BROAD-SPECTRUM THERAPEUTICS FOR VIRAL DISEASES: A MEDICAL COUNTERMEASURE PLATFORM FOR EMERGING THREATS

Developing Affinity Reagents For Novel Diagnostic Assays

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The global pandemic highlighted the key role played by antibodies as an effective therapeutic and diagnostic assay reagent. Antibody selection against highly antigenic protein targets such as the spike protein of the SARS CoV2 is a relatively well established technique. However, a novel approach incorporating non-protein targets (e.g. conserved lipids of pathogenic bacteria presented in novel systems such as nanolipid discs) would enhance the utility of therapeutic antibodies identified using in vitro selection. Moreover, a suite of antibody formats (e.g. single chain antibody – fluorescent protein chimera) are needed to validate binding specificity and affinity of the selected antibodies. The novel cascade assembly binding assay (CABS) uses antibodies that recognize orthogonal epitopes would enhance the diagnostic potential in addition to the therapeutic value.

In this presentation/poster, we will discuss details of our in vitro antibody selection pipeline that produced nineteen orthogonal antibody pairs against SARS CoV2. Various antibody formats and assays developed for validation using antibodies specific to external and internal domains of influenza A will also be highlighted. Using the CABS technique and extending it to non-protein antibodies (e.g. conserved lipids of Yersenia pestis), we aim to develop novel therapeutic and diagnostic antibodies to emerging viral diseases. The approach described could be extended to toxin detection utilizing non-traditional affinity reagents such as peptides and/or protein domains selected from a library or developed using artificial intelligence/machine learning (AI/ML) techniques.