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Supporting Information

Materials

Resins of Urethane Methacrylate (UMA, in cyan, white and black) and Silicone (SIL 30 in grey) were generously supplied by Carbon, Inc. (Redwood, CA.). Isopropanol (IPA) from Thermo Fisher Scientific (Waltham, MA USA) was used as received. Placebo Estring[®] and NuvaRing[®] were obtained from Particle Sciences Inc. and stored in ambient conditions prior to mechanical testing.

Silicone: Placebo EstRing[®]



SIL 30: 54 – 7.6 Solid



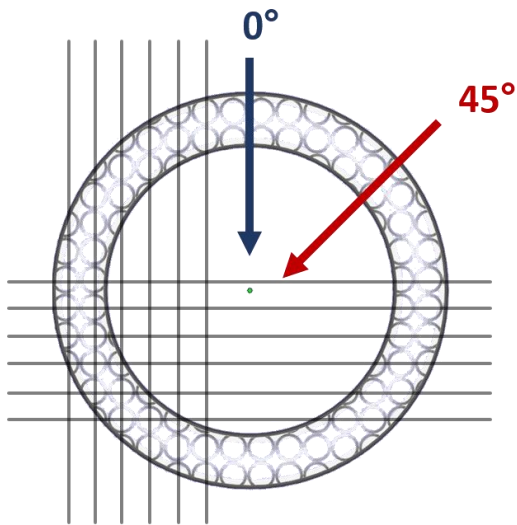
SIL 30: Nodal 3.80 [Unbanded]



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Supporting Figure 1. Mechanical property testing with Instron for load at 50% compression. Representative rings shown (left to right) silicone EstRing placebo, DLS SIL 30: 54-7.6 solid ring, and DLS SIL 30: Nodal 3.80 (unbanded). Custom UMA shims designed to support and stabilize ring during compression.

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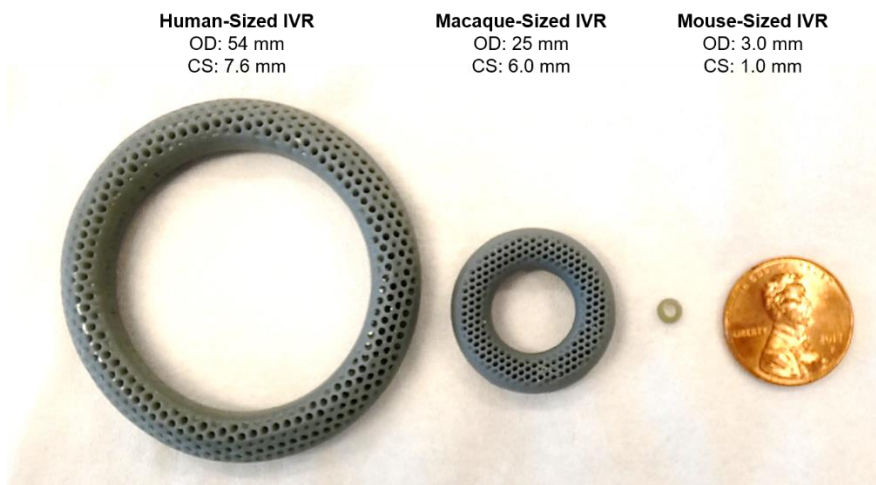
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957 **Supporting Figure 2. Schematic illustration force orientation relative to unit cell array.**

958 Example CAD image of Cylinder 3.80 banded (4.0H 0.6T) with lines demonstrating direction of

959 linear array of unit cell. Force orientation was conducted at both 0° and 45°, relative to the array

960 of the unit cell.



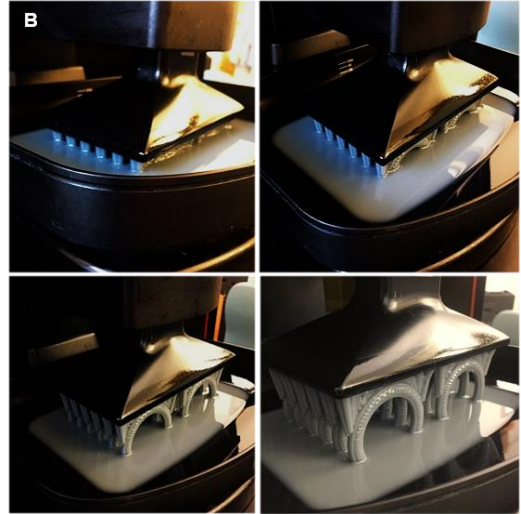
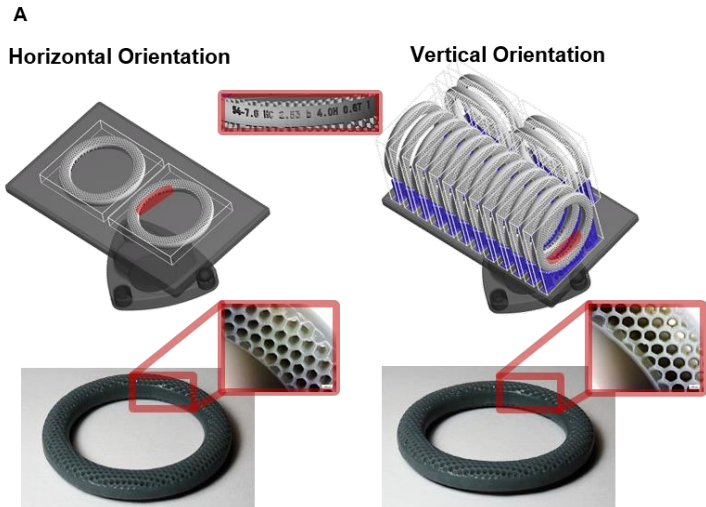
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962 **Supporting Figure 3. Images of IVRs by size fabricated by DLS in SIL 30. Human, macaque**

963 and mouse-sized IVRs compared to a standard penny.

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Supporting Figure 4. Illustration of horizontal versus vertical orientation. Demonstration of multiple rings orientated horizontally and vertically with identifying label. Multiple rings (x16) during the fabrication process with DLS in SIL 30.

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979 **Supporting Table 1. Tabulation of volume fraction and log 50% compression of IVRs**
 980 **presented in Figure 7. Average and standard deviation values represent n=3 samples per ring**
 981 **type.**

Outer Diameter - Cross Section (mm)	IVR Design Parameters				Volume Fraction		Log 50% Compression	
	Unit Cell Design	Unit Cell Size (mm)	Band Height (mm)	Band Thickness (mm)	Average	Stdev	Average	Stdev
Silicon: Estring	Solid	---	---	---	1.000	2.027	0.307	-0.872
EVA: NuvaRing	Solid	---	---	---	1.000	2.611	0.417	-0.766
DLS 54-7.6	Solid	---	---	---	1.000	0.003	0.307	-0.872
DLS 54-4.0	Solid	---	---	---	1.000	0.134	-0.873	-2.180
DLS 54-7.6	Nodal	3.80	---	---	0.543	0.006	-0.430	-1.330
DLS 54-7.6	Nodal	3.80	4.0	0.6	0.681	0.013	-0.155	-1.433
DLS 54-7.6	Nodal	1.52	---	---	0.871	0.004	0.143	-1.669
DLS 54-7.6	Nodal	1.52	4.0	0.6	0.979	0.001	0.183	-1.302
DLS 54-7.6	Cylinder	3.80	---	---	0.389	0.001	-0.869	-1.431
DLS 54-7.6	Cylinder	3.80	4.0	0.3	0.535	0.006	-0.345	-1.681
DLS 54-7.6	Cylinder	3.80	4.0	0.6	0.557	0.023	-0.155	-1.479
DLS 54-7.6	Cylinder	3.80	4.0	0.9	0.544	0.005	-0.046	-1.812
DLS 54-7.6	Cylinder	3.80	4.0	1.2	0.629	0.025	0.040	-1.577
DLS 54-7.6	Cylinder	2.53	---	---	0.429	0.004	-0.762	-1.833
DLS 54-7.6	Cylinder	2.53	4.0	0.6	0.629	0.019	-0.145	-1.675
DLS 54-7.6	Cylinder	1.90	---	---	0.538	0.004	-0.678	-1.614
DLS 54-7.6	Cylinder	1.90	4.0	0.6	0.715	0.005	-0.148	-1.820
DLS 54-7.6	Honeycomb	3.80	---	---	0.302	0.003	-0.148	-1.752
DLS 54-7.6	Honeycomb	3.80	4.0	0.6	0.499	0.008	-0.159	-1.733
DLS 54-7.6	Honeycomb	3.12	4.0	0.6	0.650	0.011	-0.137	-1.553
DLS 54-7.6	Honeycomb	2.53	---	---	0.370	0.005	-0.681	-1.682
DLS 54-7.6	Honeycomb	2.53	3.0	0.6	0.554	0.006	-0.214	-1.455
DLS 54-7.6	Honeycomb	2.53	4.0	0.6	0.573	0.018	-0.108	-1.397
DLS 54-7.6	Honeycomb	2.53	5.0	0.6	0.600	0.005	-0.074	-1.462
DLS 54-7.6	Honeycomb	2.53	6.0	0.6	0.686	0.006	-0.011	-1.481
DLS 54-7.6	Honeycomb	1.90	---	---	0.601	0.021	-0.640	-1.739
DLS 54-7.6	Honeycomb	1.90	4.0	0.6	0.688	0.014	-0.146	-1.405
DLS 54-7.6	Dode	3.63	---	---	0.385	0.003	-0.765	-1.653
DLS 54-7.6	Dode	3.63	4.0	0.6	0.579	0.000	-0.150	-1.768
DLS 54-7.6	Dode	3.80	---	---	0.331	0.003	-0.778	-1.500
DLS 54-7.6	Dode	3.80	4.0	0.6	0.578	0.007	-0.143	-1.431

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