decades. A wide array of available electroporators and electrodes available today require careful evaluation and optimization for different applications. The process can be demanding and involves the use of large number laboratory animals for preclinical testing. Objectives: We have adopted the use of a skin explant model to optimize the delivery of plasmid DNA using intradermal injections followed by electroporation.

Methods: Skin explants were obtained from mice, non-human primates collected post-mortem from marmosets euthanized in unrelated trials, or humans represented by aborted material after cosmetic operations, Skin explants were cultured in a humidified CO_2 incubator for up to 72 hours. The explants were injected intradermally with a DNA plasmid encoding a near-infrared fluorescent reporter protein (iRFP670). The explanted skin was immediately electroporated using either a 2-needle, multi-needle array, plate or fork-plate electrode utilizing varying pulse voltages (50V, 75V, 100V) and pulse polarities (+/-, +/+) (BEX Ltd, Japan). Expression of the DNA construct was monitored daily using a Spectrum CT device (Perkin Elmer) to quantify the fluorescence generated by iRFP670. At the end of the culturing period crawl-out cells emigrating from the tissue were collected, counted and evaluated for cell type and the efficacy of direct transfection/reporter expression using flow cytometry.

Results: Injection of the fluorescent reporter with subsequent electroporation resulted in observable expression indicated by up to 16-fold increase of baseline fluorescence intensity 3 days post immunization. Efficiency of DNA delivery/reporter expression was evaluated by the detected fluorescence and depended on the type of electrode, voltage and amount of DNA used. Fifteen micrograms or less resulted in fluorescence levels similar to the background regardless of the electrodes, parameters or species used. A dose of 30 μg DNA was sufficient to quantify the signal with good precision. As low is 300 ng of the reporter protein could be detected in the skin, and also *in vivo*, in injected animals, starting from 24 h post injection of 30 μg of the reporter gene. Using this amount, we observed the highest expression levels when electroporating with fork-plate electrode, followed by plate, multi-needle and 2-needle. Driving pulses of 70–70 volts were optimal for efficient expression and induced low levels of tissue damage. Too low (50V) voltage did not yield considerable expression. High voltage (>100V) supported similar expression levels to those after 75V electroporation, but resulted in more tissue trauma. Delivery of the driving pulses of the same (+/+) versus alterating (+/-) polarity demonstrated no enhancement of reporter expression due to electric field alterations. Methodology has been applied for optimization of delivery of immunotherapeuticals based in plasmids encoding drug-resistant HIV-1 enzymes, for prevention of drug resistance in HIV-1/AIDS.

Conclusions: The skin explant model seems to be a promising alternative to animal preclinical and even human testing of delivery of gene therapeuticals and genetic vaccines. Gene delivery can be significantly enhanced by optimized electroporation. Skin model allows such optimization. It is easy to work with, provides quick feedback of delivery efficiency when using a reporter gene, and considerably reduces the number of animals required for optimization of gene delivery. Study was in part supported by Russian Science Foundation 15-15-30039, and Thematic partnership of the Swedish institute grant 09272/2013.

Role of gut microbiota in microbial translocation: in HIV-infected patients

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Bacterial components, passed to the bloodstream from the gut as a result of microbial translocation, is known to induce immune hyperactivation causing progression of HIV infection. However, the pathogenesis of this process is not fully understood.

Hypothesis. Qualitative and quantitative gut microbiota abnormalities lead to intensification of microbial translocation.

Objective. To estimate the impact of intestinal flora abnormalities on concentration of serum markers of the microbial translocation in HIV infected patients, and compare these values with the clinical data.

Materials and methods. A cross-sectional study will be carried out in 120 ARV-naive HIV-positive subjects at different stages of the disease.

Gas chromatography mass spectrometry will be used to evaluate microbiota of small and large intestine. To assess colon bacterial population stool cultures for potential pathogens also will be done. Microbial translocation will be analyzed through serum levels detection of endotoxin, 16s ribosomal DNA and soluble CD14.

The data obtained will be compared with the clinical and laboratory characteristics.

Expected Results. The findings extend the understanding of the gut microbiota's role in microbial translocation mechanisms in HIV-infected individuals. Furthermore, research forms basis for pathogenetic correction of some gastrointestinal symptoms and disease progression.

Co-infection of the human placenta and problem of the mother-to-child transmission of HIV A

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Background: The mother-to-child transmission of HIV in the absence of any interventions transmission rates range from 15–45%. This rate can be reduced to levels