Suman Alishetty, PhD

Research Assistant Professor, Department of Bioengineering

Education
PhD, Chemistry, National Tsing Hua University

Key Interests

Vaccines | Lipids | Organic Chemistry | Synthetic Methodology | mRNA Delivery | Semiconductors | Polymers

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SELECT PUBLICATIONS

> Chandrasekaran, R. *et al*. (2022). UDP-glucose dehydrogenase (UGDH) Activity is suppressed by peroxide and promoted by PDGF in fibroblast-like synoviocytes: Evidence of a redox control mechanism. *PLOS ONE*, 17(9), e0274420.

> Petruncio, G. *et al*. (2021). Skipped dienes in natural product synthesis. *Natural Product Reports*, 38(12), 2187-2213.

> Carrasco, M. J. *et al*. (2021). Ionization and structural properties of mRNA lipid nanoparticles influence expression in intramuscular and intravascular administration. *Communications Biology*, 4(1).

> Buschmann, M. D. *et al*. (2021). Nanomaterial delivery systems for mRNA vaccines. *Vaccines*, 9(1), 65.

Research Focus

My research involves the design of novel lipid nanoparticles (LNPs) in a multidisciplinary effort to develop mRNA delivery systems. Applications of this technology include improved mRNA-based vaccines consisting of mRNAs encapsulated within LNPs that encode the target antigen. Key techniques we use include chemical synthesis of novel lipids, conjugation chemistry, chemical modification methods, and chemical analysis of polymers, lipids, and conjugates related to nucleic acid delivery systems. I collaborate with structural and physical chemists for design, fabrication, and characterization of the LNPs as well as with molecular biologists for cell and animal characterizations of LNP performance.

Current Projects

- Designing, synthesizing, and characterizing novel ionizable lipids, which are formulated into LNPs for carrying nucleic acid payloads

- The design and execution of experiments to evaluate and characterize novel LNP formulations and manufacturing processes in support of diverse therapeutic modalities including (but not limited to) mRNA-based therapeutics

- Collaborating with molecular biologists at the University of Pennsylvania for cell and animal characterization of LNP performance screening studies

- Collaborating with researchers at the National Institutes of Standards and Technology for structural characterization of new LNPs