

FLUORESCENT MAGNETIC NANOPARTICLES AS MODULATORS OF SIGNALING PATHWAYS

Self organized phenomena in cells , such as the formation of the cytoskeleton or signal transduction pathways result from the collective behaviour of molecules. Many biological systems require precise positional information to function correctly. This positional information is often encoded in concentration gradients. **Here our approach is based on fluorescent magnetic nanoparticles as tools to modulate in space and in time cellular signaling components**

Generation of protein gradients

a) induced Gradient
b) Concentration threshold

Bioconjugated Hybrid fluorescent and magnetic NP

Free Cell extract
Confined cell extract

Cell Division
Membrane Signal transduction

t=0 min *t=0 min* magnet

Roullier V., Marchi-Artzner V. et al *Chem Mat* **2008**,20, 6657
Roullier V., Clarke S. Marchi-Artzner V., Piehler J., Dahan, M. *Nanoletters* **2009**, 9(3), 1228

Targeting of EB1-his protein by quantum dots and Monitoring of its motion within microtubule based structures

Free Cell extract

Control of the stoichiometry of EB1-His QD complex

Dif A., Le Borgne R, Dahan M., Gueroui Z., Marchi-Artzner V. et al *J. Am. Chem. Soc* **2009**, DOI10.1021

Purification and biological activity of the **Ran protein**, an example of protein regulating network

•Purification of RanGTP-his
•RanGTP-his Biological activity characterized by a switch-like behavior

Migration of the QD-Ran* complex

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