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## Targeting of cellular organelles by fluorescent nanoparticles

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The targeting of cellular organelles and the design/development of a suitable delivery system are both essential for the success of drug and gene therapies. The organelle targeting is a relevant issue as many bioactive agents must be delivered specifically to a cell organelle to operate therapeutically. This targeting tool is still a great challenge for researchers and new approaches are needed to evolve in this field. Not only targeting nucleus can bring impressive therapeutic progresses, specially for the most serious and deadly diseases (such as cancer), but also mitochondria and lysosomes are important intracellular targets to reach. The conception of fluorescent ligands, displaying targeting specificity and great levels of biocompatibility, is an emerging and reliable area to develop innovative release systems. In line with this, biocompatible protein or plasmid DNA/ligand nanoparticles were formulated by a co-precipitation method and were shown to cross the plasma membrane and target specific intracellular organelles. Fluorescence confocal microscopy analysis and a cell-associated fluorescence study reveal clear evidence of cytosol, lysosomes and mitochondria targeting. *In vitro* transfection mediated by plasmid DNA based fluorescent carriers can lead to protein expression. The therapeutic effect on cancer cells, mediated by the developed vehicles, is promising and instigates further research for clinical translation.

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