Docket #: S20-279

A Three Component Vaccine for Covid-19

Stanford researchers have designed a vaccine for COVID-19 that induces isotype switched neutralizing antibody responses. The vaccine is comprised of three parts: a mRNA encoding the soluble version of the Receptor Binding Domain (RBD) of SARS-CoV-2 Spike protein, a TLR9 agonist (CpG) and Charge Altering Releasable Transporters (CARTs). RBD mRNA and TLR9 agonist are delivered to cells in living animals using CARTs to efficiently formulate nanoparticles around the components. In vivo data demonstrates that the three-component vaccine induces robust anti-RBD immunoglobulin response.

Related technology: Stanford Docket S16-157: "CART – a transfection delivery system for efficient intracellular mRNA delivery"

Stage of Research

- in vivo

Applications

- **COVID-19 vaccine**
- Other viral vaccines

Advantages

- **mRNA vaccine with TLR9 agonists**
- Easily adapted to other viruses by swapping protein
- CART tailors bioavailability to lungs, other organs or systems

Publications

- Ole A.W. Haabeth, Julian J.K. Lohmeyer, Adrienne Sallets, Timothy R. Blake, Idit Sagiv-Barfi, Debra K. Czerwinski, Blaine McCarthy, Abigail E. Powell, Paul A. Wender, Robert M. Waymouth, Ronald Levy, An mRNA SARS-CoV-2 vaccine employing Charge-Altering Releasable Transporters with a TLR-9 agonist induces neutralizing antibodies and T cell memory bioRxiv 2021.04.14.439891;

Patents

- Published Application: WO2022020810
- Published Application: 20240148858

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