

Complex 3D Nano-Patterned Scaffolds for Cell Culture Applications

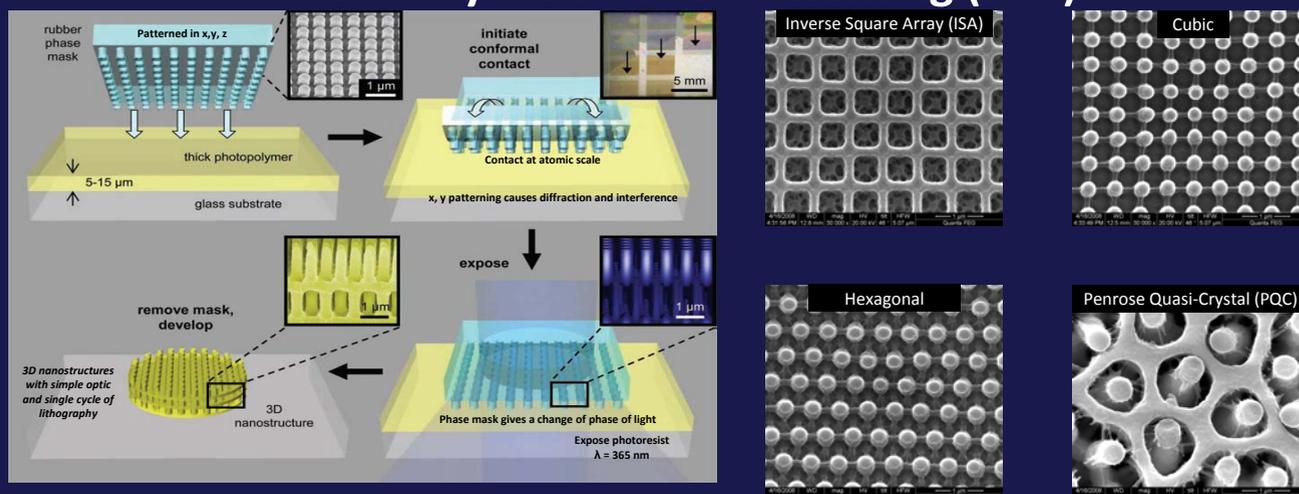
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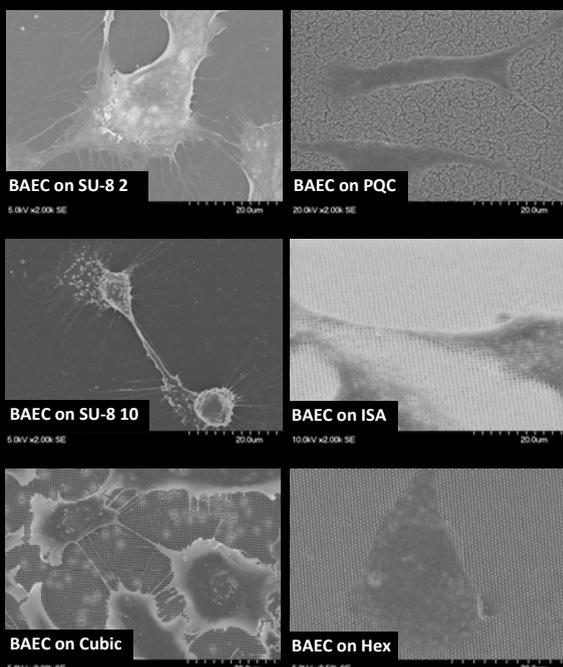
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It is well known that interactions between tissue and surface are critical for biomedical applications such as implant compatibility and longevity. These tissue-surface interactions are mediated by cell-surface and cell-cell interactions. Recent advances in engineering, biology, and materials science are being applied to enhance the understanding of cell-material interactions. Here we apply a recent technique developed by John Rogers at the University of Illinois at Urbana-Champaign called Proximity Field nano-Patterning (PnP) to create more predictable and complex structures than other methods. We have evaluated the response of Bovine Aortic Endothelial Cells (BAEC)s to the nanoscale structures, films of the photopolymer SU8, and tissue culture polystyrene (TCPS) controls.

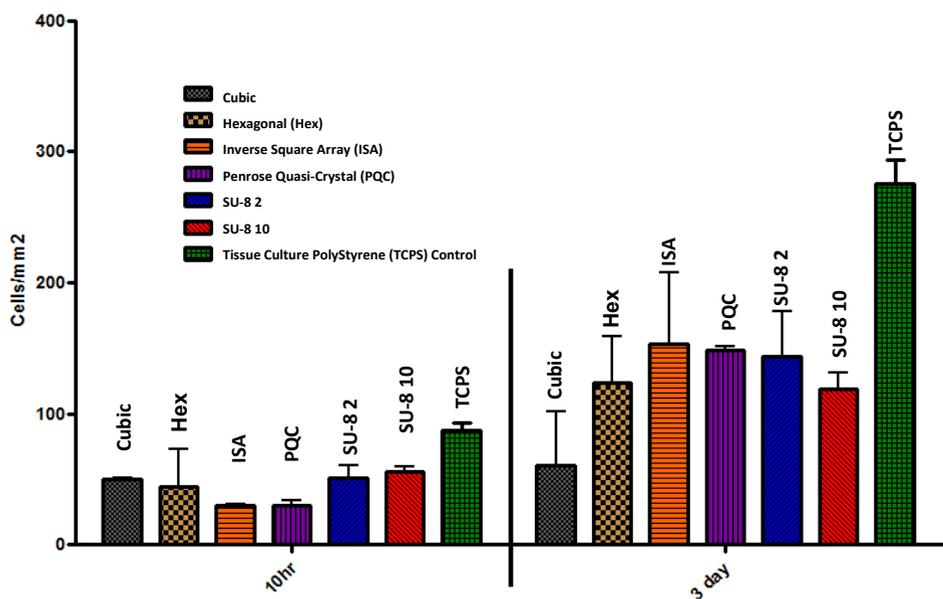
Proximity Field nano-Patterning (PnP)



Initial Cell Growth Results on PnP Scaffolds



Bovine Aortic Endothelial Cells (BAEC) Count on PnP Scaffolds



- BAECs express filopodia on SU-8 films and Cubic PnP structures
- Cells express different morphologies on PQC, ISA, and Hexagonal PnP structures
- TCPS control retains the most amount of cells out of all surfaces
- Cells on the PnP structures have varied responses. The cells react differently to the different patterns
- Cellular response could be due to initial attachment or changes in gene expression after the cells have attached to the surfaces

Future Work:

- Determine extent of cell-cell communication
- Evaluate gene expression changes
- Assay response of the cells to variations within the patterns, such as changes in the diameter and period of the ISA and PQC posts