Potential new COVID-19 immunotherapy could protect the vulnerable

March 22 2022

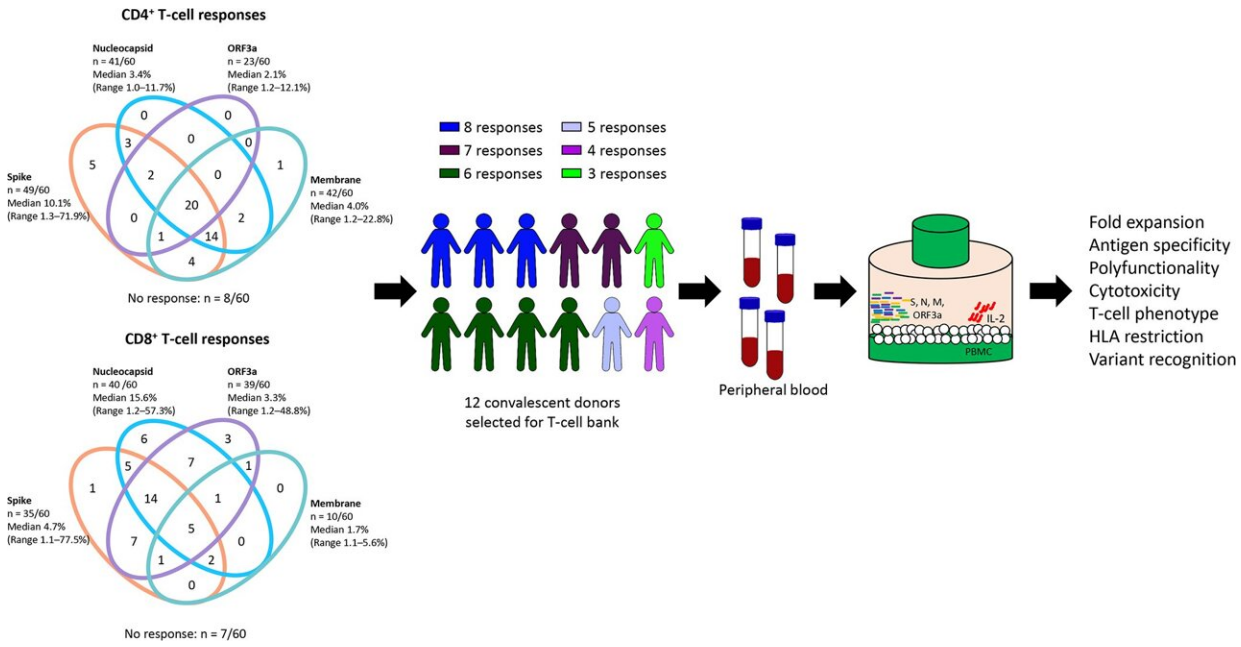

Fig 1. Schematic representation of donor selection and generation of SARS-CoV-2-specific T cells for T-cell therapy. Donors for T-cell expansion were selected from a cohort of 60 SARS-CoV-2-convalescent individuals whose cells had been screened for reactivity to SARS-CoV-2 antigens using an intracellular cytokine assay. Venn diagrams represent the number of donors generating a combination of antigen-specific responses by $CD4^+$ or $CD8^+$ T cells. Donors selected for T-cell expansion showed a minimum of three antigen-specific responses in $CD4^+$ and/or $CD8^+$ T cells. PBMC from each donor were stimulated with a single mixture of N, S, M and ORF3a overlapping peptide pools then cultured in G-Rex culture vessels for 2 weeks in the presence of IL-2. Cultured T cells were then assessed for a range of standard T-cell attributes. Credit: *PLOS Pathogens* (2022). DOI: 10.1371/journal.ppat.1010339

Queensland research is providing new hope to immunocompromised people who are vulnerable to COVID-19. Scientists from QIMR Berghofer have discovered promising evidence that T cell immunotherapy could help them to fight against multiple strains of the virus.

Lead researcher, Professor Corey Smith said while vaccination is very effective against COVID-19, it may not be enough for immunocompromised people who are at greater risk of getting sick and dying. "This study gives us hope that we can develop a T cell-based immunotherapy capable of treating multiple COVID-19 variants in the sickest patients," Professor Smith said.

T cells are white blood cells that specialize in killing infected cells, and there's emerging evidence that they play an important role in protecting against COVID-19.

Researchers hope to take T cells from blood donors who have recovered from COVID-19, and train them in the lab to recognize and attack the virus in vulnerable patients. The study shows they can generate T cells capable of recognizing COVID-19 from a relatively small cohort of donors. "We had 60 volunteers in Queensland generously donate their blood after recovering from COVID-19 so we could better understand immune responses to the virus and potentially develop a life-saving immunotherapy," Professor Smith said.

"We learned that from a small number of COVID-exposed blood donors we can quite easily generate a bank of T cells that provide broad population coverage and can potentially target multiple virus variants. While more research is needed, we believe these findings offer critical proof-of-concept that T cell immunotherapy may help

immunocompromised patients fight COVID-19."

The T cells were generated in QIMR Berghofer's cell therapy manufacturing facility, Q-Gen Cell Therapeutics.
Professor Smith hopes his team will be able to start studying the therapy's safety in coming months, ahead of broader clinical trials assessing its efficacy.

If the therapy proves successful, T cells could be matched to recipients and delivered via infusion to immunocompromised patients at risk of severe COVID, such as organ transplant recipients and cancer patients receiving chemotherapy. "It won't replace vaccination, but T cell immunotherapy could potentially offer another treatment option to select patients in niche settings," Professor Smith said.

The study has been published in the journal *PLOS Pathogens*.

More information: Archana Panikkar et al, SARS-CoV-2-specific T cells generated for adoptive immunotherapy are capable of recognizing multiple SARS-CoV-2 variants, *PLOS Pathogens* (2022). DOI: 10.1371/journal.ppat.1010339

Provided by QIMR Berghofer Medical Research Institute