A time resolved study of blood platelet spreading

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Human blood platelets are non-nucleated fragments of larger cells (*megacaryocytes*) and of high importance for blood clotting. The hemostatic function of platelets is directly linked to their mechanics and cytoskeletal morphology. However, the exact mechanism of spreading and contraction remains elusive. In our study we focus on the investigation of single blood platelets *in vitro* employing Traction Force Microscopy (TFM) and Metal-Induced Energy Transfer (MIET) imaging. By combined TFM and microscopy, we are able to correlate the force generation with the emerging actin structures in a time resolved manner. Our force maps show a hot spot distribution, typically in spindle like, triangular or circular shape. Additionally, from fast scanning and static MIET experiments, we reconstruct the temporal evolution of the membrane-to-surface distance during adhesion and spreading with nanometer resolution. We observe, analogous to the TFM, hot spot distribution shapes of areas with lower membrane-to-surface distances.