Docket #: S20-175

Optimized Synthesis of RNA-based Therapeutic Candidates

Stanford researchers have developed improved methods for producing mRNAs. Efficient, robust and high fidelity production of mRNAs is critical for obtaining pharmaceutical quality vaccines, viruses and expression constructs, and for eliminating noise due to batch variation. The researchers optimized conditions for efficient RNA synthesis, capping and poly(A)-tailing and identified the best parameters for high quality, uniform mRNA production. This is essential for expression in cells after delivery of RNA into cultured cells. They also created modular mRNA designs that allow testing of rationally and computationally designed 5'UTRs, coding regions, and 3'UTRs for optimal protein expression. In addition, synthetic barcodes that uniquely identify each design enable high-throughput sequencing readouts of tens of thousands of different designs in a single screen for selection of optimal candidate RNAs in downstream mRNA translation and stability assays.

Applications

- Development of RNA based-therapeutics
- Development of mRNA vaccines
- Development of COVID-19 mRNA vaccines

Advantages

- Supports efficient, robust and high fidelity production of mRNA
- Enables large scale RNA-based screens for modularly designed sequence candidates

Patents

- Published Application: WO2022015513
- Published Application: 20220135964
- Issued: 11,739,317 (USA)

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