Robust and scalable single-molecule protein sequencing with fluorosequencing

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Abstract: The need to accurately survey proteins and their modifications with ever higher sensitivities, particularly in clinical settings with limited samples, is spurring development of new single molecule proteomics technologies. Here, we describe our optimization of one such highly parallelized single molecule peptide sequencing platform, fluorosequencing, which is based on determining the positional information of select amino acid types within peptides to enable their identification and quantification from a reference database. Substantial improvements included identifying fluorophores compatible with the sequencing chemistry, developing a practical solution to mitigate dye-dye interactions, and developing an end-to-end workflow for sample preparation and sequencing. We demonstrate by fluorosequencing peptides in mixtures and identifying a target neoantigen from a database of decoy MHC peptides, highlighting the potential of the technology for high sensitivity clinical applications.

Bio: Jagannath Swaminathan is Chief Technology officer and co-founder at Erisyon Inc, and affiliated scientist at the University of Texas- Austin. He received his PhD from the University of Texas-Austin in 2015, where he worked with Prof Edward Marcotte and developed fluorosequencing technology, a single molecule protein sequencing technology. He has continued the development of this project in his new role at Erisyon for the last five years, enabling applications in single molecule proteomics in the fields of immuno-oncology, neurology and basic research in phosphoproteomics. He is the PI on a number of grants from National Institute of Health, National Science Foundation and Michael J Fox Foundation. He is an inventor on 21 patent families spanning the field of single molecule protein sequencing.