

INNOVATING CROSS-DOMAIN SOLUTIONS TO DETECT EMERGING BIOLOGICAL THREATS

Progress In Developing Symbas - Synthetic Molecular Binding Agents To Replace Monoclonal Antibodies In Diagnostic Tests

Christian Schafmeister ThirdLaw Molecular LLC **Justin Northrup** ThirdLaw Molecular LLC **Thomas Paniak** ThirdLaw Molecular LLC **Jesse Wiener** ThirdLaw Molecular LLC **Julia Leonard** ThirdLaw Molecular LLC **Denise Andrade** ThirdLaw Molecular LLC **Donald Bernsteel** ThirdLaw Molecular LLC **Eugeney Bichenkov** Temple University **Alla Arzumanyan** Temple University **Jacqueline Hines** SenSanna

We will describe our progress in developing Spiroligomer molecule-based SYnthetic Molecular Binding Agents to replace monoclonal antibodies in lateral flow assay diagnostic tests and to develop new surface acoustic wave-based diagnostic tests. We describe the development of three DNA-encoded libraries of SYMBAs formed by linking three and four Spiroligomer building blocks to create macromolecules that bind protein surfaces like antibodies do. The most recent DEL-SYMBAs library contains 4.5 billion members. We will describe the screening of this library against viruses, proteins, and small molecule targets and the work we have done to identify hit SYMBAs, validate them, and then incorporate them into diagnostic tests. Spiroligomer based SYMBAs are made with synthetic chemistry, and they will have indefinite shelf life because they cannot unfold like fragile monoclonal antibodies do. Spiroligomer molecules are highly preorganized synthetic molecules formed from cyclic monomers that are connected through pairs of amide bonds to create ladder molecules that do not fold but display protein binding functional groups in well-defined three-dimensional arrangements.

This research was funded by the Department of Defense, Defense Threat Reduction Agency (W15QKN209C004). This research was, in part, funded by the U.S. Government. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressed or implied, of the U.S. Government.