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13 April 2022 (Wednesday), 11am

Hosted by: Dr Zhang Dan

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The fungal plasma membrane – control of lateral segregation and turnover in a non-fluid mosaic

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Prof. Roland Wedlich-Söldner studied Biology in Munich and graduated with Regine Kahmann and Gero Steinberg on microtubule-dependent transport in Ustilago maydis. During his postdoc with Rong Li at Harvard Medical school he studied the mechanisms of spontaneous cell polarization. He then headed a research group at the Max Planck Institute of Biochemistry before joining the University of Münster as professor and director of the Institute of Cell Dynamics and Imaging.

Saprophytic fungi rely on the uptake of a wide range of organic materials as nutrients and energy source. To achieve this task yeast cells have evolved a large arsenal of membrane transporters that are tightly regulated in their expression, localization and activity. We and others could previously show that the endocytic turnover of several yeast amino acid transporters is blocked by their lateral segregation into a unique invaginated domain of the plasma membrane. We now combined super resolution microscopy and genetic engineering to reveal how a group of tetraspanner proteins prevents the closure of those invaginations into membrane tubes. Interestingly, lateral transporter segregation is relieved by a conformational change during substrate uptake, which in turn allows the transporter to become ubiquitinated, internalized and degraded. I will discuss the role of this dynamic segregation mechanism in the context of wide-spread crystalline membrane assemblies within the yeast plasma membrane and a lack of lateral diffusion for most transmembrane proteins.

Recent Publications:

1. Bayraktar, S., Nehrig, J., Menis, E., Karli, K., Janning, A., Struk, T., Halbritter, J., Michgehl, U., Krahn, M.P., Schuberth, C.E.*, Pavenstädt, H.*, **Wedlich-Söldner, R.*** (2020) A deregulated stress response underlies distinct INF2 associated disease profiles. JASN 31, 1296-1313.

2. Busto, J.V., Elting, A., Haase, D., Spira, F., Kuhlman, J., Schäfer-Herte, M. and **Wedlich-Söldner, R**. (2018) Lateral plasma membrane compartmentalization links protein function and turnover. EMBO J 37, pii: e99473.

3. Wales, P., Schuberth, C.E., Aufschnaiter, R., Fels, J., García-Aguilar, I., Janning, A., Dlugos, C.P., Schäfer-Herte, M., Klingner, C., Wälte, M., Kuhlmann, J., Menis, E., Hockaday Kang, L., Maier, K.C., Hou, W., Russo, A., Higgs, H.N., Pavenstädt, H., Vogl, T., Roth, J., Qualmann, B., Kessels, M.M., Martin, D.E., Mulder, B. and **Wedlich-Söldner, R.** (2016). Calcium-mediated actin reset (CaAR) mediates acute cell adaptations. Elife 5, e19850.