

PALADINS: PROTECTIVE APPROACHES LEVERAGING AD-APTIVE AND IN-NATE SYSTEMS

Designing Studies For The Collection And Analysis Of Saliva Samples From Pre-symptomatic Individuals

Joshua Dye Darwin Biosciences, Inc. **Stephen Clark** Darwin Biosciences, Inc. **Camille Paige** Darwin Biosciences, Inc. **Jordan Hoffman** Darwin Biosciences, Inc. **LCDR Paul C.F. Graf** Naval Medical Research Unit SIX **LCDR Michael Zundel** Naval Health Research Center **Roger Pan** Naval Health Research Center **Anne Fraser** Naval Health Research Center **Caroline Balagot** Naval Health Research Center **Nicholas Meyerson** Darwin Biosciences, Inc. **Rebecca Blackwood** Darwin Biosciences, Inc. **Amy Emerman** Darwin Biosciences, Inc. **Philip Fox** Darwin Biosciences, Inc. **Hannah Folk** Naval Health Research Center
Erin Hansen Naval Health Research Center

The COVID-19 pandemic highlighted the need to detect if an individual is infected and potentially contagious before the onset of symptoms. This problem is broadly applicable to other infectious diseases, many of which are commonly found amongst military populations and exacerbated by the confined situations in which warfighters often live and work. The ability to identify warfighters who are pre-symptomatic but potentially still contagious for infectious disease can prevent transmission chains from occurring and improve the overall health of a unit. Screening tools are needed to identify pre-symptomatic individuals, and ideally such tools should be pathogen agnostic to respond to emerging threats, enable routine screening through use of a non-invasive biospecimen, and identify people who are in the earliest stages of infection.

In this study, we aim to discover host biomarkers that are upregulated shortly after infection and before the onset of symptoms. Such a study requires the challenging task of collecting samples from infected individuals before they know they are sick. To enable collection of samples from pre-symptomatic individuals, we've initiated two studies: A contact tracing study for sample collection from close contacts of an index case, and daily collections from populations with high prevalence of infection. Here we describe the design of these studies for the collection of saliva samples, a promising, non-invasive biospecimen for routine screening.

We previously identified a set of RNA biomarkers that are upregulated in response to a broad panel of pathogens (viral, bacterial, and fungal), and are therefore ideal candidates for agnostic detection of infectious disease. We optimized an RT-qPCR panel to specifically measure the expression of a selection of these biomarkers that will be used to analyze saliva samples collected during our human studies. By studying these transcripts in saliva samples collected prior to symptom onset, we aim to uncover a minimum set of RNA biomarkers that will identify pre-symptomatic infections in a sensitive and specific manner. Such a discovery would empower warfighters to implement early interventions and prevent further spread of disease.

This work was supported by the Chem-Bio Diagnostics program contract MCDC-2016-004 from the Department of Defense Chemical and Biological Defense program through the Defense Threat Reduction Agency (DTRA).