Docket #: S20-258

Chemical Additive Reduces Cost of Manufacturing mRNA

Stanford researchers have discovered that ribonucleoside vanadyl complexes can be used as an additive in transcription reactions resulting in ~2-fold increased yield. Currently, manufacturing industrial-scale mRNA (e.g., for vaccines) is very expensive, in part because most of these manufacturers rely on costly T7 RNA polymerase as the enzyme for mRNA synthesis. Using low concentrations (0.1 mM) of ribonucleoside vanadyl complexes as enhancers, the researchers were able to obtain superior yields of RNA. As it is extremely cheap to purchase ($0.000086/20 ul reaction), *the use of this additive could effectively cut the cost of manufacturing mRNA in half.* Moreover, it is an RNase inhibitor that *specifically enhances* T7 RNA polymerase kinetics. It does not alter the kinetics of other tested RNA polymerases.

This technology is part of a portfolio of innovations aimed at fighting the COVID-19 pandemic.

Explore a portfolio of RNA vaccine technologies and tools:

Stanford docket S20-224 - Algorithm for Maximizing mRNA Thermodynamic Stability
Stanford docket S20-183: https://techfinder.stanford.edu/technology/mrna-vaccines-methods-synthesis-and-stability-assessment

Applications

- Industrial-scale mRNA manufacturing (e.g., mRNA vaccines)
- COVID-19 vaccine manufacturing

Advantages

- Superior yields ~ 2X

- Dramatically reduces manufacturing costs
- Specifically enhances T7 RNA polymerase kinetics

Patents

- Published Application: WO2022015768
- Published Application: 20230272465

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