

# Microfluidic Model to Mimic Initial Event of Neovascularization

Ping Zhao<sup>1</sup>, Xing Zhang<sup>1</sup>, Xiao Liu<sup>1</sup>, Li Wang<sup>4</sup>, Haoran Su<sup>1</sup>, Liyi Wang<sup>1</sup>, Dongrui Zhang<sup>1</sup>, Xiaoyan Deng<sup>3</sup>, Yubo Fan<sup>1,2</sup>

<sup>1</sup>Beijing Advanced Innovation Centre for Biomedical Engineering, Key Laboratory for Biomechanics and Mechanobiology of Chinese Education Ministry, School of Biological Science and Medical Engineering, Beihang University <sup>2</sup>School of Engineering Medicine, Beihang University <sup>3</sup>Artificial Intelligence Key Laboratory of Sichuan Province, School of Automation and Information Engineering, Sichuan University of Science and Engineering <sup>4</sup>Beijing Research Center of Urban System Engineering

## Corresponding Authors

**Xiao Liu**  
liuxiao@buaa.edu.cn

**Xiaoyan Deng**  
dengxy1953@buaa.edu.cn

**Yubo Fan**  
yubofan@buaa.edu.cn

## Citation

Zhao, P., Zhang, X., Liu, X., Wang, L., Su, H., Wang, L., Zhang, D., Deng, X., Fan, Y. Microfluidic Model to Mimic Initial Event of Neovascularization. *J. Vis. Exp.* (170), e62003, doi:10.3791/62003 (2021).

## Date Published

April 10, 2021

## DOI

10.3791/62003

## URL

jove.com/video/62003

## Materials

| Name                                 | Company  | Catalog Number | Comments |
|--------------------------------------|--|----------------|----------|
| 0.25% Trypsin-EDTA                   | Genview  | GP3108         |          |
| Collagen I, rat tail                 | Corning  | 354236         |          |
| DAPI                                 | Sigma-Aldrich  | D9542          |          |
| Electromagnetic pinch valve          | Wokun Technology   | WK02-308-1/3   |          |
| Endothelial cell medium (ECM)        | Sciencell  | 1001           |          |
| Fetal bovine serum (FBS)             | Every Green  | NA             |          |
| Fibronectin                          | Corning  | 354008         |          |
| FITC-dextran                         | Miragen  | 60842-46-8     |          |
| Graphical programming environment    | Lab VIEW   | NA             |          |
| Image editing software               | PhotoShop  | NA             |          |
| Image processing program             | ImageJ   | NA             |          |
| Isopropanol                          | Sigma-Aldrich  | 91237          |          |
| Lithography equipment                | Institute of optics and electronics, Chinese academy of sciences | URE-2000/35    |          |
| Methanol                             | Sigma-Aldrich  | 82762          |          |
| Micro-peristaltic pump               | Lead Fluid   | BT101L         |          |
| Micro-syringe pump                   | Lead Fluid   | TYD01          |          |
| Oxygen plasma                        | MING HENG  | PDC-MG         |          |
| Paraformaldehyde                     | Sigma-Aldrich  | P6148          |          |
| PBS (10x)                            | Beyotime   | ST448          |          |
| Permanent epoxy negative photoresist | Microchem  | SU-8 2075      |          |
| Phenol Red sodium salt               | Sigma-Aldrich  | P5530          |          |
| Polydimethylsiloxane (PDMS)          | Dow Corning  | Sylgard 184    |          |
| Poly-D-lysine hydrobromide (PDL)     | Sigma-Aldrich  | P7886          |          |
| Polytetrafluoroethylene              | Teflon   | NA             |          |

|   |                |         |  |
|---|----------------|---------|--|
| Program software                            | MATLAB         | NA      |  |
| Recombinant Human VEGF-165                  | StemImmune LLC | HVG-VF5 |  |
| Sodium hydroxide (NaOH)                     | Sigma-Aldrich  | 1.06498 |  |
| Stage top incubator                         | Tokai Hit      | NA      |  |
| SU-8 developer                              | Microchem      | NA      |  |
| Trichloro(1H,1H,2H,2H-perfluorooctyl)silane | Sigma-Aldrich  | 448931  |  |
| TRITC Phalloidin                            | Sigma-Aldrich  | P5285   |  |