## **Supplementary Information**

## Engineering long-term controlled drug release from biodegradable devices 3D printed with vat polymerization

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<b>Fable S1:</b> Working curve values from drug loaded photoset resin								
Model Drug	$E_{c} (mJ/cm^{2})$	$D_{p}(\mu m)$	Exposure time for 30 µm layer (s)					
None	$56.82 \pm 1.38$	$260\pm10$	$1.41\pm0.03$					
Rhodamine B (RhB)	$42.95\pm0.66$	$360\pm30$	$1.02\pm0.02$					



**Figure S1.** Theoretical dimensional analysis of (A) strut size (B) Pore size using 3 mm gyroid as an example.

Table S2: Surface area	(SA)	, Volume (	(V).	, SA/V	of solid	cylinder	diameter	series
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	Surface area (mm <sup>2</sup> )	Volume (mm <sup>3</sup> )	SA/V (mm <sup>-1</sup> )
1 mm solid cylinder	39.22	9.38	4.18
3 mm solid cylinder	127.04	84.42	1.50
6 mm solid cylinder	282.39	338.24	0.83

	Surface area (mm <sup>2</sup> )	Volume (mm <sup>3</sup> )	SA/V (mm <sup>-1</sup> )	Strut length (mm)	Pore size (mm)
4 mm gyroid	428.30	219.48	1.95	2.3	1.6
3 mm gyroid	468.69	163.18	2.87	1.4	1.6
2 mm gyroid	556.90	102.62	5.43	0.7	1.6

Table S3: Surface area (SA), Volume (V), SA/V, strut length, and pore size of unit cell series

Table S4: Surface area (SA), Volume (V), SA/V, strut length, and pore size of lattice type series

	Surface area (mm <sup>2</sup> )	Volume (mm <sup>3</sup> )	SA/V (mm <sup>-1</sup> )	Strut length (mm)	Pore size (mm)
3 mm primitive	349.56	179.44	1.95	1.4	3.0
3 mm gyroid	468.69	163.18	2.87	1.4	1.6
3 mm Fisher-Koch	725.51	158.37	4.58	0.8	1.0

Table S5: Surface area (SA), Volume (V), SA/V, strut length, and pore size of pore size series

	Surface	Volume	$SA/V (mm^{-1})$	Strut length	Pore size
	area (mm <sup>2</sup> )	$(mm^3)$	574 V (IIIII )	(mm)	(mm)
2.5 mm poresize	342.37	119.26	2.87	1.4	2.45
1.6 mm poresize	468.69	163.18	2.87	1.4	1.6
0.75 mm poresize	659.31	247.35	2.67	1.4	0.75

**Table S6:** 6 mm RhB loaded cylinder drug loading. 6 mm samples were freeze milled and extracted with Methanol for 14 d. 6 mm RhB drug loaded samples freeze-milled and extracted with 30 mL of methanol over 7 d at  $37 \,^{\circ}\text{C}$ 

Theoretical amount of RhB (mg)	Amount extracted (mg)	Drug loading (%)
0.8	$0.76\pm0.01$	$95 \pm 1$



Figure S2. Fitting results of in vitro drug release data from 3 mm RhB loaded cylinder

Table S7: Kinetic	fitting data	a of 3 mm RhB	loaded c	ylinder u	p to 56 d
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Custom curve fit	Coet	Coefficients and 95% confidence bounds			R- Square	DFE	RMSE
$f(x) = 4*((a*x).^0.5)$	a 0.3733	Lower 0.3488	Upper 0.3977	2.8979	0.9877	9	0.5674



**Figure S3.** Drug release kinetics obtained for the diameter series fitted to the Korsmeyer-Peppas model. (A-C) Kinetic fit up to 60% of release for the 1 mm, 3 mm and 3 mm cylinder. (D-F) Kinetic fit up to 35 d, 56 d, and 84 d for the 1 mm, 3 mm, and 6 mm cylinders, respectively.



Figure S4. Visible light images of the clyinders at 84 d of release.



Figure S5. Zero-order kinetic fit of release data from diameter series after plateau.



Figure S6. Percent gel fraction of unit cell series.