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“Early Antibody Responses to SARS CoV-2 Infection in Non-Human Primates”

The widespread detrimental effects of the COVID-19 pandemic caused by SARS CoV-2 virus has made investigating the pathogenesis of infection and development of therapeutics a pressing matter. Currently, antibody responses following COVID-19 infection are poorly understood. An increased understanding of antibody responses following infection may reveal implications for serological testing in early stages of COVID-19 infection. Non-human primate (NHP) models for COVID-19 are needed to characterize virus-specific immune responses under controlled conditions. This project will assess the earliest primary serum antibody responses that are generated in NHP after infection with the SARS CoV-2 virus. Six Indian rhesus macaques will be inoculated with 2×10^6 infectious units of SARS CoV-2 by a combination of three routes: intranasal, intratracheal, and intraocular. Serum samples will be collected before infection and, at intervals, between days 7 through 14 after infection. To measure antibodies present in these samples, a Luminex-based multiplex assay will be developed by covalently attaching SARS CoV-2 envelope and nucleocapsid proteins to Bioplex beads that contain different combinations of infrared dyes. Monoclonal antibodies and human COVID-19 convalescent serum will be used to confirm integrity of proteins after conjugation to beads. This customized multiplex assay will be used to measure IgM, IgG and IgA antibodies in serum of the infected macaques. The results can then be compared to those obtained in humans with COVID-19 to validate this NHP model of SARS CoV-2 infection which will be invaluable for the development of treatment or preventative measures for COVID-19. Analysis of primary immune responses after infection with SARS CoV-2 virus will also allow for better guidance in the diagnosis of COVID-19.