

## PExM: polyplex expansion microscopy for cell trafficking studies

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Nanomedicine is a field at the intersection of nanotechnology and medicine, promising due to its potential to revolutionize healthcare [1]. Despite its long trajectory, there is still a long road ahead for its full development, and smart design of nanomedicines is still a challenge. Among other problems, this is due to the scarcity of tools available for the precise visualization and comprehension of nano–bio interactions, impeding progress towards the clinical phase [2]. One of the developed tools that stands out to be a strong nanoscopy technique for studying nano-delivery systems within cellular environments is expansion microscopy (ExM). This technique was used for tissue and cell expansion (**Figure 1**) and most recently for lipid molecule expansion inside cells [3]. Herein, we present for the first time polyplex expansion microscopy (PExM); a comprehensive examination of ExM as an already developed technique, but adapted for expanding polymer based nanocarriers, in particular polyplexes within cells, allowing the analysis of their trafficking (**Figure 2**). With our method set up, PExM will be extensively used for the study of polyplex nanoparticle cell trafficking, becoming a high-resolution technique which can also be applied to primary amine containing polymeric nanoparticles without requiring expensive super-resolution microscopes.

This work has been published [4].

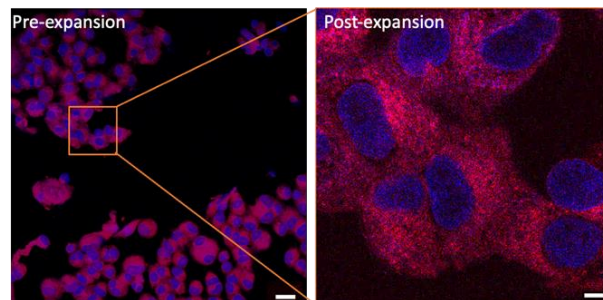
## References

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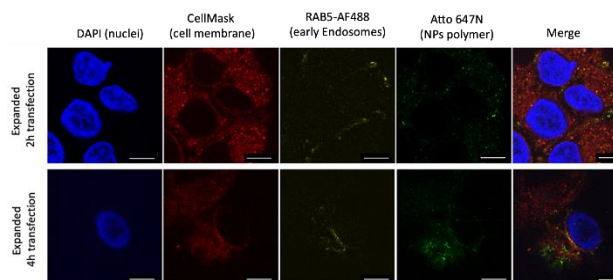
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## Figures



**Figure 1.** Isotropic expansion where pre-expanded and post-expanded cells images are shown. Scale bars are 5  $\mu\text{m}$  for pre-expansion image and 23  $\mu\text{m}$  for the post-expansion image.



**Figure 2.** A549 cells expanded images with different pBAE NPs transfection timings. Nanoparticles were transfected for 2 and 4 hours and expanded with PExM protocol. Scale bar of 93  $\mu\text{m}$ .