Nikhil's Thesis - Popular scientific description

The term "Electroporation" is defined as use of high voltage short pulses to overcome the barrier of the cell membrane. The term "transfection" is defined as the delivery of genes DNA or RNA into Eukaryotic cells. The goal of transfection is to express the particular genes into host cell. The efficiency of gene transfer in rat skeletal muscle can be enhanced by electroporation following plasmid DNA injection. However, the transfection efficiency cannot be much improved with plasmid DNA injection followed by electroporation.

In the present study, we investigated how transfection efficiency can be optimized by changing different parameters, such as: number of injections, vector concentrations and hyaluronidase concentration. We delivered a plasmid that expresses green florescent protein (GFP), to the skeletal muscle (Tibialis anterior) of rats (transfection) and measured the quantity of GFP protein through Western blotting analysis. After transfection with the help of electroporation technique a long-term expression of GFP protein in skeletal muscle was achieved.

The result of testing the number of injections showed that the increase of GFP expression is possible by increasing injections, 7 injections is more effective and gives high GFP expression. In addition, the vector concentrations could have an important consideration for increasing the GFP expression; we have tested different vector concentrations and the data obtained indicates that the 1 μg/μl vector amounts give high GFP expression. Finally, we tested hyaluronidase amount, 0.7 U/μl dose amount give the optimum expression. This data could likely be applied for other DNA transfers and animal studies. *In vivo* DNA transfer with electroporation is an efficient method for testing the different vectors over the muscle