

Visualisation of nano-structures using Expansion Microscopy

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Abstract

In recent years there has been an increased interest from researchers in better-resolving tissues and cells in 3D, in order to visualize sub-cellular structures. At Scilifelab, our Advanced Light Microscopy Facility has been providing scientists with advanced sample preparation support for super-resolution microscopy techniques such as STED and SMLM. We have recently started offering support with Expansion microscopy as a service to users across Sweden and internationally. Expansion microscopy enables super-resolution microscopy to be performed on diffraction-limited microscopes. This method involves crosslinking proteins in a fixed sample to a swellable polymer, which can be physically expanded by immersion in distilled water. With this technique we can swell tissue and cells, therefore generating increased resolving power with reduced light absorption and scatter, allowing life scientists to image the nanoscale with conventional microscopy. As this has been a rapidly developing technique with many new articles and protocols published each year, we realized this could be somewhat daunting when wishing to start with this method. Thus, we have chosen a single protocol, based on Magnified Analysis of the Proteome which is robust in our hands, to perform expansion (4-5x) of adherent cells. We are now accepting applications for project support, it can be done via our project portal: <https://nmi.scilifelab.se/> or via euro bioimaging as part of the Euro-BioImaging Proof-of-Concept study: <https://www.eurobioimaging.eu/about-us/how-to-access>.

