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High Throughput Flow Cytometry for Drug Discovery and Repurposing

Larry A. Sklar (PhD, Physical Chemistry, Stanford), Distinguished Professor Emeritus/founding director University of New Mexico Center Molecular Discovery, has >450 publications and patents in biotechnology, drug discovery and repurposing. With Bruce Edwards and Fritz Kuckuck he invented the HyperCyt high throughput flow cytometry platform and co-founded the Albuquerque startup company IntelliCyt. His inventions contributed to several startup companies and clinical trials. IntelliCyt's acquisition by Sartorius represented a commercialization landmark for UNM. Recent leadership roles included UNM Chemical Biology Consortium Center for the NExT Program; NIH's Illuminating the Druggable Genome; Drug Repurposing Network for the UNM Clinical and Translational Science Center; Cancer Therapeutics Program/Budke and Anderson Chair in Cancer Drug Discovery for UNM Comprehensive Cancer Center, and board member Cures Within Reach. Awards include: at UNM, 53rd Annual Research Lecturer, Innovation Fellow (2011), Presidential Award of Distinction (2016); and National Academy of Inventors (2020).

Abstract: We introduced high throughput flow cytometry (HyperCyt) as a technology for drug discovery, patenting applications of the technology. While the academic mission has traditionally involved research and education it now spans technological innovation, discovery, translation and commercialization. The high throughput flow cytometry platform for drug discovery has been associated with multi-target screening for both cellular and molecular targets such as efflux transporters, integrins, GPCRs, and GTPases, as well as protein-protein, and DNA-protein interactions. These have been accompanied by repurposing screens in association with the NIH Molecular Libraries Program, the UNM Comprehensive Cancer Center, and the UNM Clinical and Translational Science Center through the Drug Repurposing Network. Kinetic measurements in flow cytometry have provided insight into small molecule mechanism of action. Experimental and computational methods have led to the identification of small molecules as first in class chemical probes, leads for drug discovery, and repurposed drugs. These molecules and technologies have been described in several hundred publications and more than 40 patents, and have contributed to several

clinical trials and start-up companies. We have conducted discovery studies in neurological, cardiovascular and infectious diseases as well as cancer that show promising results. We envision future repurposing contributions to personalized medicine. The technology is now commercially available worldwide, with additional applications in antibody discovery and immuno-oncology.