ADVANCED FUNCTIONAL MATERIALS

Supporting Information

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Tuning the Poisson's Ratio of Biomaterials for Investigating Cellular Response

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Supplimentary figure captions:

SI: NPR structures fabricated without the side-support can also exhibit biaxial expansion/contraction or “auxetic” behavior.

S2: (a,b) SEM image of collapsed NPR and PPR suspended structures (Scale bar: 100µm). (c) Optical image shows NPR structures fabricated on the glass surface (Scale bar: 10µm).

S3: Immunofluorescence images of 10T1/2 cells on NPR and PPR suspended structures (blue-nucleus; green-focal adhesion (FA)). A,C are z-stack confocal images, while B,D are images from only one plane. White arrows indicate the locations of FAs (E,F). NPR and PPR topologies attached to glass substate.

S4,5: Unusual cell-division on NPR structure using PEGDA biomaterial

S6: Unusual cell-division on NPR structure using PEGDA biomaterial: one cell above the web and the other cell below the web (black circle) remain attached to each other throughout the duration of the experiment.

S7: Fluorescent time-lapse imaging demonstrates abnormal cell division.

S8: Movements of 3T3 fibroblasts on suspended structures with a Poisson's ratio gradient. Left side is PPR, while right side is NPR: PPR and NPR regions are connected (white dotted line), so that cells can sense the differences in Poisson's ratio across the interface.

Supplementary movie caption:

S1: Cells moving on a NPR web and deform the NPR unit cells in multiple configurations.

S2: Single cell on the entire NPR structure demonstrates the web-point movement in response to cellular forces.

S3: Cell spreading on the NPR structures; finger like pseudopods pull on various web-points in all directions, and cause the NPR web-points to yield and displace in both X and Y directions.

S4: Cell spreading on the PPR structures; pseudopods try to move the web-points, however, the movement of web-points are minimal.

S5: Cell division during late telophase: midbody does not resolve.

S6,7: Blebs are formed continuously