ID tubes by fitting reducers. The connection to the culture media reservoir is made via 3D printed connectors and silicone tubes. The circuit continues with 0.5 mm tubing, connected to male and female luer lock connectors so that the tubing remains in the peristaltic pump. The circuit ends by returning to the connector.



<u>Figure S7.</u> Overall fabrication pipeline to obtain non cytotoxic 3D printed objects with reduced autofluorescence. The objects are 3D printed using the LCD-based 3D printer and are then cleaned in an IPA ultrasound bath followed by UV curing. The cleaning and curing parameters given are for Bio-Med Clear resin but differ for other resins. The 3D printed objects are then immersed in an SBB solution to reduce their autofluorescence and are then coated with Parylene C to reduce their cytotoxicity. The entire process takes 29 hours

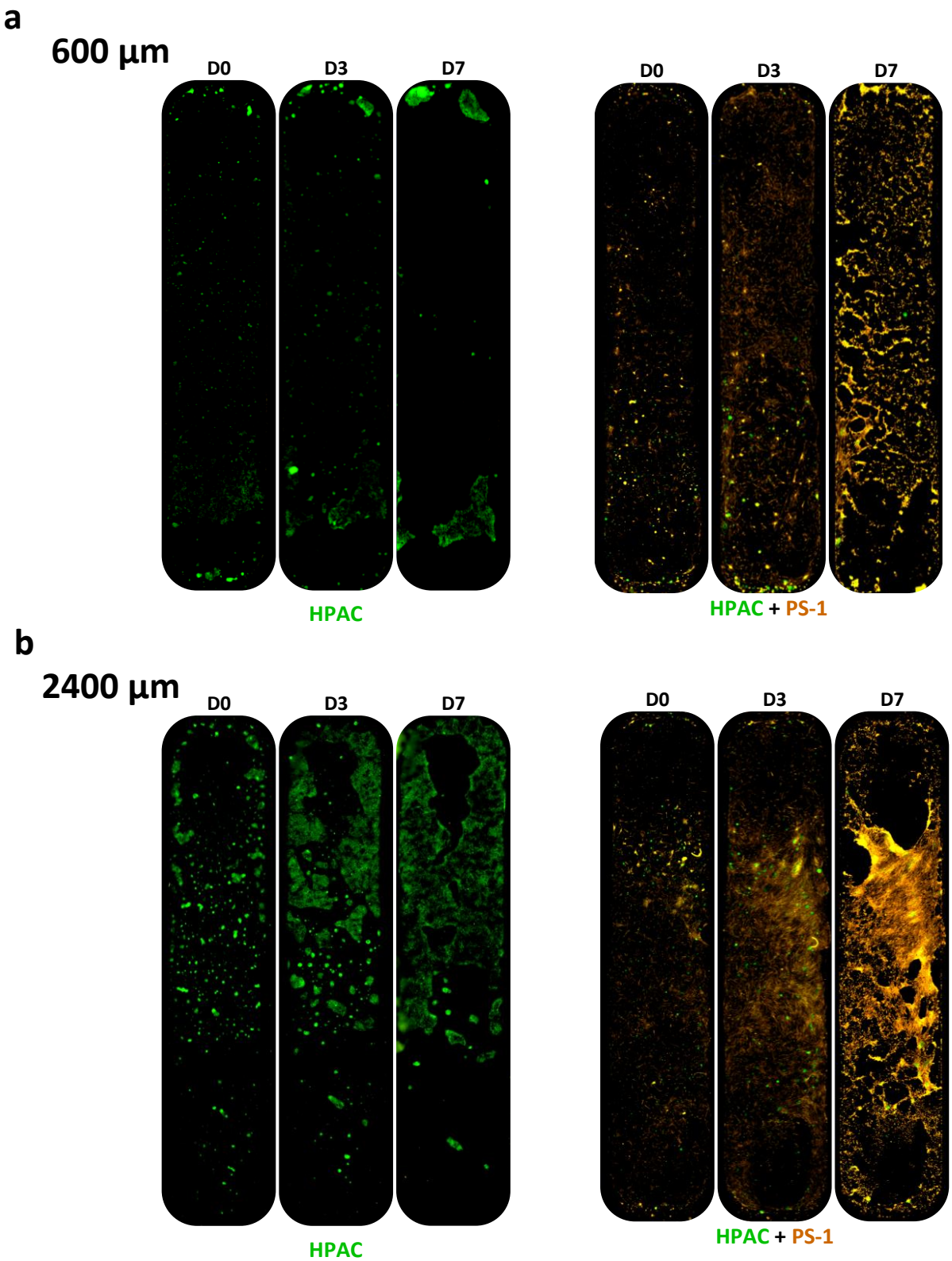


Figure S8. 2D co-culture of human HPAC and PS-1 cells in the microfluidic device. (a) HPAC - eGFP monoculture and HPAC – eGFP/PS-1 – TD Tomato coculture cultivated in the 600 µm high culture chamber for 7 days. **(b)** HPAC - eGFP monoculture and HPAC – eGFP/PS-1 – TD Tomato coculture cultivated in the 2400 µm high culture chamber for 7 days (n=1).

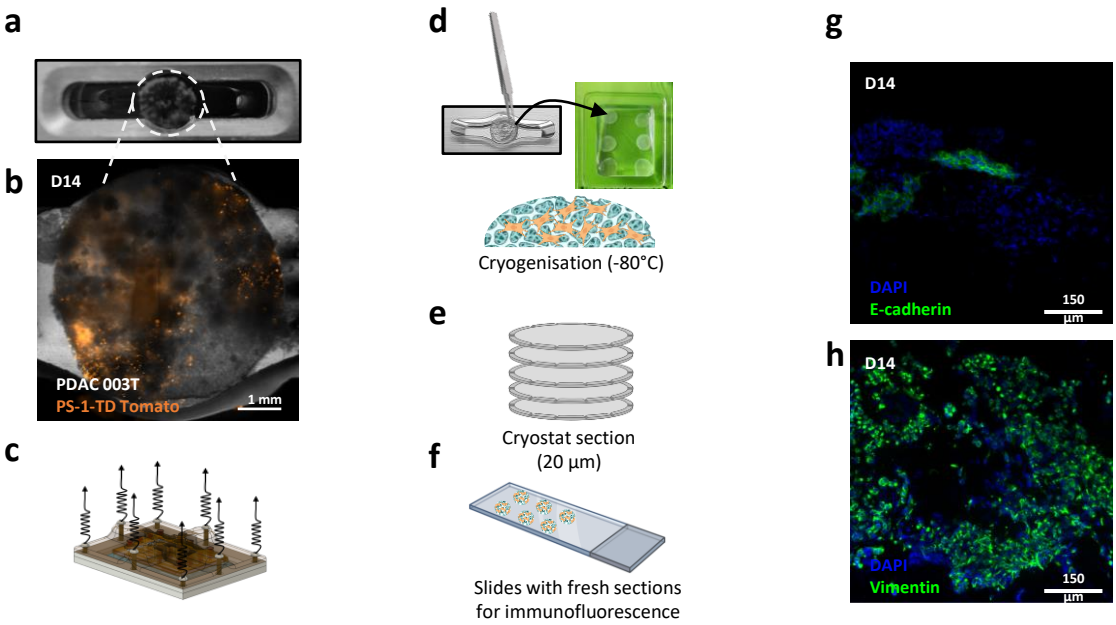


Figure S9. Extraction and analysis of the biological material from the device. After 14 days of PDAC 003T tumoroids and PS-1-TD Tomato stellate cells co-culture in the device **(a and b)**, the microfluidic chip was opened **(c)** and matrixes containing tumoroïds and fibroblasts were extracted and immerged in the cryopreservation solution **(d)**. Samples were then cryogenised and sliced on a cryostat (20 µm thickness) **(e)** to dispose slices on slides and perform immunofluorescence **(f)**. Epithelial E-cadherin (**g**) and fibroblastic vimentin (**h**) immunostaining (green). Nuclei were stained with DAPI (blue).

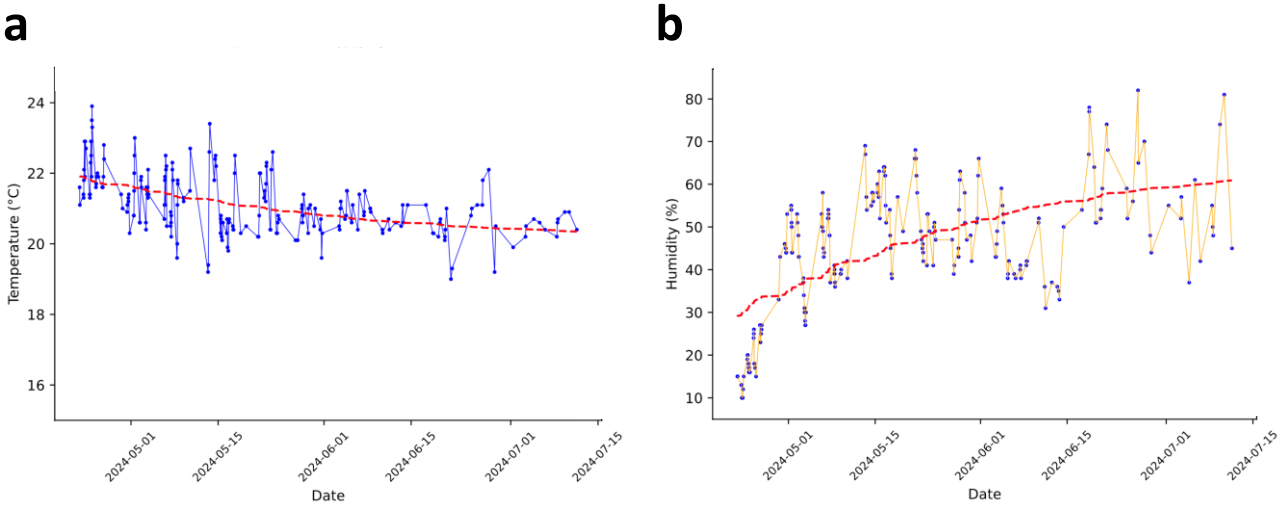


Figure S10. Measured temperature and humidity in the 3D printing room over 3 months. (a) Temperature in Celsius degrees (°C) and **(b)** humidity in %.

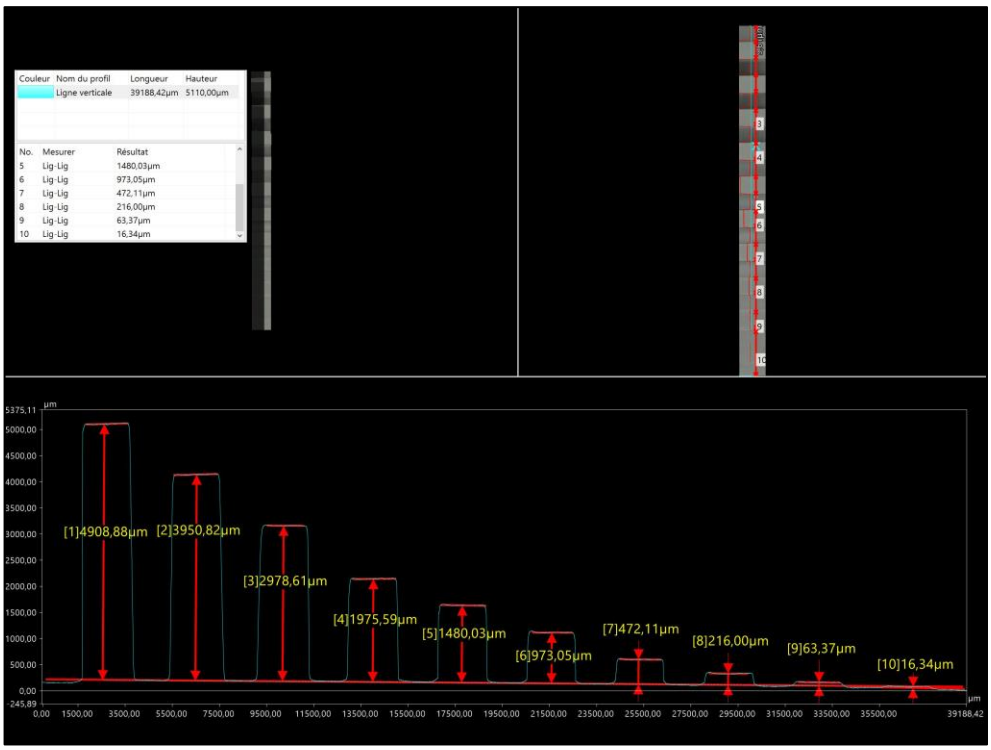


Figure S11. Example of a height profile measurement with the digital microscope on protrusions.

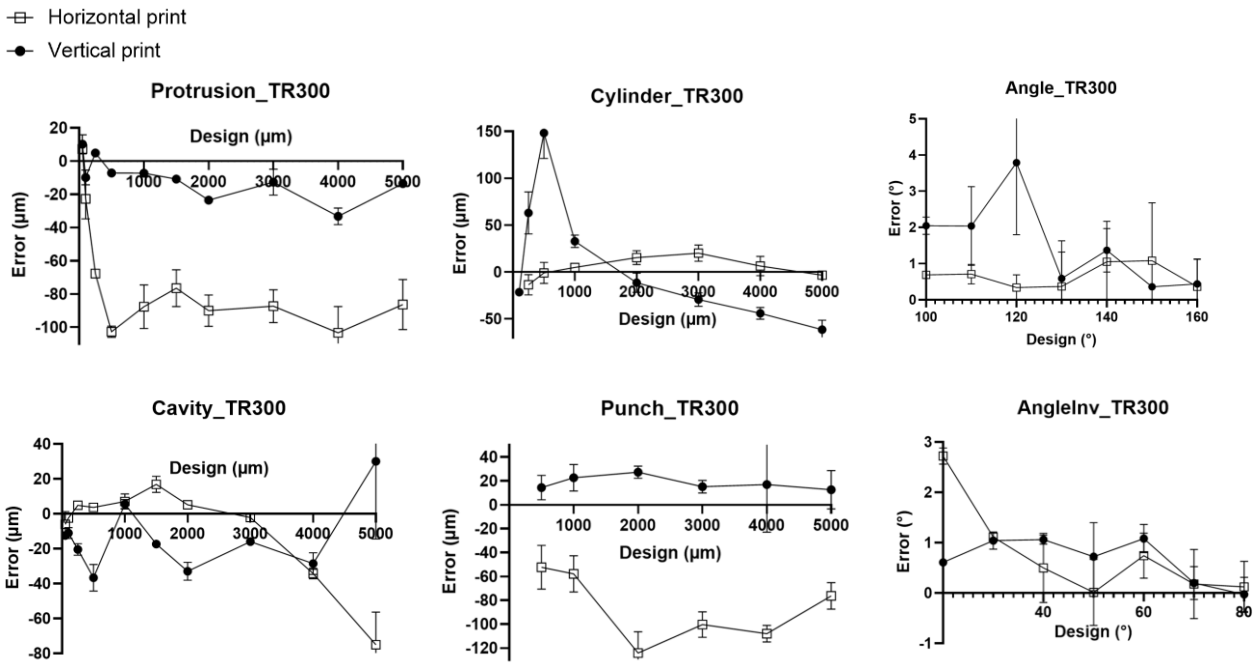


Figure S12. Example of all the measurements obtained for the different patterns to characterise the precision of a resin, depending on printing orientation. Data are presented as mean values +/- standard deviations (n=3).

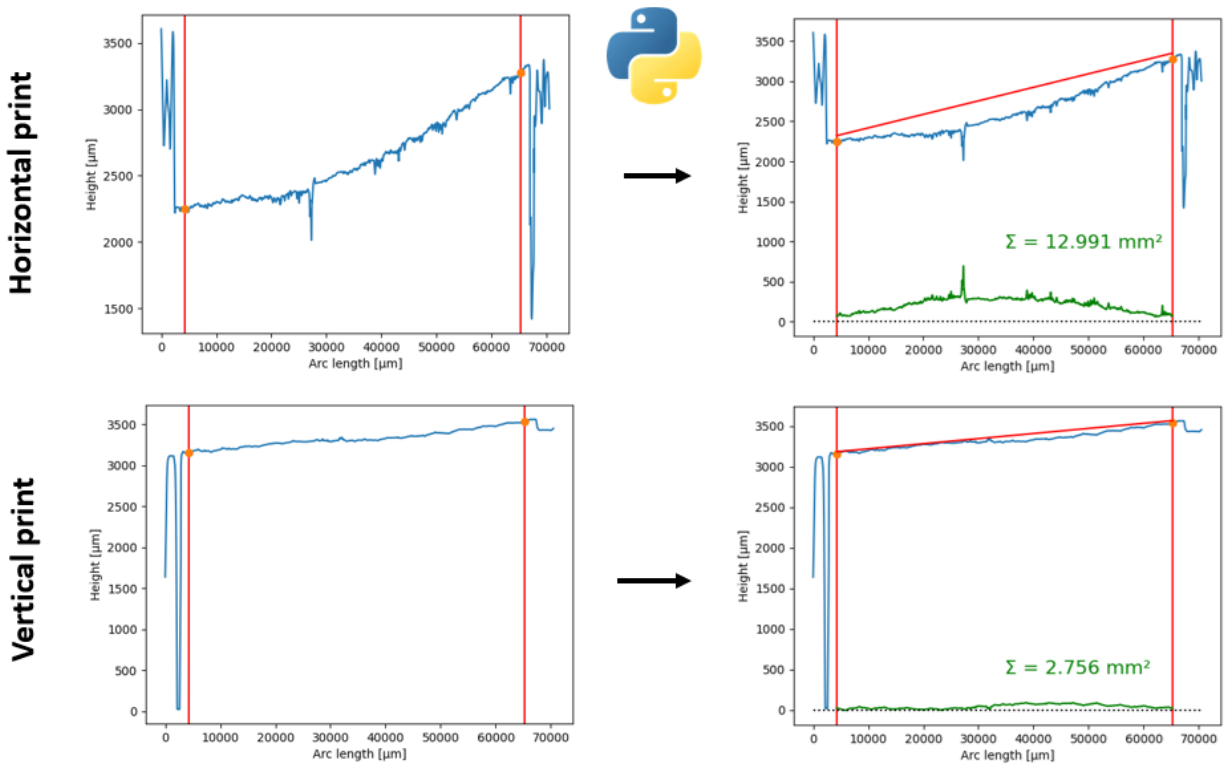
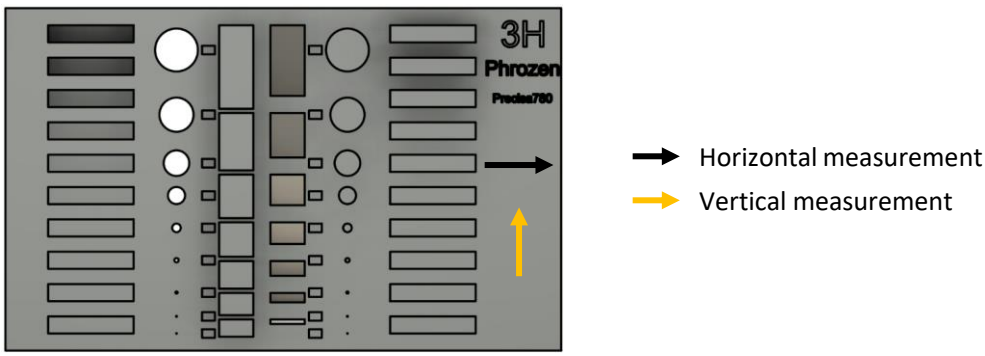


Figure S13. Methodology for curvature characterization, determination of area using height profile extracted from digital microscope measurement and automated analysis thanks to a custom python script.



<u>Figure S14.</u> Visual representation of average roughness measurements. Three vertical and three horizontal measurements were performed and averaged on each 3D printed characterisation platform to recapitulate its overall average surface roughness.