

Light enhances endosomal escape and DNA delivery

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In May 2016, European Commission approved the world's first gene therapy treatment for children: Strimvelis, which fixes faulty genes those cause severe combined immunodeficiency (ADA-SCID). In fact, effective gene therapy relies on high efficacy of delivering exogenous genes. Liposomes are used in constructing gene and drug delivery systems, widely applied into biomedical fields including gene therapy and chemotherapy. In this work¹ we designed a kind of light-triggered liposomes, which encapsulated a clinically used photosensitiser (verteporfin, VP) and antisense DNA fragments. This smart complexes system can be responsive to a short time of light exposure, which were employed to silence a specific gene participating in regulations of neurite growth and gene delivery in cancer cells. The light-induced enhancing efficacy of gene delivery was then assessed. Additionally, we demonstrated this light-enhanced manner for gene delivery at subcellular level, particularly carried out the quantitative analysis of colocalization between DNA and endo/lysosomes. This light-triggered process offered a facile and effective platform for nonviral gene delivery, which can also be developed as a promising strategy for efficient gene therapy by carrying other therapeutic siRNA or DNA.

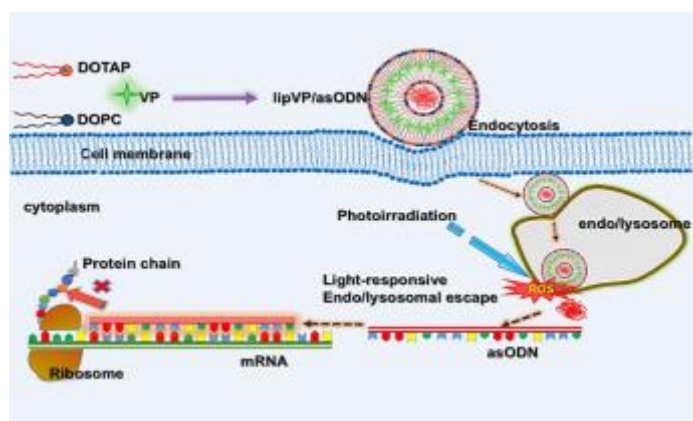


Figure 1: Scheme of light-responsive liposomes used for gene silencing

References

¹ Chen, W., Deng, W., & Goldys, E. M. (2017). Light-Triggerable Liposomes for Enhanced Endolysosomal Escape and Gene Silencing in PC12 Cells. *Molecular Therapy-Nucleic Acids*, 7, 366-377.

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