In situ generated adhesive spaces trigger endothelial transition to a more mesenchymal phenotype

Karin Kiefer[1], Marcelo Salierno[3], Aránzazu del Campo[1,2]

[1] *INM – Leibniz-Institute for New Materials, 6613 Saarbrücken, Germany*

[2] *Saarland University, 66123 Saarbrücken, Germany*

[3] *Institute of Physiological Chemistry, University Medical Center Johannes Gutenberg University, 55128 Mainz, Germany*

Endothelial-to-mesenchymal transition (EndMT) defines the process of endothelial cells that transform into a mesenchymal phenotype. In humans this transition is involved in various physiological and pathological processes like fibrosis and cancer. Many factors can promote this transition. TGF-ß was found to stimulate EndMT during vein graft remodeling [1], cardiac cushin formation [2] or contribute to cardiac fibrosis [3]. Recent results evidence that adhesive cues from the ECM might also trigger the EndMT [4]. Here we describe a new material platform able to *in situ* trigger and follow EndMT from endothelial monolayers. Using surface layers containing a photo-activatable adhesive peptide, cell adhesive lines, as models for ECM fibers, are opened from confined epithelial monolayers. The appearance of the adhesive lines induces single cell migration events from the cohesive cell layer. With this tool we address the question of migration alone ECM fibers with variable dimensions induces phenotypical changes in the migrating endothelial cells.

[1] Cooley B C et al., Sci. Transl. Med. 6, 227ra34 (2014)

[3] Zeisberg E M et al., Nature Medicine 13, 952 - 961 (2007)

[2] Gouman M-J et al., TCM 18, No. 8, 293-298 (2008)

[4] Salierno M J et al., Biomaterials Vol. 82, 113–123 (2016)