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Optical delivery of anti-HIV-1 drugs into CD+ cells through a diffraction limited femtosecond laser beam spot

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Abstract content
   (Max 300 words)

In cell biology, cytoplasmic expression of genetic materials and other macromolecules has a crucial role in medicine and biology. Essential applications involve delivery of a wide selection of potentially therapeutic agents e.g. proteins, oligonucleotides, ribonucleic acid, and deoxyribonucleic acid. For example, the delivery of antisense oligonucleotides and ribozymes to HIV-1 infected cells by antibody-targeted liposomes, certain cationic lipid formulations and pH sensitive liposomes has been reported to result in significant anti-HIV-1 activity. Various methods including chemical, cationic polymers and lipids, viral, or physical approaches have been developed to promote uptake of foreign genes, drugs and other macromolecules into living mammalian cells. However, each of these delivery systems harbours limitations. For both in vitro as well as in vivo procedures a drug delivery scheme possessing minimum cytotoxicity, which can be applied under sterile tissue culture protocols and can offer targeted treatment of a large number of individual cells is highly desirable. Optical translocation (drug delivery) techniques using femtosecond (fs) laser light sources satisfies these criteria. Additional benefits are that optical translocation setups are non-invasive and can be easily integrated with other optical techniques such as confocal laser scanning microscopy and optical tweezers systems. In this work, we investigate the possibility of targeted optical drug delivery within populations of TZM-bl cells. Thus, opening the future prospect of coupling this optical translocation methodology with endoscopes for in vivo applications, that could lead to a possibility of treating HIV-1 within human lymph nodes administered via optical fibers.

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Yes

Level for award
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Hons.

Main supervisor (name and email)
and his / her institution

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Would you like to
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No

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