

Photo-transfection of mammalian cells via femtosecond laser pulses

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Various methods including chemical, viral or physical approaches have been developed to trigger transient membrane permeabilisation with limited cytotoxicity in cells. Such developments permit efficient cytoplasmic delivery of genes, fluorochromes, antibodies etc. which are essential for research in subject areas such as genetics, cell biology and clinical therapy. Genetic species can be exclusively introduced and subsequently expressed in live mammalian cells via optical systems, a technique presently referred to as photo-transfection. Localised application of femtosecond (fs) laser pulses onto the cell membrane induces transient submicrometer holes, thereby facilitating cytosolic uptake of extracellular exogenous materials.