

Article

Targeted Printing of Cells: Evaluation of ADA-PEG Bioinks for Drop on Demand Approaches

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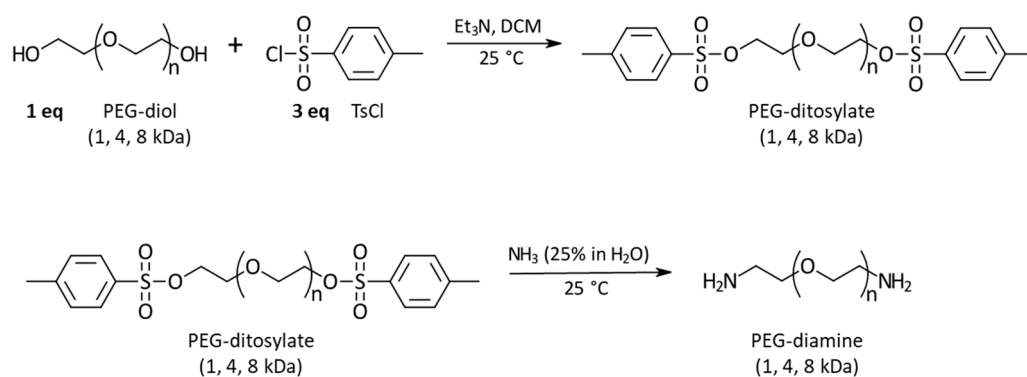


Figure S1. Two-step synthesis of PEG-diamine. First, PEG-diol was reacted to tosylate end groups with *p*-toluenesulfonyl chloride (TsCl) and converted in a second step to amino end groups to PEG-diamines using ammonia solution at RT.

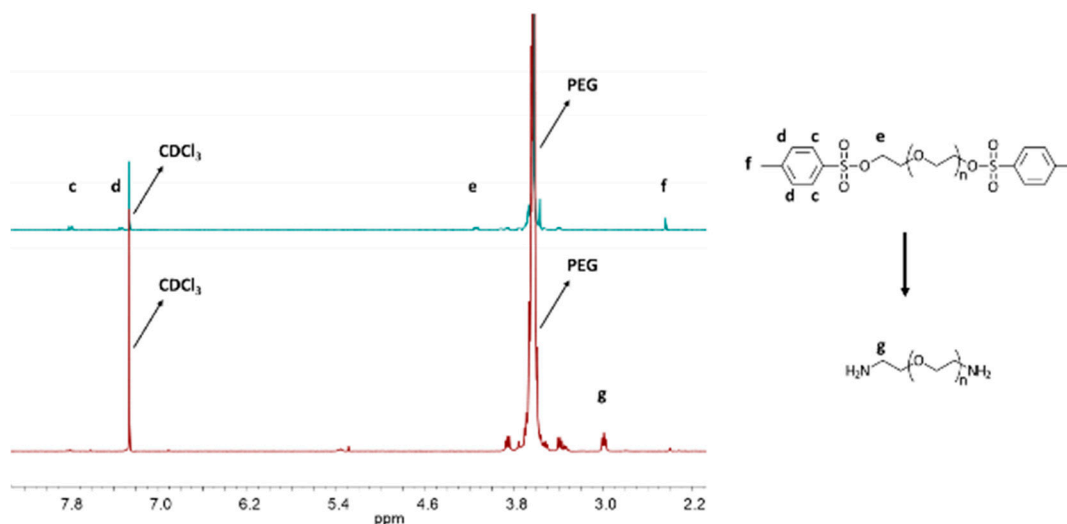


Figure S2. Comparison of the ¹H-NMR spectra of PEG-ditosylate 4 kDa and PEG-diamine 4 kDa.

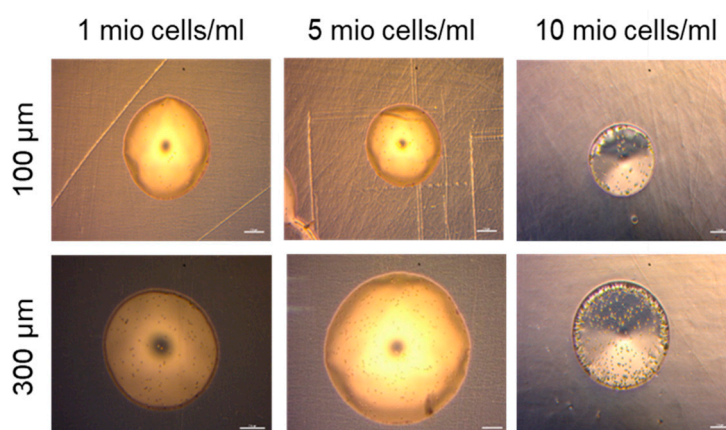


Figure S3. Exemplary light microscopy images of ejected droplets consisting of ADA-PEG(+) 1 kDa loaded with NIH/3T3 cells (1 - 10 mio·mL⁻¹) and printed with two different nozzle diameters: 100 µm (top) and 300 µm (bottom).

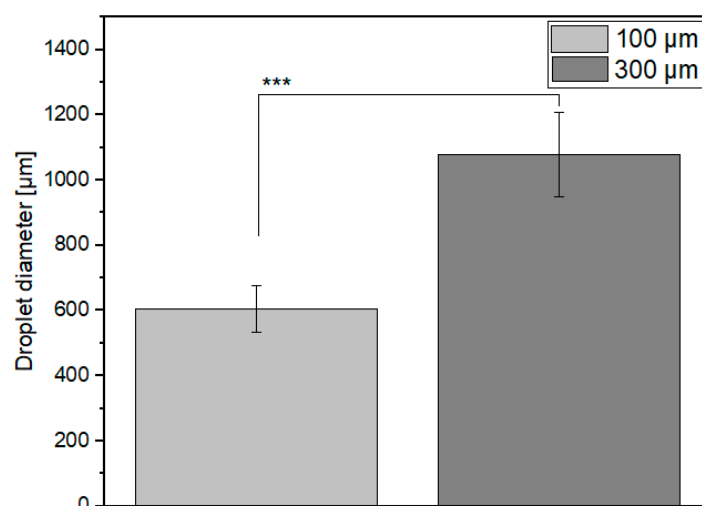


Figure S4. Diagram showing the average diameter of printed ADA-PEG(+) 1 kDa droplets using the 100 µm and the 300 µm nozzle, respectively. Average was calculated from 6 individual printing experiments with different initial cell concentrations (100.000 – 10 mio·mL⁻¹). ns *p < 0.05, **p < 0.01, ***p < 0.001.

Table S1. List of covalently crosslinked (+) and uncrosslinked (-) ADA-PEG bioinks and information about their ADA and PEG-diamine or PEG-diol concentrations for the preparation of final bioinks after the combination of ADA and PEG hydrogels in a ratio of 1:1.

Bioink label*	Concentration of	Concentration of	Concentration of
	ADA for 2 mL (w/v%)	PEG-diamine for 2 mL (w/v%)	PEG-diol for 2 mL (w/v%)
ADA-PEG(-) 1 kDa	5.00	-	1.00
ADA-PEG(-) 4 kDa	5.00	-	4.25
ADA-PEG(-) 8 kDa	5.00	-	8.65
ADA-PEG(+) 1 kDa	5.00	1.00	-
ADA-PEG(+) 4 kDa	5.00	4.25	-
ADA-PEG(+) 8 kDa	5.00	8.65	-

* Final volume: 4 mL.

Table S2. List of parameters used for the DoD printing of ADA-PEG(+) bioinks.

Bioink label	Printing pressure [kPa]	Printing speed [mm·s ⁻¹]	Printing height [mm]	Open time [ms]	Cycle time [ms]
ADA-PEG(+) 1 kDa	15 - 40.0	5.00	10.0	1.00	50 - 1000
ADA-PEG(+) 4 kDa	15 - 40.0	5.00	10.0	1.00	50 - 1000
ADA-PEG(+) 8 kDa	15 - 40.0	5.00	10.0	1.00	50 - 1000