Complex geometries of suspended cell cortices

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Most cell types have a defined state of spreading which depends on their function: epithelial cells form cohesive layers, mesenchymal cells adhere to their environment but not much to their neighbors to migrate efficiently, and leukocytes are mostly suspended.

During events like embryogenesis and metastasis however, cells may change their original phenotype. We sought to understand the consequences of such transitions with an emphasis on the cell cortex. This thin meshwork under the plasma membrane, which is mainly composed of F-actin, motors proteins and cross-linkers, is indeed one of the main contributors to cell shape. As such, we hypothesize is that the change in adhesive state must be accompanied by changes in the actin cortex structure and dynamics.

To investigate cortical actin dynamics, we used FRAP (Fluorescence Recovery After Photobleaching) where we detected differences in the dynamics of long, formin elongated, and short, Arp 2/3 nucleated, filaments depending on the adhesion state of the cell. However, the interpretation of the actin turnover in the suspended state of cells revealed to be much more complex than in the case of adhered states.

We observed that cells display small folds of membrane after being brought into suspension. These folds are, contrary to blebs, less dynamic and exhibit an underlying filamentous actin layer. We will discuss here the consequences of such geometries regarding our interpretation of the FRAP data.