

Patterning Cells on Fibrous Scaffolds

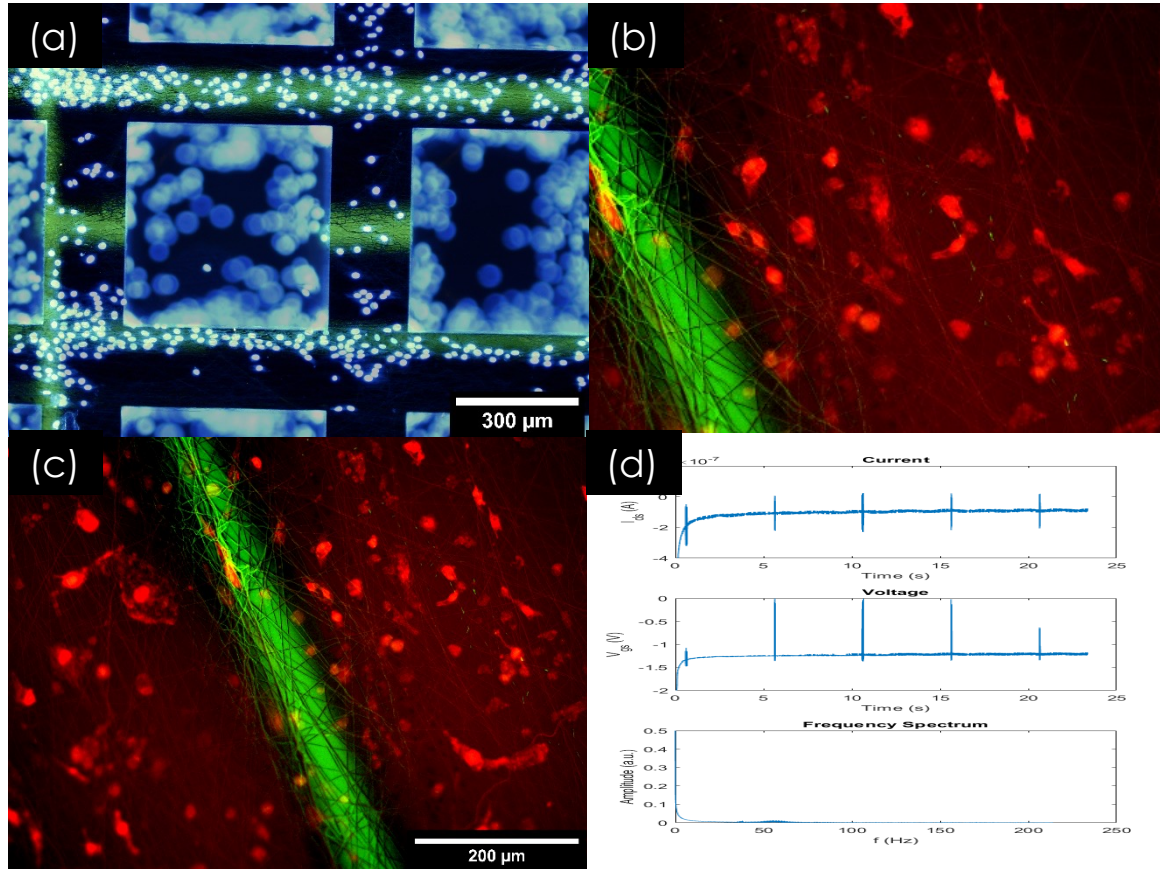


Figure: Cells patterned on various surfaces. (a) and (b) show fibroblasts (blue) patterned onto OVJP-printed tetracene (green). (a) demonstrates patterns on a silicon substrate and (b) demonstrates patterning on suspended fibers. (c) and (d) show cardiomyocytes (red) patterned *outside* of OVJP-printed lines of tetracene (green) on both PDMS (c) and suspended fibers (d).

Objective

In this work, we use organic vapor jet printing (OVJP) to pattern scaffolds with cardiomyocytes. Microscale cell patterning allows for considerable control over the *in vitro* growth of cardiac tissue.

Impact

After a patient suffers a heart attack, the healthy cardiac tissue is replaced by scar tissue, affecting the functioning of the heart and making the patient more likely to have another heart attack. With stem cells, we may be able to develop patches of cardiac tissue *in vitro*. These patches could be implanted to replace the scar tissue.

Facilities and Methods Used

- Organic vapor jet printer (OVJP)
- E-beam and thermal evaporation chambers
- LNF facilities for lithography, plasma etching, and fluorescent imaging

Relevant Papers

- Horowitz et al., *Langmuir* **2021** DOI: 10.1021/acs.langmuir.0c03319

Funding

- CELL-MET NSF Engineering Research Center

Collaborators

- Sam DePalma, Prof. Brendon Baker, Biomedical Engineering
- Prof. Todd Herron, Dr. Kim Saraithong, Frankel Cardiovascular Center
- Xiaoyang Zhong, Prof. Joerg Lahann, Materials Science and Engineering

Contact

- Jeff Horowitz, jeffhtz@umich.edu