**Plan for Outreach to Underserved Communities**

DISC2COVID19-11838 #2

**Biomaterial vaccine to enhance the formation of SARS-CoV-2-specific T memory stem cells**

The objective of this discovery project is to develop an injectable biomaterial platform that can induce T memory stem cells (TMSCs) and boost immunoactivation to vaccines against SARS-CoV-2, which will help protect the elderly population and many others who have deficiency in generating TMSCs for long-term immunity. One of the major tasks is to investigate the effect of our drug delivery platform on the induction of TMSCs from human donors. We will ensure that the human donors have a diversity in age, gender, race and ethnicity, etc. If time and funding allow, we will increase the sample size in these experiments to include more samples of underserved populations.

This project will take place at UCLA, which includes studies and patients drawn from UCLA-Ronald Reagan Medical Center and UCLA-Santa Monica Hospital. Our collaborating institutions in a variety of clinical and translational efforts in COVID-19 include Cedars-Sinai Medical Center, Charles R. Drew University of Medicine and Science and the Los Angeles Biomedical Institute at Harbor UCLA Medical Center. Together, our institutions bring biomedical innovations to bear on the greatest health needs of Los Angeles—the largest and one of the most ethnically, socially and economically diverse counties in the United States. To promote diversity and inclusion, we have analyzed the database of COVID+ specimens in our biospecimen and data repository that will provide the materials for these T-cell studies. Our findings show that our community and our approach offer the possibility to address underserved communities and underrepresented minorities (Table 1, unpublished data).

The diversity of varied HLA types that coevolve with ancestry allow for the exciting possibility of testing the induction of SARS-CoV-2 specific T cells in these subjects. In addition, we plan to propose a supplement for our application with the specific goal of developing artificial APCs endowed by these specific HLA types. We will characterize their performance from T cells obtained from the same donors. HLA types will be specifically imputed from genotyping chip data, which is separately being collected for every COVID+ subject at UCLA.

**Table 1: Demographics of COVID-19 patient groups. (*) indicates a statistically significant association ($p<0.05$) between the demographic and the patient group, compared to the preceding patient group (one column to the right).**

| | Demographic | Severe (64) | Inpatient (196) | COVID-19 positive (881) | Tested (20,872) |
|---|---|---|---|---|---|
| Age Group | < 18 years | 1 (1%) | 4 (2%) | 20 (2%) * | 1236 (5%) |
| | 19-25 years | 0 (0%) | 2 (1%) * | 56 (6%) | 1143 (5%) |
| | 26-55 years | 26 (40%) * | 56 (28%) * | 482 (54%) * | 10,231 (49%) |
| | 56-65 years | 12 (18%) | 33 (16%) | 140 (15%) | 3462 (16%) |
| | > 65 years | 25 (39%) * | 101 (51%) * | 183 (20%) | 4800 (22%) |
| Sex | Female | 26 (40%) | 82 (41%) * | 452 (51%) * | 11,694 (56%) |
| | Male | 38 (59%) | 114 (58%) * | 428 (48%) * | 9171 (43%) |
| Race | White or Caucasian | 25 (39%) | 99 (50%) * | 392 (44%) * | 11,218 (53%) |
| | Asian | 7 (10%) | 19 (9%) | 68 (7%) | 2011 (9%) |
| | Black or African American | 10 (15%) | 19 (9%) | 68 (7%) | 1493 (7%) |
| | American Indian or Alaska Native | 0 (0%) | 0 (0%) | 4 (0%) | 70 (0%) |
| | Native Hawaiian or Other Pacific Islander | 0 (0%) | 0 (0%) | 0 (0%) | 43 (0%) |
| | Other Race | 19 (29%) | 56 (28%) * | 194 (22%) * | 3631 (17%) |
| | Unknown Race | 3 (4%) | 3 (1%) | 155 (17%) | 2406 (11%) |
| Ethnicity | Hispanic or Latino | 22 (34%) | 60 (30%) * | 209 (23%) * | 3415 (16%) |
| | Not Hispanic or Latino | 39 (60%) | 131 (66%) * | 528 (59%) * | 14,988 (71%) |
| | Unknown Ethnicity | 3 (4%) | 5 (2%) | 144 (16%) | 2469 (11%) |