Electronic Supplementary Material (ESI) for RSC Pharmaceutics.

Supporting Information

Synthetic mucus barrier arrays as a nanoparticle formulation screening platform

Harry Zou[1*], Allison Boboltz[1*], Yahya Cheema[1], Daniel Song[1], Devorah Cahn[1], Gregg A. Duncan[1#]
[1]Fischell Department of Bioengineering, University of Maryland, College Park, MD 20742, USA
*These authors contributed equally to this work
#Correspondence to: Gregg Duncan; email: gaduncan@umd.edu

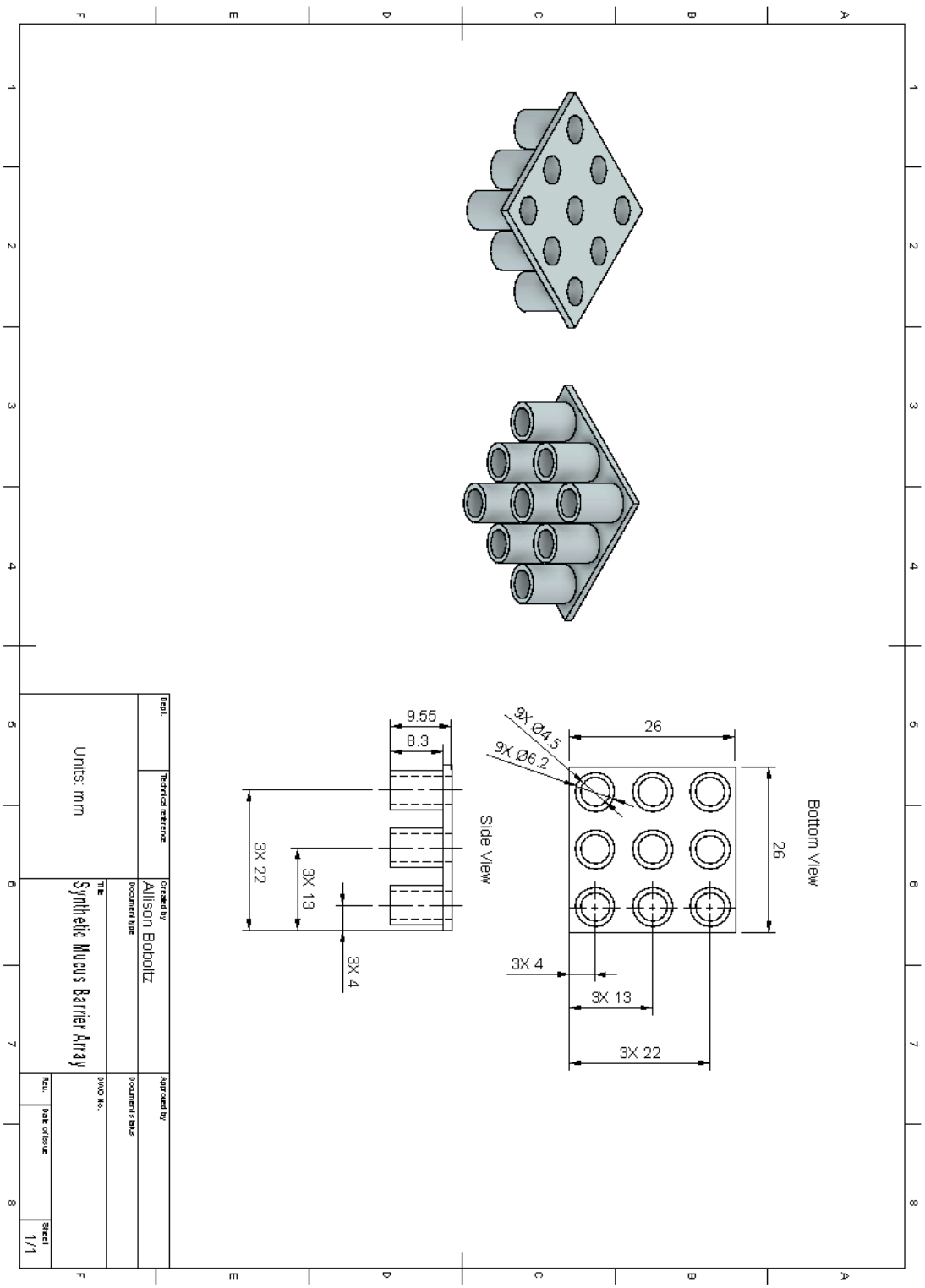

Figure S1. Engineering drawing with measurements of the synthetic mucus barrier array part that was designed using Autodesk CAD software. The array device is designed to fit snugly into the wells of a 96 well plate (Costar brand). All units are in millimeters. The STL file used to print this device is included as a supplemental file.

Table S1. PEG density and conformation on the surface of 100 nm PS NPs. The density of PEG groups attached to the NPs (% PEGylation) was found using a 1-pyrenyldiazomethane (PDAM) fluorometric assay, as previously described [see Reference 33]. The conformation of the PEG for each batch was determined using the ratio of the Flory radius (R_F) to the distance between PEG chains (D). The Flory radius (R_F) of the linear 5 kDa PEG was calculated using the equation $R_F = \alpha N^{3/5}$, where α is the size of the monomer (PEG is 0.35 nm) and N is the number of monomers within the polymer chain (113). The distance between PEG chains (D) was found using the equation $D = 2\sqrt{A/\pi}$, where A is the area covered by a PEG chain, calculated using the inverse of the PEG density (% PEGylation). The PEG conformation was found to be a dense brush regime for each batch (R_F/D > 2.8). The data shown represent the mean ± standard deviation.

Batch Number	**% PEGylation**	**Conformation (R_F/D)**
100 nm PS-PEG Batch 1	69.26 ± 10.99	8.27 ± 0.66
100 nm PS-PEG Batch 2	56.01 ± 7.10	7.44 ± 0.48
100 nm PS-PEG Batch 3	71.96 ± 6.23	8.44 ± 0.37
100 nm PS-PEG Batch 4	64.84 ± 0.23	8.01 ± 0.014