Materials List for:
Scalable Fabrication of Stretchable, Dual Channel, Microfluidic Organ Chips

Richard Novak*1, Meredyth Didier*1,2, Elizabeth Calamari1, Carlos F Ng1, Youngjae Choe1, Susan L Clauson1, Bret A Nestor1, Jefferson Puerta1, Rachel Fleming1, Sasan J Firoozinezhad1, Donald E Ingber1,3,4
1Wyss Institute for Biologically Inspired Engineering, Harvard University
2Apple, Inc
3Harvard John A. Paulson School of Engineering and Applied Sciences, Harvard University
4Vascular Biology Program and Department of Surgery, Boston Children's Hospital and Harvard Medical School
*These authors contributed equally

Correspondence to: Richard Novak at richard.novak@wyss.harvard.edu

URL: https://www.jove.com/video/58151
DOI: doi:10.3791/58151

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Catalog Number</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Protective Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hairnet</td>
<td>VWR</td>
<td>89107-770</td>
<td></td>
</tr>
<tr>
<td>Tyvek lab coat</td>
<td>VWR</td>
<td>13450-506</td>
<td></td>
</tr>
<tr>
<td>Extended cuff gloves</td>
<td>VWR</td>
<td>89521-898</td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting mat</td>
<td>VWR</td>
<td>102096-430</td>
<td></td>
</tr>
<tr>
<td>Tile cutter</td>
<td>McMaster-Carr</td>
<td>26765A31</td>
<td></td>
</tr>
<tr>
<td>Mold-in-place (MIP) top molds</td>
<td>Protolabs, Inc.</td>
<td>custom</td>
<td>printed in Prototherm 12120</td>
</tr>
<tr>
<td>Mold-in-place (MIP) bottom molds</td>
<td>Protolabs, Inc.</td>
<td>custom</td>
<td>printed in Prototherm 12121</td>
</tr>
<tr>
<td>Duckbill curved forceps</td>
<td>VWR</td>
<td>63041-864</td>
<td></td>
</tr>
<tr>
<td>Sharp tipped forceps</td>
<td>Electron Microscopy Sciences</td>
<td>72700-D</td>
<td></td>
</tr>
<tr>
<td>Metal spatula</td>
<td>VWR</td>
<td>82027-528</td>
<td></td>
</tr>
<tr>
<td>Deep reactive ion etch (DRIE) pillar array wafers</td>
<td>Sensera, Inc.</td>
<td>custom</td>
<td>Four 50 x 50 mm pillar arrays per wafer; pillars 7 um wide, 50 um tall, spaced hexagonally 40 um apart</td>
</tr>
<tr>
<td>Textured polycarbonate .01” thick</td>
<td>McMaster-Carr</td>
<td>85585K33</td>
<td>cut to 45 mm square</td>
</tr>
<tr>
<td>PDMS blocks (40 x 40 x 5 mm)</td>
<td>n/a</td>
<td>custom</td>
<td></td>
</tr>
<tr>
<td>Laminar flow hood</td>
<td>Germfree</td>
<td>BVBI</td>
<td>cast in-house</td>
</tr>
<tr>
<td>Air gun</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60°C level oven</td>
<td>Germfree</td>
<td>BVBI</td>
<td></td>
</tr>
<tr>
<td>Vacuum desiccator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass balance</td>
<td></td>
<td></td>
<td>accuracy to 0.1 g</td>
</tr>
<tr>
<td>Plasma machine</td>
<td>Diener</td>
<td>Nano</td>
<td>oxygen plasma capability is critical</td>
</tr>
<tr>
<td>Supplies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sylgard 184 poly (dimethylsiloxane) (PDMS) base/ curing agent kit</td>
<td>Ellsworth Adhesives</td>
<td>4019862</td>
<td></td>
</tr>
<tr>
<td>Mixing cup</td>
<td></td>
<td></td>
<td>Ensure adequate ventilation when handling prepolymer due to low levels of ethylbenzene</td>
</tr>
<tr>
<td>1 mL syringe</td>
<td>VWR</td>
<td>10099-395</td>
<td></td>
</tr>
<tr>
<td>Cleanroom wipes</td>
<td>VWR</td>
<td>TWTX1080</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Supplier</td>
<td>Part Number</td>
<td>Notes</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----------------------</td>
<td>---------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>25 x 75 mm glass microscope slides</td>
<td>VWR</td>
<td>48311-703</td>
<td></td>
</tr>
<tr>
<td>Packing tape</td>
<td>VWR</td>
<td>500043-724</td>
<td></td>
</tr>
<tr>
<td>Scotch tape</td>
<td>VWR</td>
<td>500026-873</td>
<td></td>
</tr>
<tr>
<td>Die-cut Polyurethane (PU) strips</td>
<td>Atlantic Gasket, Inc.</td>
<td>custom: AGWI2X3</td>
<td>1/8&quot; thick; 60 Durometer Black Polyurethane; 2” x 3”</td>
</tr>
<tr>
<td>Polycarbonate film .005” thick</td>
<td>McMaster-Carr</td>
<td>85585K102</td>
<td></td>
</tr>
<tr>
<td>100 x 100 x 15 mm square gridded petri dishes</td>
<td>VWR</td>
<td>60872-480</td>
<td></td>
</tr>
<tr>
<td>Aluminum foil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optional Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thinky PDMS Mixer</td>
<td>Thinky</td>
<td>ARE-310</td>
<td></td>
</tr>
<tr>
<td>Mold-in place (MIP) jig</td>
<td>in-house</td>
<td>screw clamp compression jig</td>
<td></td>
</tr>
<tr>
<td>Automated membrane fabricator (AMF)</td>
<td>in-house</td>
<td>pneumatic compression piston array with programmable heater</td>
<td></td>
</tr>
</tbody>
</table>