

Put Electrospun Nanofiber Materials to Work for Cell Transplantation

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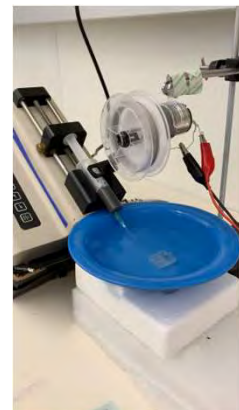
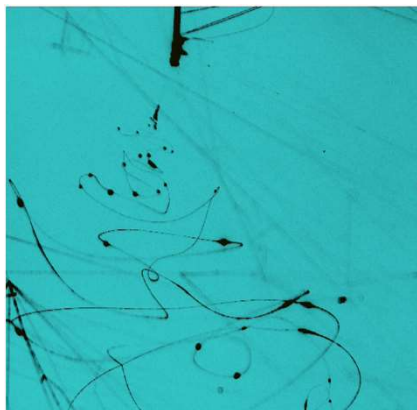
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Electrospinning and Wetspinning: the Principle, Set-up and Mechanism



Chen, Li, Li, Xie, *Adv. Drug Del. Rev.* 2018, 132, 188-213
Chen, Boda, Batra, Li, Xie, *Adv. Healthcare Mater.* 2017, 7, e1701024
Weng, Xie, *Curr. Pharm. Des.* 2015, 21, 1944-1959

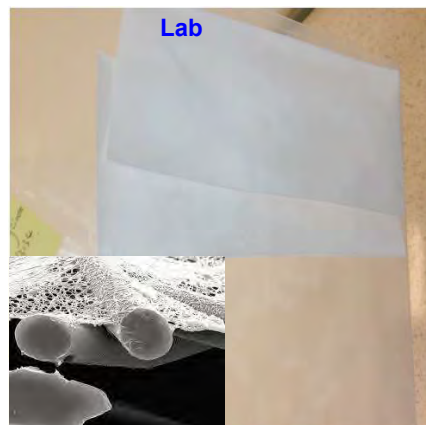
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Electrospun Nanofiber Materials: Industry and Laboratory



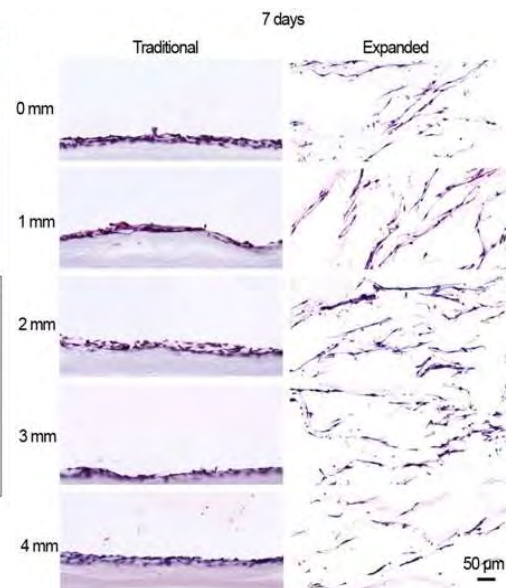
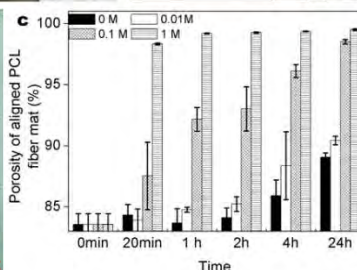
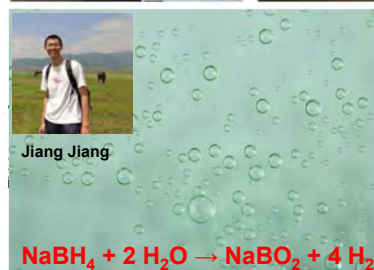
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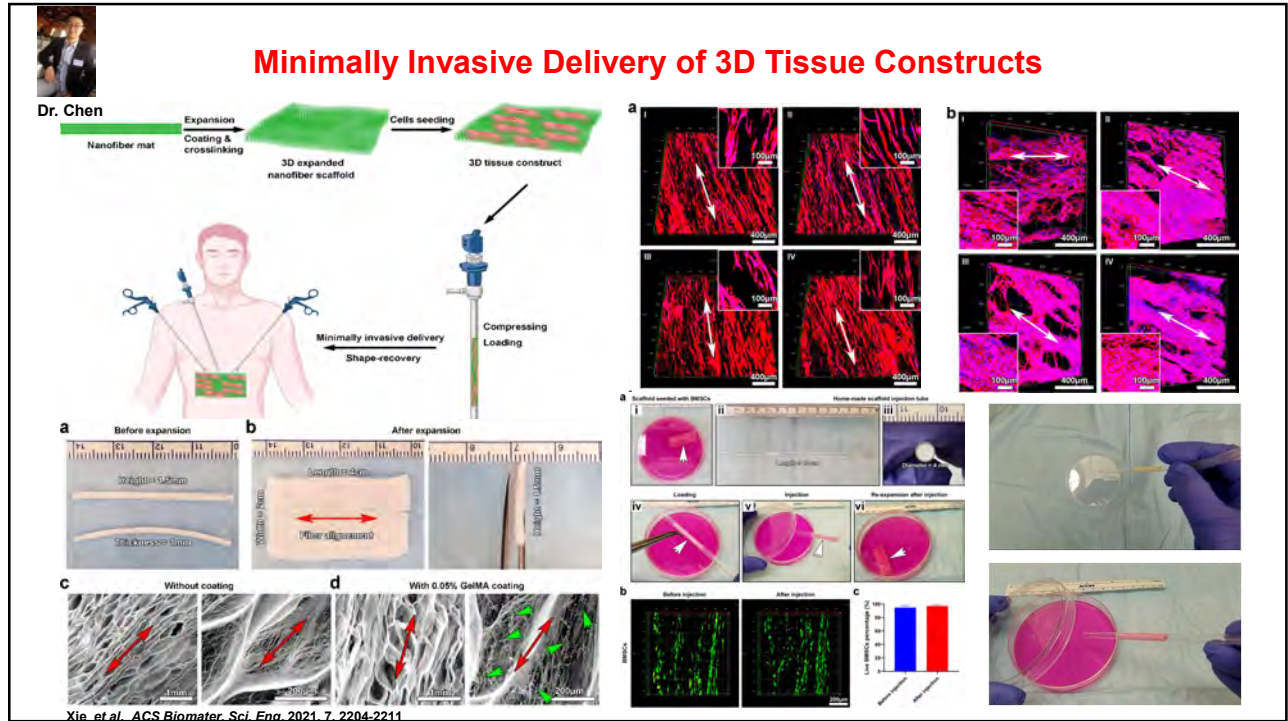
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Gas-foaming Expansion of Nanofiber Membranes in the Third Dimension

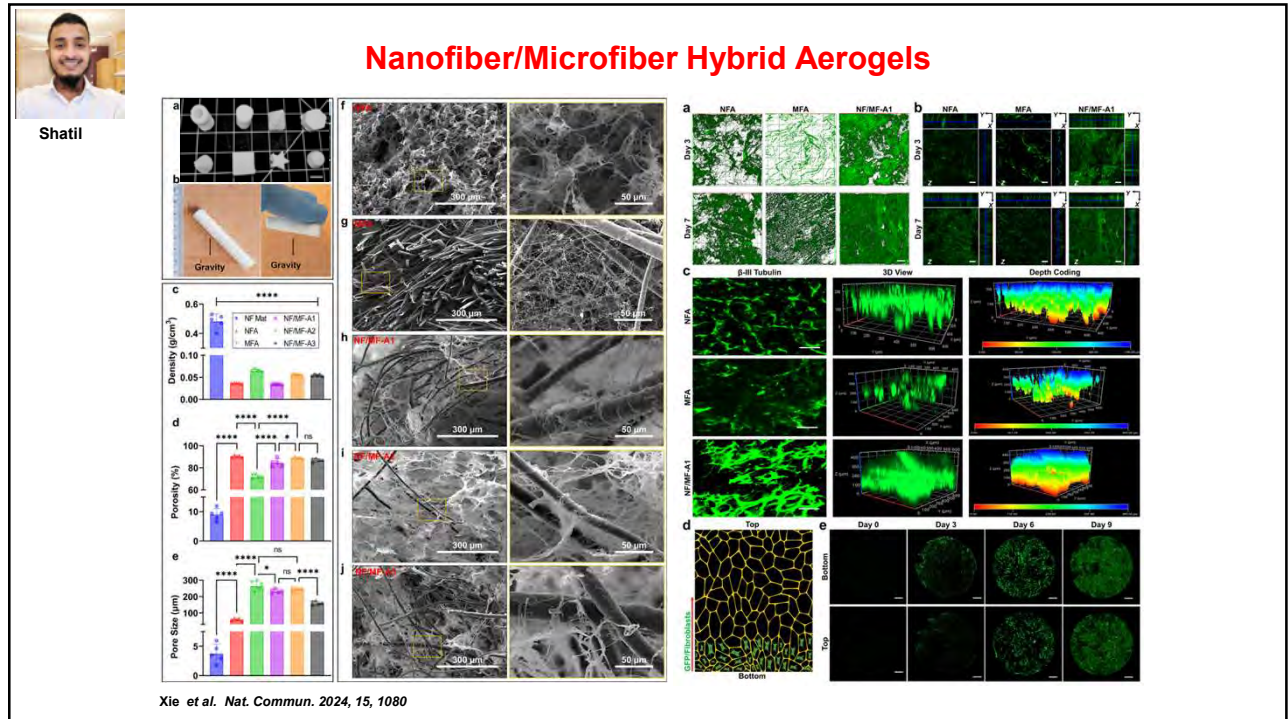


Xie *et al.*, *ACS Biomaterials Science & Engineering*. 2015 DOI: 10.1021/acsbomaterials.5b00238
Xie, Jiang, PCT application, 2015 This patent has been licensed to Beeken Biomedical Inc. Boston

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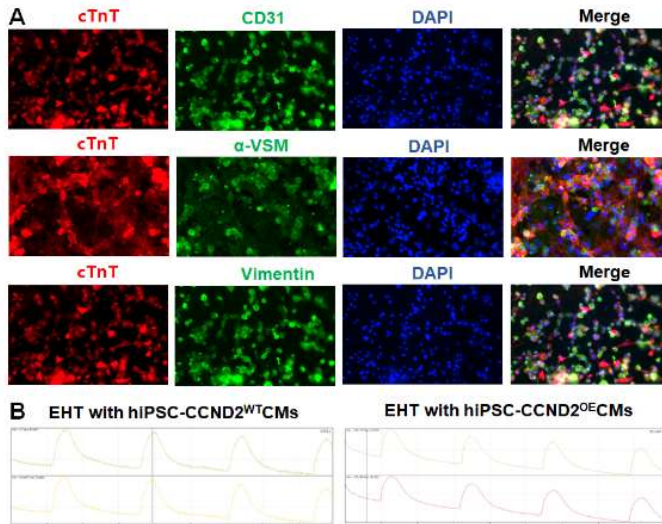


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Initial Characterization of Engineered Heart Tissues (EHT) with hiPSC-CMs and nonmyocytes



A 4 cm x 4 cm x 0.15 cm of GelMA-Tannic acid Hydrogel-coated 3D nanofiber scaffold containing 4×10^7 hiPSC-CMs, 2×10^7 hiPSC-ECs, 2×10^7 hiPSC-SMCs, and NP^{C+F} incubation for 3 days CHIR99021 and FGF1

Immunostaining human CMs (hcTnT), ECs (CD31), SMCs (α -VSM), fibroblasts (Vimentin)
Bar= 100 μ m

Optical mapping to show typical calcium transient signal of hiPSC-CMs

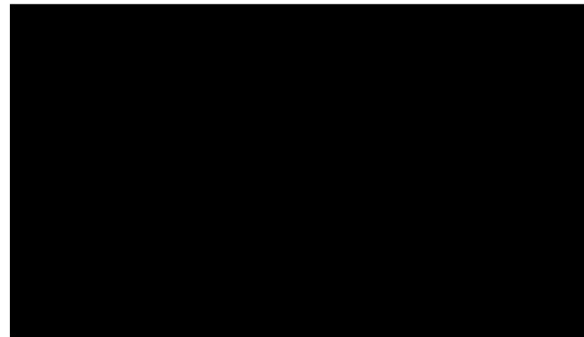
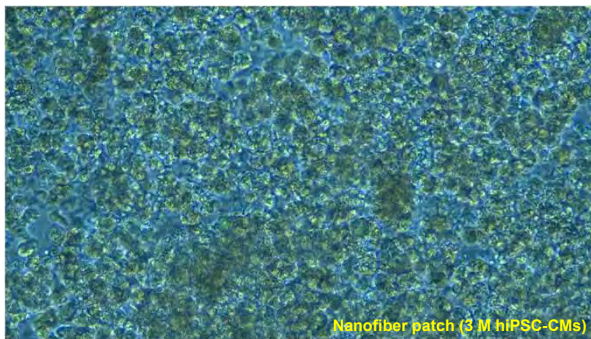
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Dr. Wuqiang Zhu

hiPSCs-derived Cardiomyocytes and Injectable Scaffolds for Myocardial Infarction Repair



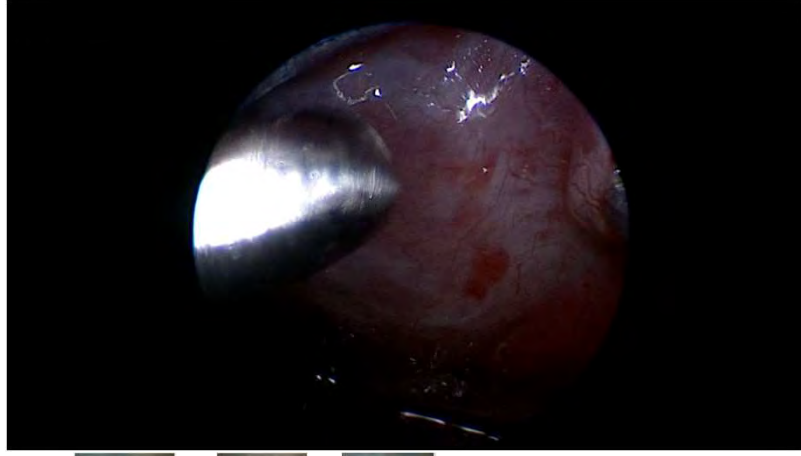
Xie et al. *ACS Biomater. Sci. Eng.* 2021, 7, 2204-2211

Xie et al. *iScience* 2022, 25, 104447

In collaboration with Dr. Wuqiang Zhu at Mayo Clinic

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EHT Delivery to Myocardial Infarction Site Using Video Assisted Thoracoscopy



EHT: engineered heart tissue



Dr. Pengsheng Li



Dr. Huiliang Qiu

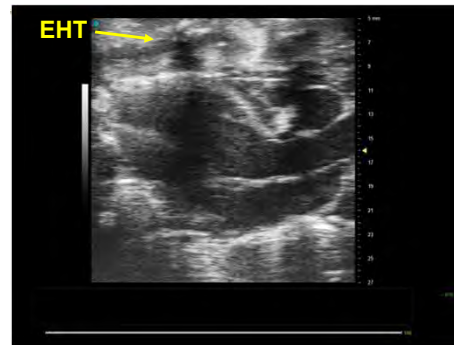


Dr. Fengpu He

Unpublished data

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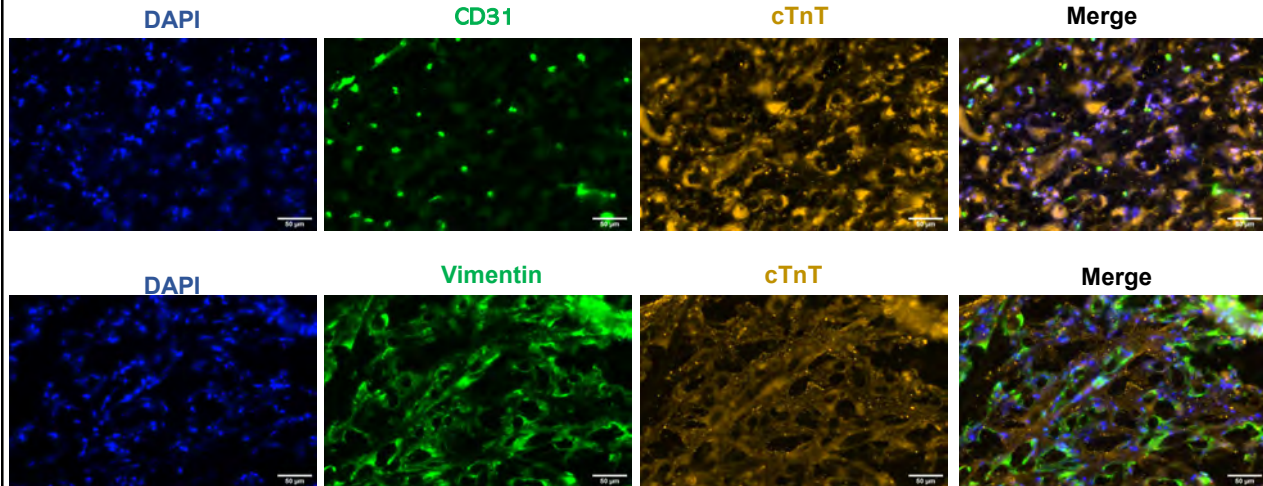
One Week After the EHT's Transplant



Unpublished data

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EHT after Transplant for 1 Month



Cardiomyocyte(cTnT), Endothelial cells (CD31), Fibroblasts (Vimentin)

Unpublished data

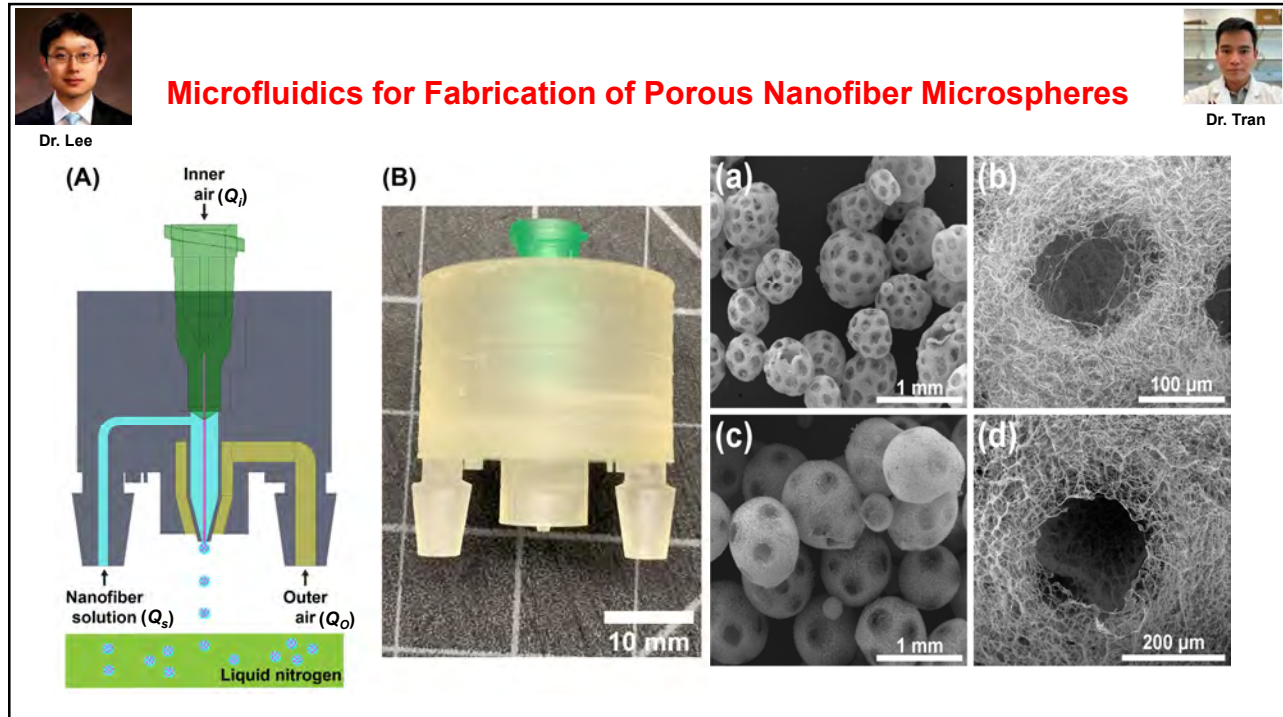
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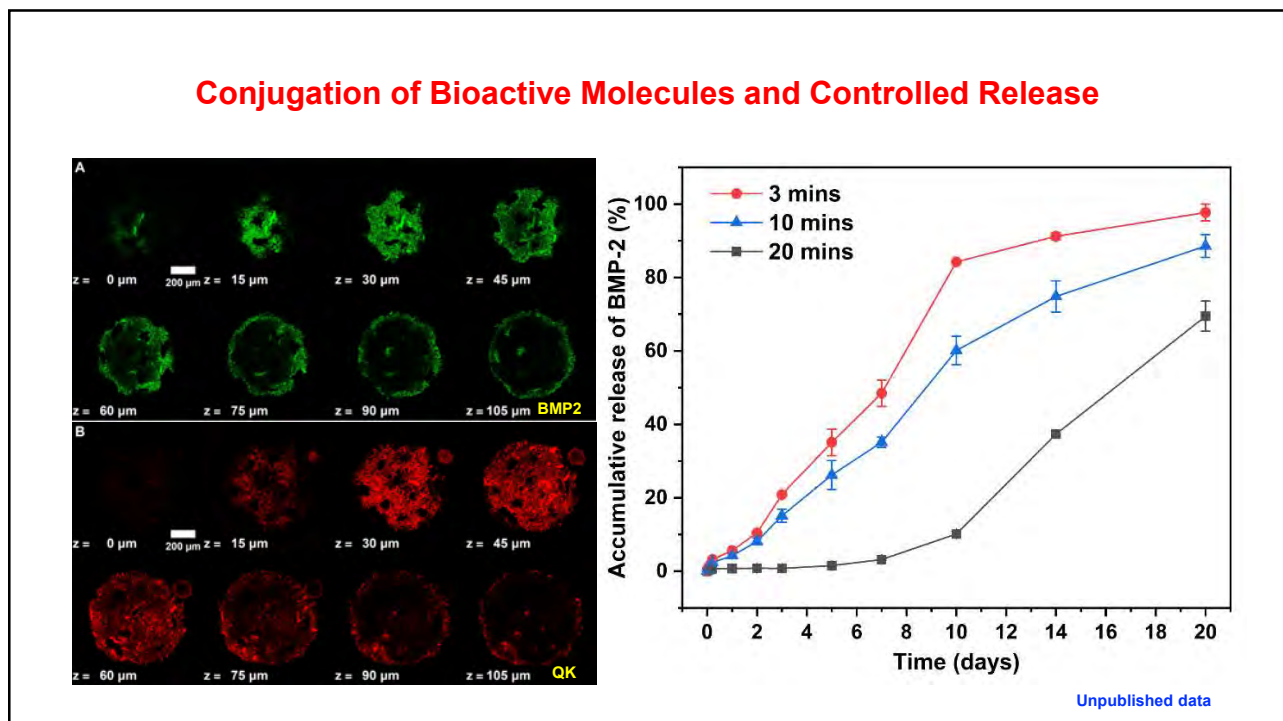
BMSCs and Signaling Molecules Incorporated Nanofiber Microspheres for Regulating Cellular Response

Xie et al. ACS Appl. Mater. Interfaces 2018, 10 (30), 25069-25079
Xie et al. Nanomedicine: NBM 2019, 22, 102081
Xie et al. Small 2020, 16, 1907393

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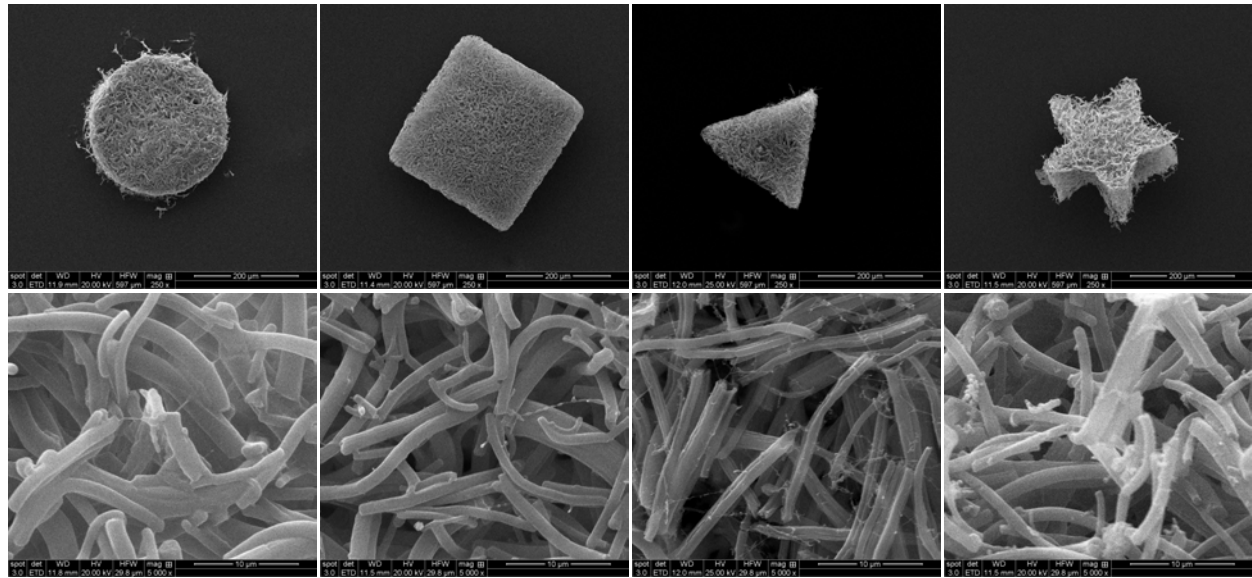


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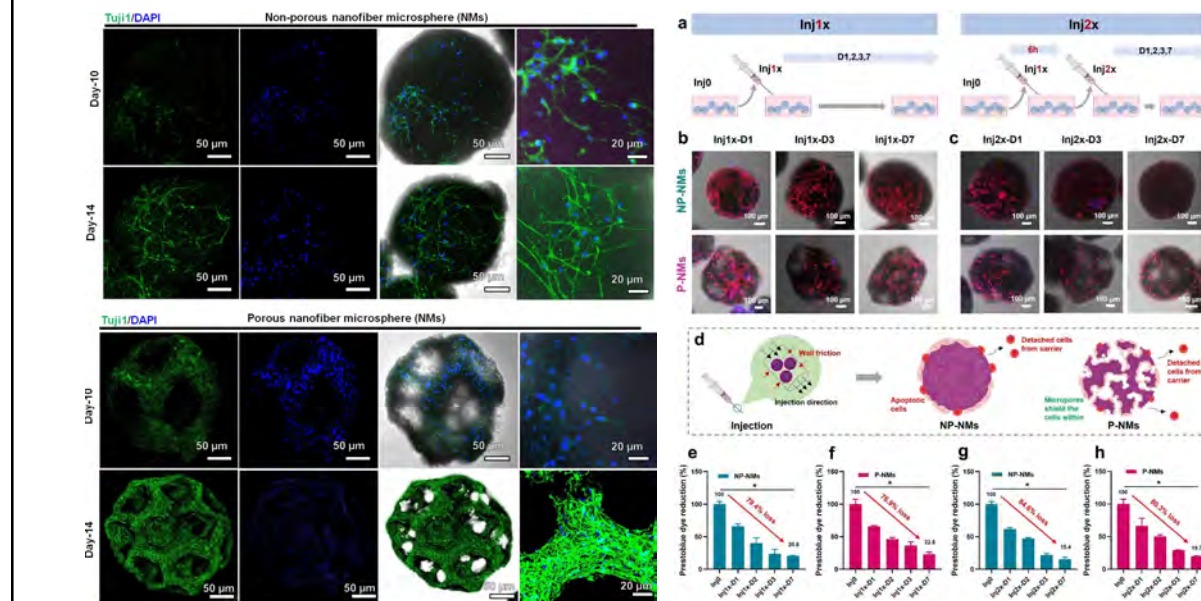
Engineer the Shapes of Nanofiber Microparticles



Unpublished data
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Cell-seeded Nanofiber Microspheres



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Acknowledgement

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 NIH/NIDCR R01DE031272
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