

The role and interplay of cytoskeletal filaments in microtentacles

L.Kainka^{1,2}, E. Terriac^{1,2}, D. Bahr², Reza Shaebani², L. Santen², F. Lautenschläger^{1,2}

¹ INM – Leibniz Institut for New Materials, Saarbrücken, Germany

² Saarland University, Saarbrücken, Germany

Circulating Tumor Cells (CTCs) pose a significant threat due to their role in metastasis: It has been proposed that CTCs are able to escape the blood stream and reattach to the tissue by the formation of so-called microtentacles (McTNs) [1].

McTNs are microtubule based membrane protrusions with a diameter of less than 1 μm and a length of tens of μm [2].

In CTCs the balance of the outward growing microtubule and the contractive forces of the actin cortex is disrupted enabling microtubules to form these kind of protrusions. Using cytoskeletal drugs such as Latrunculin A and Y27632, which are targeting the actin cortex integrity and its contractility, we induce McTNs even in non-cancerous RPE1 cells. We investigate the presence of microtubules and actin as well as vimentin, which has been hypothesized to stabilize McTNs [3], under those conditions.

We establish a statistic over the number and lengths of McTNs depending on different drug concentrations applied. Further experiments on the dynamics of McTNs, especially during retraction after drug wash-out, give a better insight in the role of individual cytoskeletal elements.

Understanding the mechanisms of the formation of McTNs may help the development of new cancer therapies targeting CTCs in the microvasculature.

- [1] R.A. Whipple, A.M. Cheung, and S.S. Martin, *Detyrosinated microtubule protrusions in suspended mammary epithelial cells promote reattachment*. Exp Cell Res, 2007. **313**(7): p. 1326-36.
- [2] A.N. Killilea, R. Csencsits, E. Le, A.M. Patel, S.J. Kenny, K. Xu, K.H. Downing, *Cytoskeletal organization in microtentacles*. Exp. Cell Res, 2017. **357**(2): p. 291-98
- [3] R.A. Whipple, E.M. Balzer, E.H. Cho, M.A. Matrone, J.R. Yoon, S.S. Martin, *Vimentin Filaments Support Extension of Tubulin-Based Microtentacles in Detached Breast Tumor Cells*. Cancer Res, 2008. **68**(14): p. 5678-88