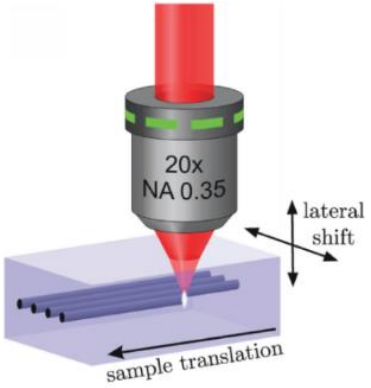
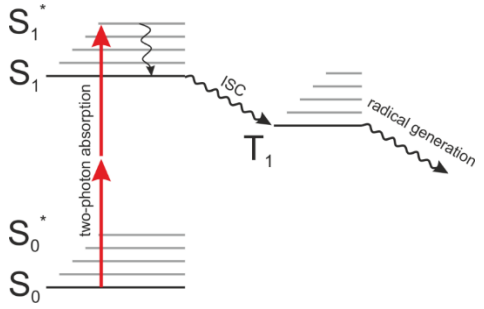
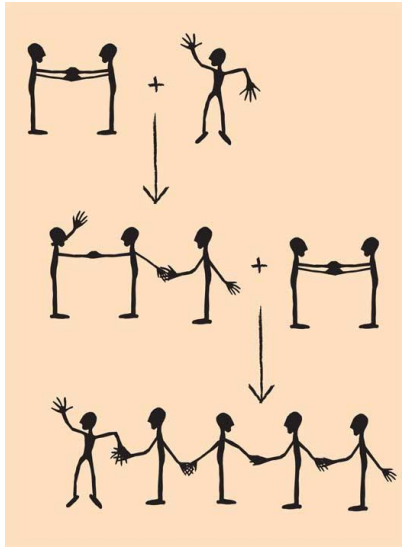
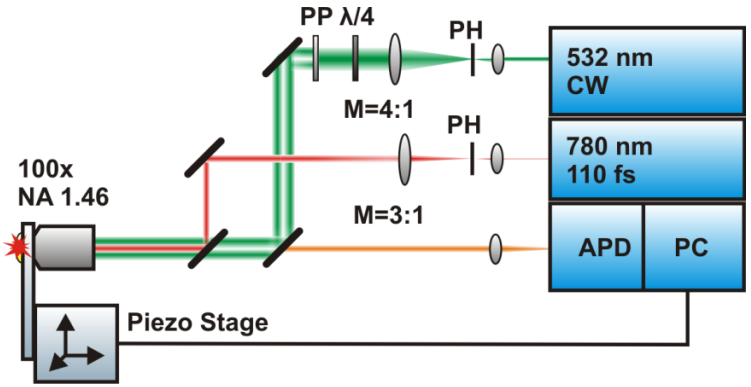
3D MULTIPHOTONEN LITHOGRAPHIE / STIMULATED EMISSION DEPLETION (STED) LITHOGRAPHIE





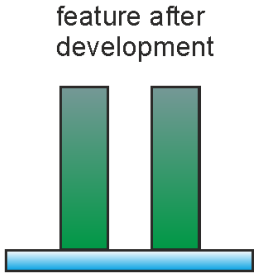


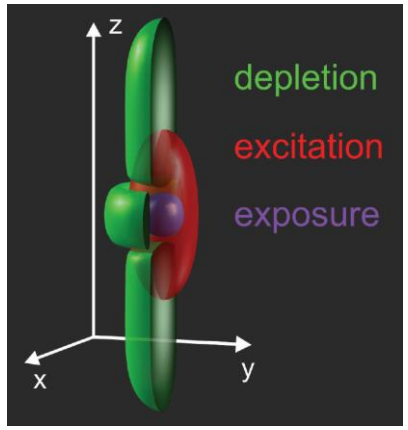


- Multiphotonenanregung startet eine lokale Polymerisation

Strukturgrößen:

- ~ 100 nm Strukturgröße (800 nm Laseranregung)
- ~ 200 nm Strukturauflösung



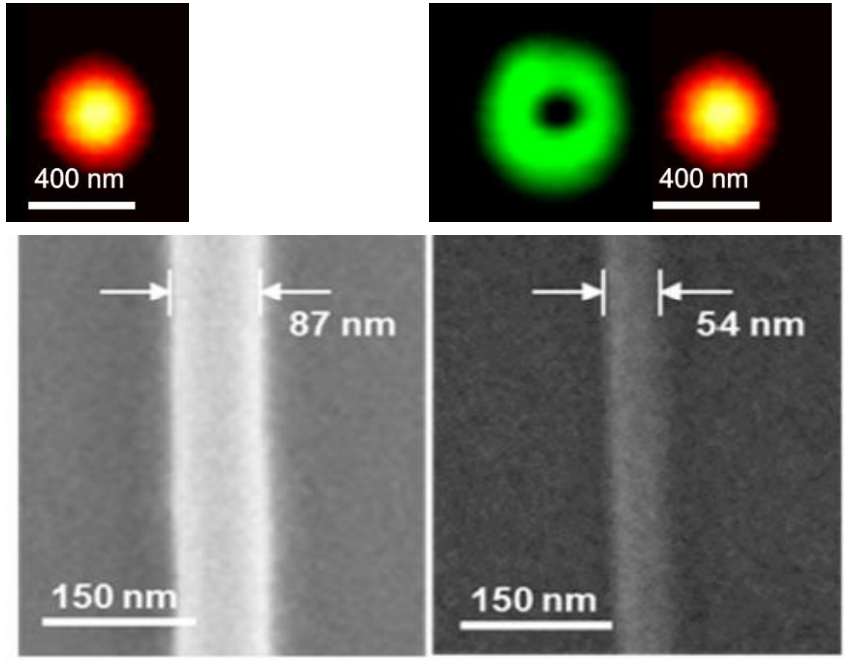


Klar, and Hell, Opt. Lett 24: p. 954-956 (1999), Klar; Jakobs, Dyba, Egner & Hell, PNAS 97: 8206 (2000)

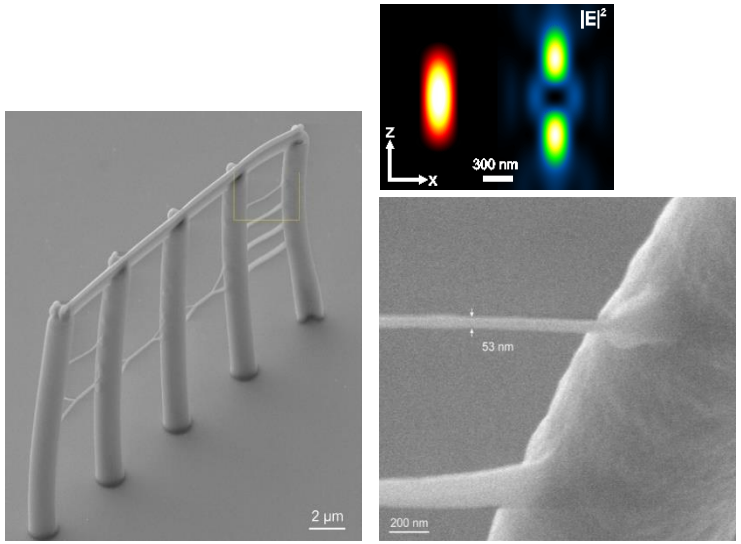
NANOLITHOGRAPHIE

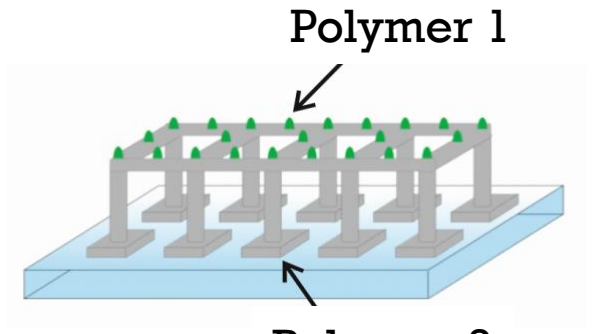
Strukturgrößen

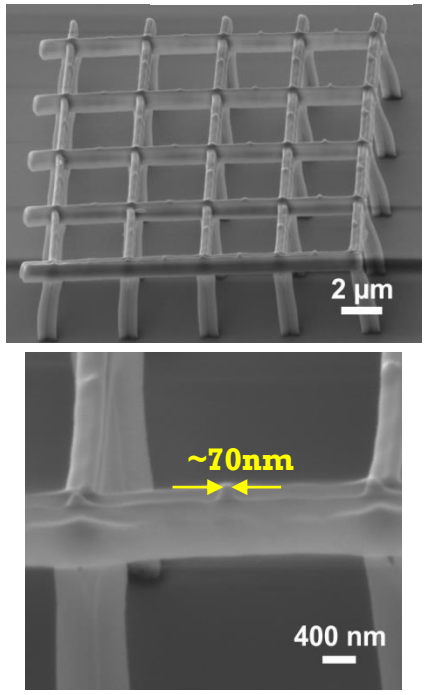
Experimental PSF



- Anregung (Rot)
- Donut-PSF für STED (Grün)

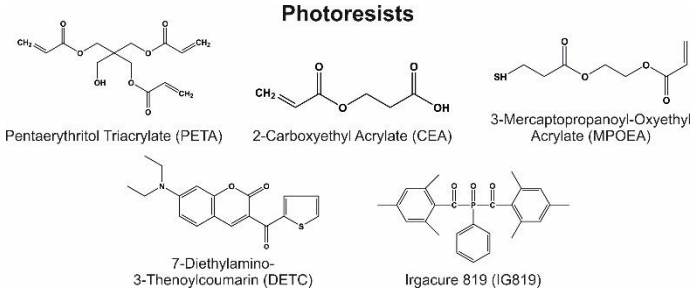


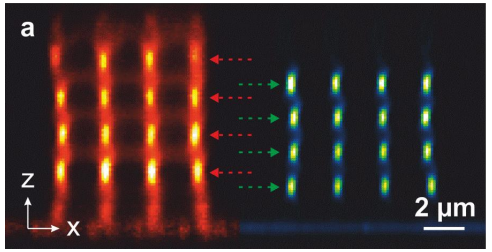


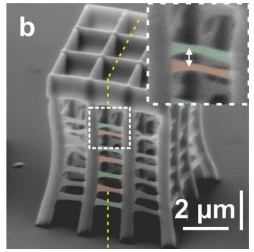


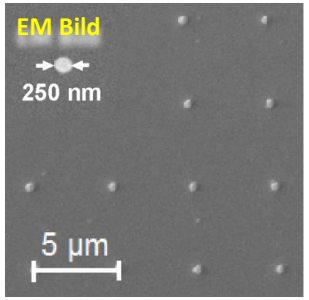
Wollhofen et al., Opt Express, 21, 10831-10840, 2013
Wiesbauer et al., Nano Letters, 13, 5672, 2013
Klar et al, Physica Scripta, 162, 14049, 2014

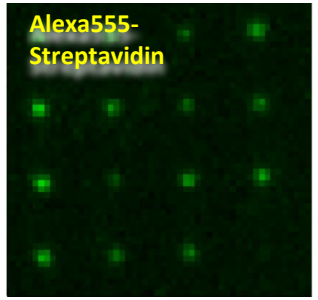
FUNKTIONALE & BIOKOMPATIBLE POLYMERE

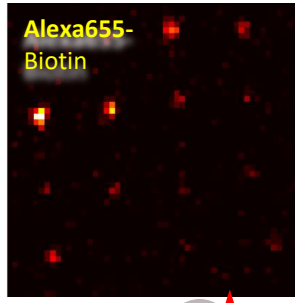






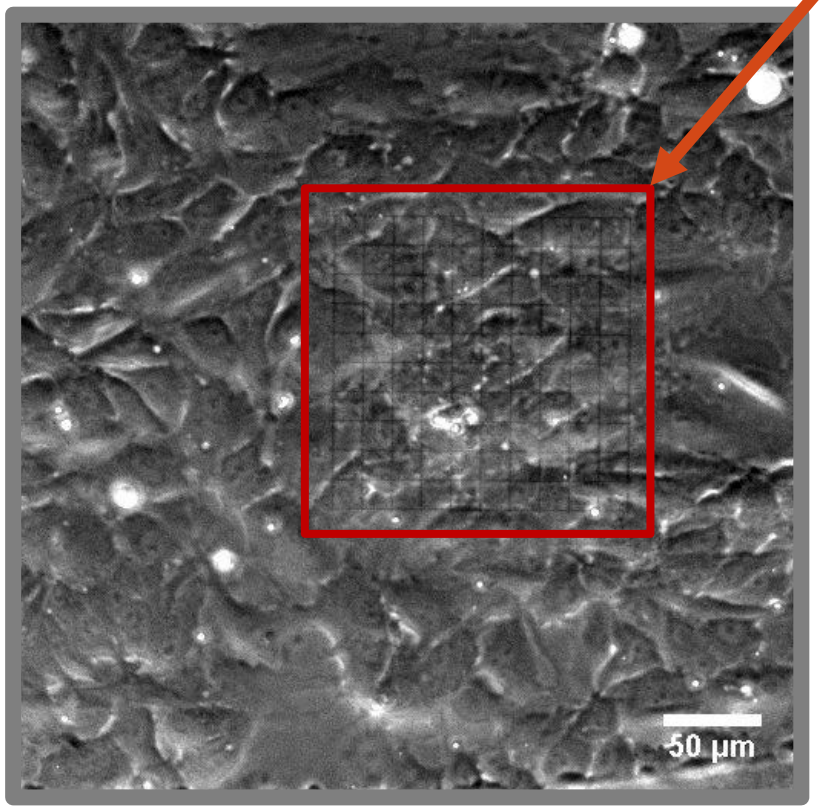






Wiesbauer et al., Nano Letters, 13, 5672, 2013
Wolfesberger et al., Journal of Nanobiotechnology 13, 27, 2015
Wollhofen, Optical Materials Express; 7; 7; 2538, 2017
Buchegger et al., ACS Nano, 10 (2), 1954-1959, 2016

Polymer Zellträgerstruktur

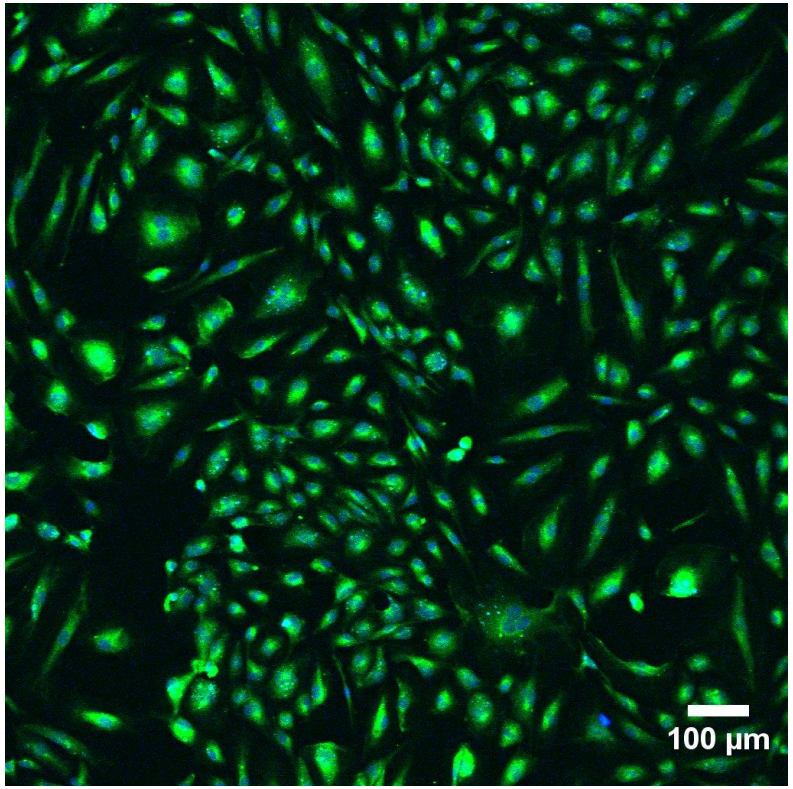


24 h nach der Besiedlung mit HUVEC-Zelle (100.000 cells/slide)

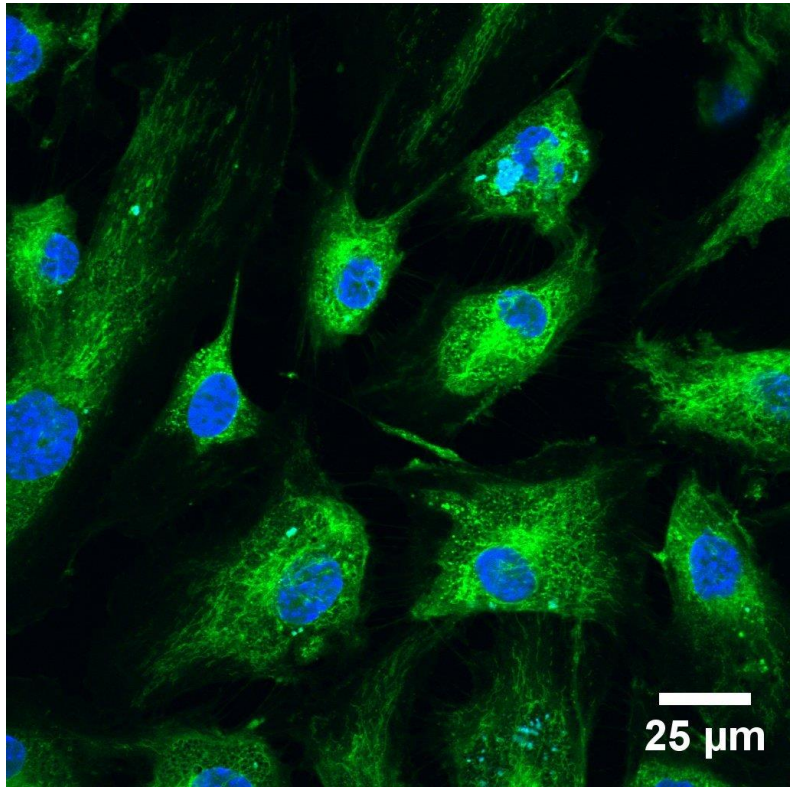
Growth of HUVEC on PET membranes

0.1% gelatin for 1 h

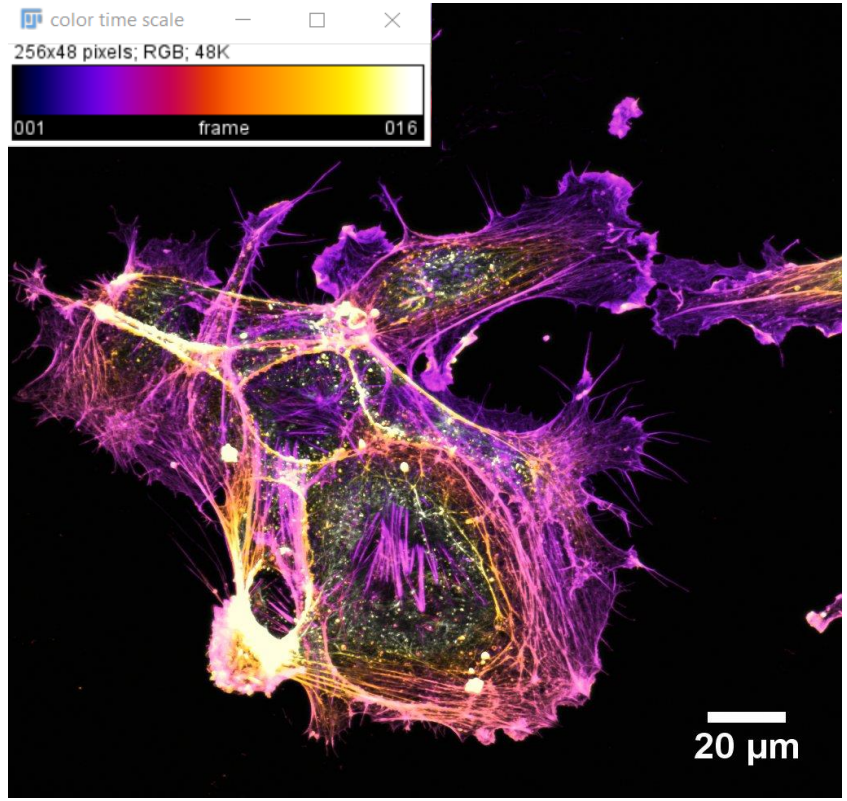
4 days after seeding (10.000 cells/cm²)



Paclitaxel Hoechst

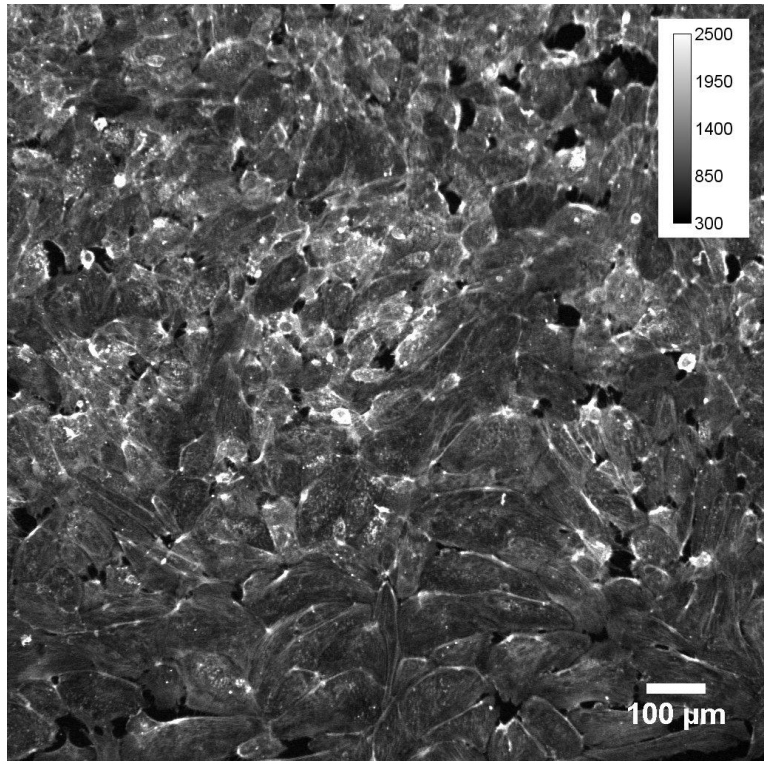


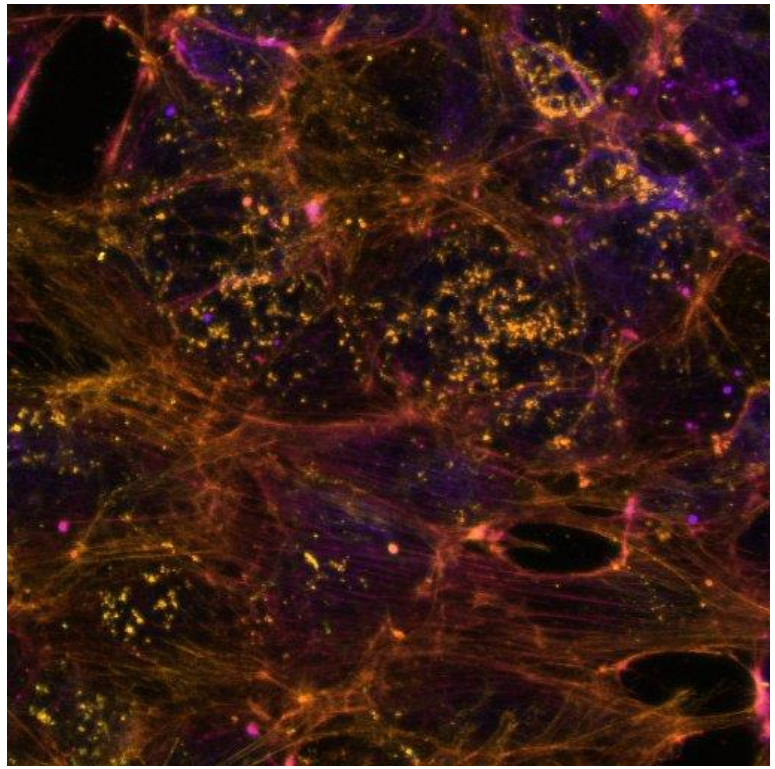
Paclitaxel Hoechst



Phalloidin Alexa 488

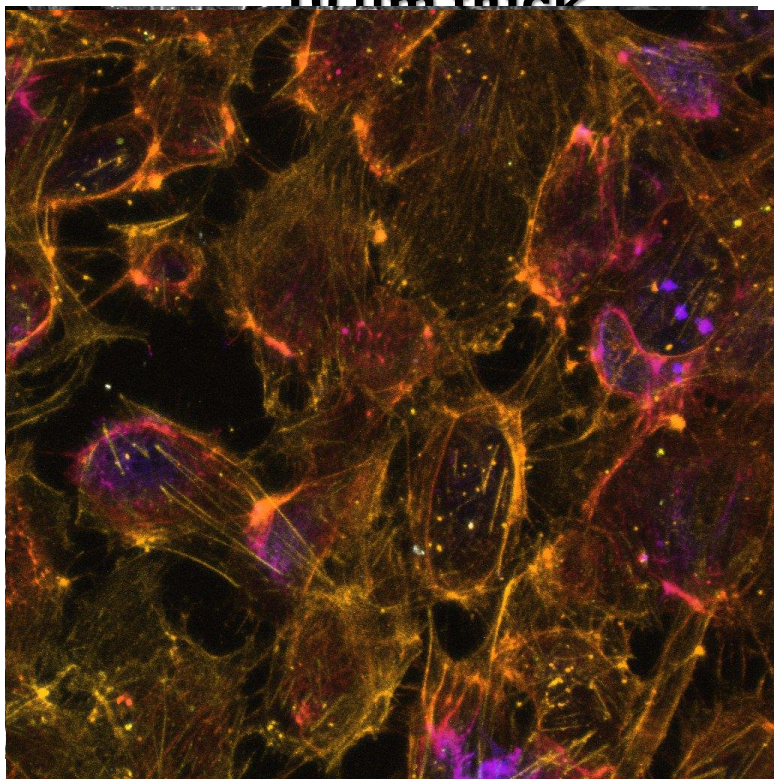
PET membrane
100 nm pores
23 µm thick





Phalloidin Alexa 647

transwell PET membrane
400 nm pores
10 µm thick



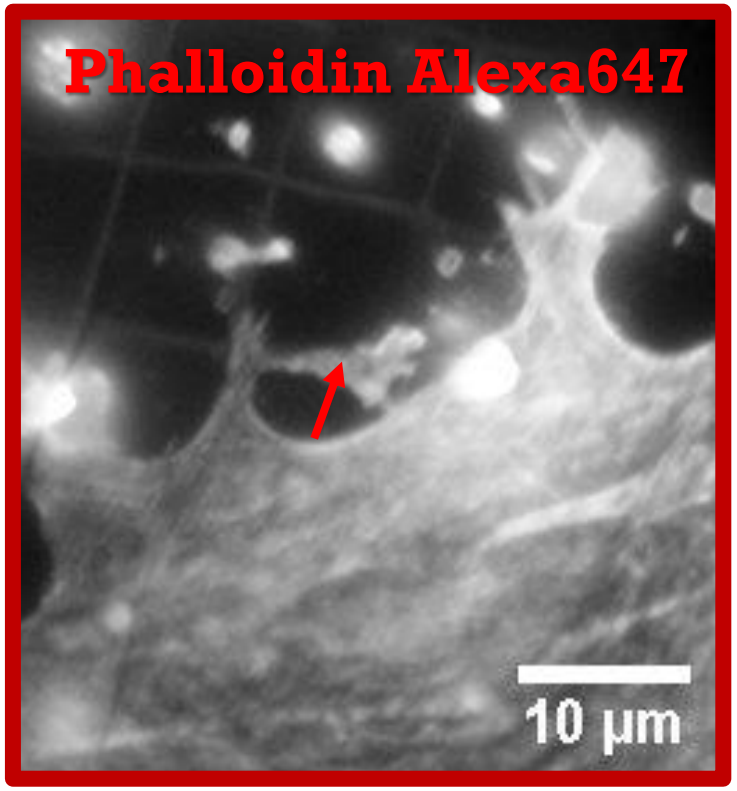
Phalloidin Alexa

100µg/ml fibrinogen 1h @37°C

40 hours post seeding (220.000 cells/cm²)

3D STRUKTUREN / ZELLWACHSTUM UND MIKROFLUIDIK

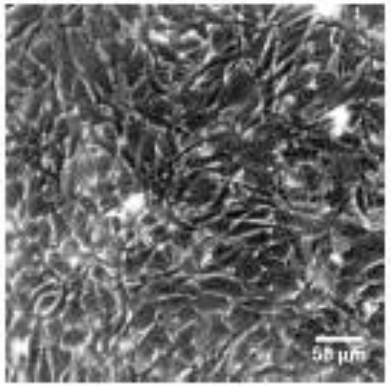
Aktin-Zytoskellet einer Endothelzelle
Auf einer Polymerstruktur



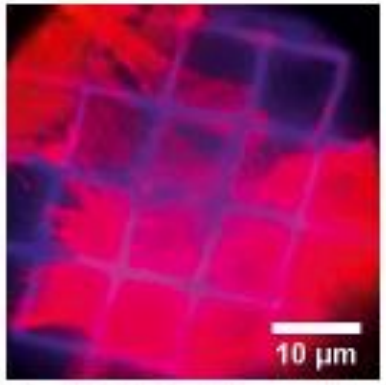
100x100x15µm Gitterkonstante:10µm

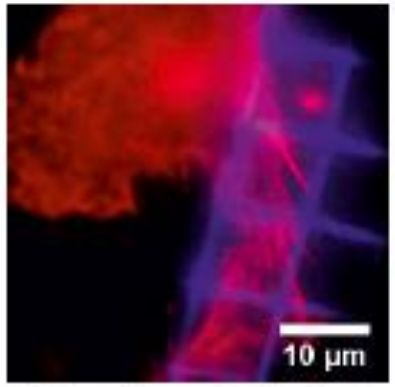
CELLS ON POLYMER STRUCTURES

Human umbilical vein endothelial cells (HUVEC) on nanostructures

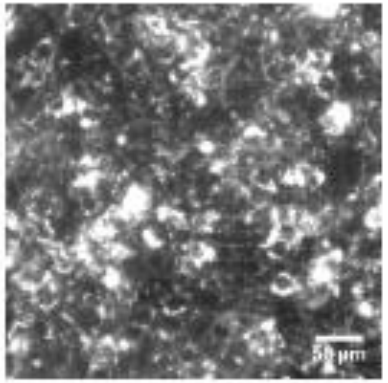


Bright-field image

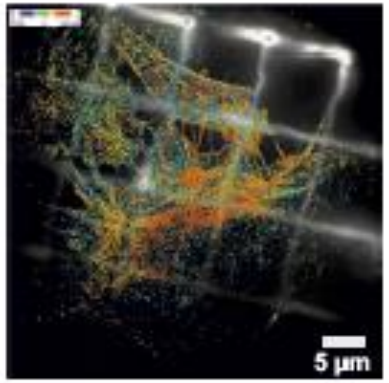


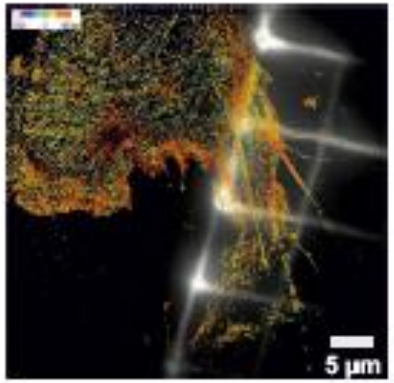


Phalloidin Alexa488 labeled actin cytoskeleton



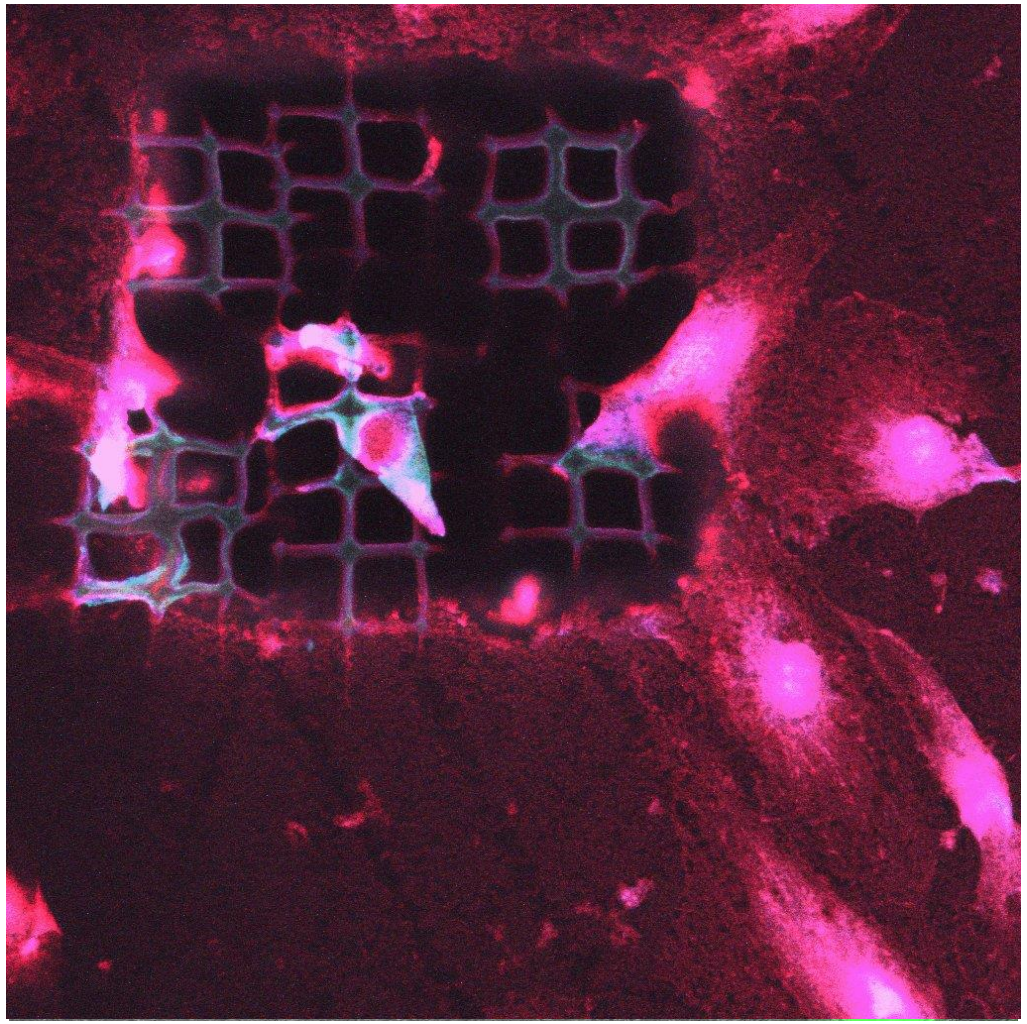
Dark-field image

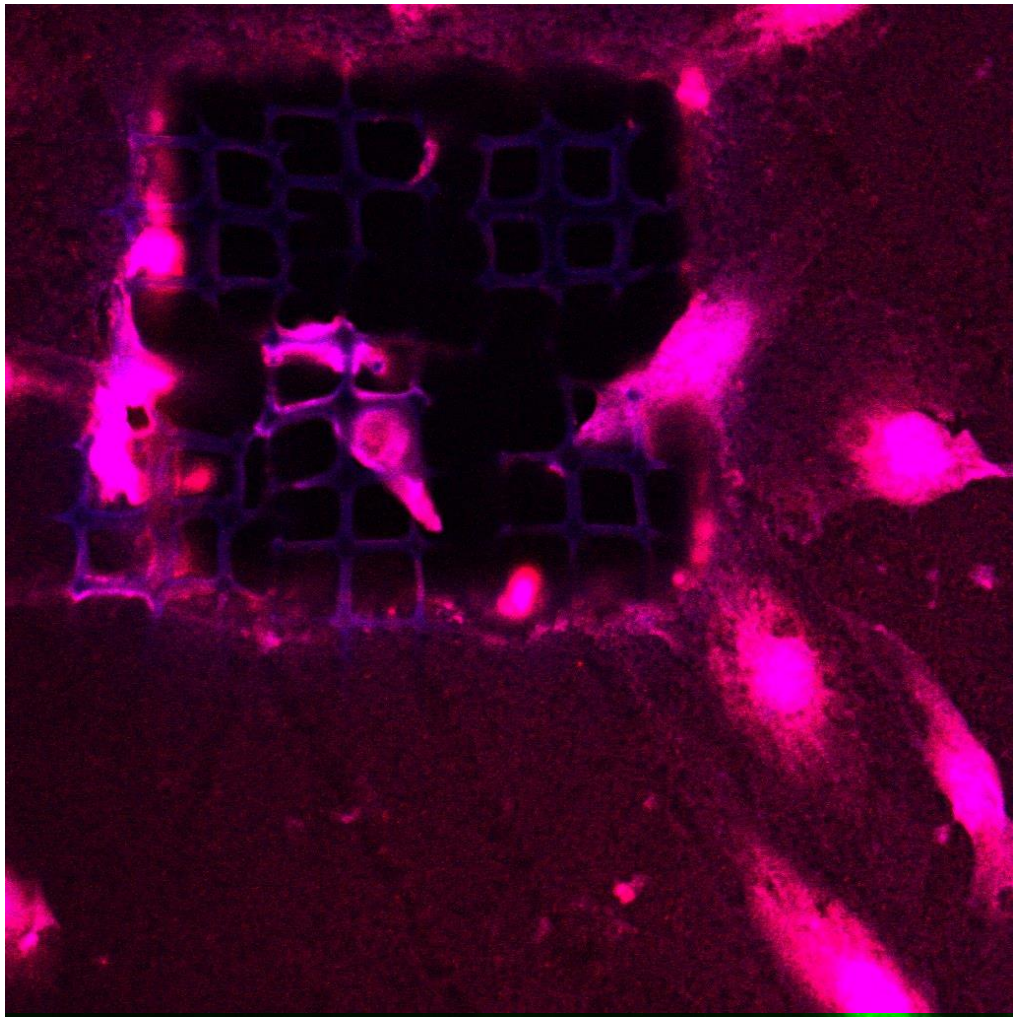




Reconstructed dSTORM images

Growth of HUVECtert2 on 3D polymer scaffolds within PET membrane





Eosin

Phalloidin Alexa647

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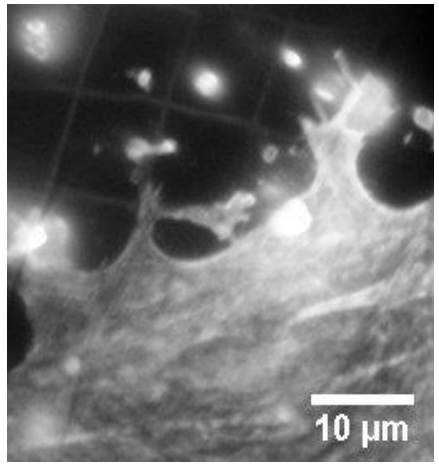
curt.

JOHANNES KEPLER UNIVERSITÄT LINZ

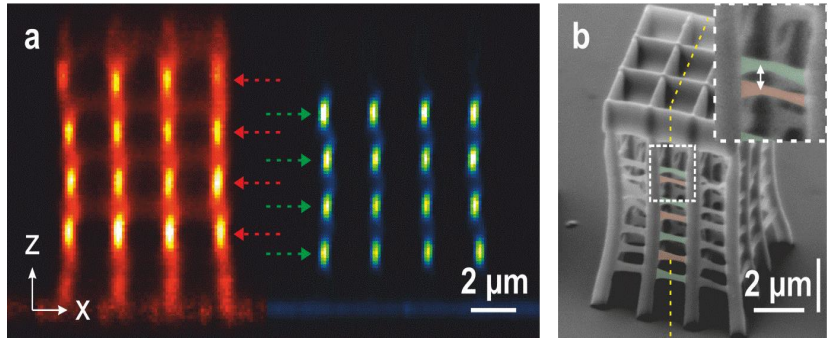
ZUSAMMENFASSUNG

Nanolithographie

Zellträgerstrukturen / Tissue Engeenering



Funktionalen Polymere



Interreg

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