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New lipoplex formulation to efficiently transfect human fibroblast: Fluorescence Cross Correlation Spectroscopy as tool for lipoplex characterization

We present a new formulation of DNA liposome characterized by Fluorescence Cross Correlation Spectroscopy (FCCS) to efficiently transfect human somatic cells. Liposomes have been considered as the best carrier to delivery drugs and genes to cells due to their properties[1]. It is known that the composition of the vesicle has huge impact on efficiency of transfection as well on its toxicity. For that, we tested the cytotoxicity and transfection of 28 combinations including DOPE, DOPC, DOTAP and Ceramide DiI stained lipids. As shown in figure 1, comparing to a commercial Lipofectamine® 2000, some of the liposomes presented lower toxicity and better transfection efficiency. Using a combination of previous stained plasmids (labeled with rhodamine or FITC), we used FCCS to quantitatively control the load of these genes into liposomes (figure 2). Our data shows that, not only our lipoplexes preparation had better results as delivery tool for human somatic cells but also the use of FCCS to visualize the properly formation of lipoplex[2] could be use in further applications for pharmaceuticals industry and also on nanomedicine field.

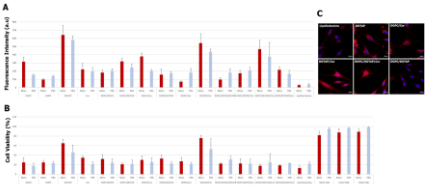

Figure 1 – Cell viability and transfection efficiency analysis: A) DiI fluorescent intensity analysis on microplate reader (549/650 nm); B) PrestoBlue assay and C) Immunofluorescence images of nucleous (DAPI, blue) and liposomes stained with DiI (red).

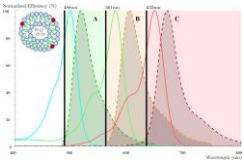

Figure 2 – Illustration showing the three colors to be analyzed at FFCS: liposome stained with DiI (561 nm), different plasmids stained with Rhodamine (633 nm) and FITC (488 nm).

References

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