EXPANSION MICROSCOPY ON BLOOD PLATELETS

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Platelets are central players in several (patho)-physiological processes, including hemostasis, maintenance of vascular integrity, wound healing, inflammation, immune defense and tumorigenesis/metastasis [1]. Fluorescence imaging of platelet receptor localizations and distributions is challenging due to the small platelet size of only 1-2 µm in diameter. The recently developed "Expansion Microscopy" (ExM) turns conventional (confocal) fluorescence microscopy into a superresolution instrument by imaging a physically expanded sample [2,3]. As ExM has not been shown on platelets so far, we established multi-color (ExM) to visualize receptors on the cell surface.

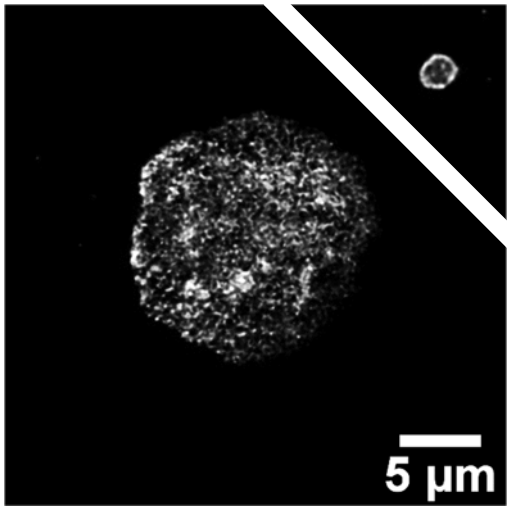

Fig. 1: Blood platelet receptor distribution before and after expansion

We show that isotropic three-dimensional platelet expansion to a quadruple of its diameter is possible. This expansion leads to a virtual resolution gain that easily competes with other super-resolution methods such as single molecule localization microscopy. Since receptors are very densely packed on the platelets membrane, it would be more than challenging to map and localize them with conventional imaging. Using ExM, this becomes feasible.
Using this technique, we aim to study colocalization of platelet receptor complexes. Therefore, we validate the implications of the expansion procedure for colocalization analysis.

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