

Project Title: Lipid Nanoparticles for the Delivery of mRNA Therapeutics

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Description:

Delivery of oligonucleotides, such as DNA, siRNA, and mRNA, is one of the most active areas of research. Oligonucleotides face multiple delivery challenges: degradation by omnipresent nucleases, reaching the desired target organ, and crossing biological membranes to reach the right intracellular target organs. The challenges can be overcome by the use of a vector such as viruses that have evolved as highly efficient nucleotides vectors over millions of years. However, injecting viruses into patients is a safety risk.

The laboratory of Professor Robert Langer is one of the leading groups in the world for the development of non-viral vectors for the delivery of oligonucleotides. We are using lipid nanoparticles for the delivery of mRNA and siRNA. A first application that will be published in 2016 is the use of lipid nanoparticles for the delivery of mRNA vaccines for cancer immunotherapy. In 2016, we will also explore applications in the area of protein replacement therapy.

We will have a number of opportunities for master-thesis or internships in the aforementioned areas. Please contact me directly if you have any questions or apply directly by submitting a CV including two references of past project supervisors.