Electronic Supplementary Information

A transparent 3D printed device for assembling droplet hydrogel bilayers (DHBs)

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1) Casting of hydrogel sheets

Moulds for casting our hydrogel sheets were cut from 380 μ m thick sheets of plastic shim (RS Components) using a flatbed laser cutter (Universal Systems). In the absence of a laser cutter, preparation of the shim can also be realised using a cutting board, scalpel and a ruler. The mould consisted of three pieces of shim made from two solid squares pieces sandwiching a middle piece which had a section removed for casting. The bottom two pieces of the mould was assembled on a 5 mm thick piece of acrylic and 5% (w/v) of molten agarose was poured (Figure S1). The third piece of shim was subsequently placed on top followed by a second piece of acrylic. The assembly was compressed for 5 minutes using a handy clamp (RS Components). In this configuration the thickness of the hydrogel sheet was determined by the thickness of the middle piece of shim. Further to casting the mould was removed from the clamp and stored in buffer. Prior to use the pieces of shim were carefully removed.



Figure S1: Casting of hydrogel sheets. Three pieces of 380 μ m thick shim (red) were cut. Two pieces comprised of intact squares while one had an insert removed for casting. The mould was assembled on a piece of acrylic (grey) with the casting sheet positioned on top of one of the intact pieces of shim. Molten agarose as dispensed inside the well and mould was completed by the addition of another piece of shim and acrylic. Pressure was applied to the assembly using a clamp.

2) Transparency measurements

20 x 20 mm gaskets containing a 10 mm hole were cut from 5 mm thick acrylic using a flatbed laser cutter (Universal Systems) and bonded to the respective materials using double sided adhesive. The wells were filled with hexadecane prior to use. 1 μ L droplets of buffer containing the relevant concentration of calcein were dispensed into the wells and imaged using fluorescence microscopy with an exposure time of 30 ms using the appropriate filter cube. The transmittance measurements referenced in the main text are shown in Figure S2.



Figure S2: Transmittance measurements of (A) Veroclear and (B) PLA in the near-UV region.