

INTRODUCTION

Next-generation protein sequencing is a transformational tool for protein science to unlock new insights into the function of proteins in health and diseases. Quantum-Si's Platinum™ technology brings the insights of protein sequencing to every lab with a space-friendly benchtop instrument, a simple end-to-end workflow, and single-molecule resolution that enables detection of protein variants and modifications.

Herein, we employed Platinum to sequence and identify various interleukins, either recombinant or immunoprecipitated from human serum.

Interleukins play a critical role in cellular biology, particularly in the immune system. These cytokines act as messengers, facilitating communication and coordination between immune cells to regulate immune responses and maintain overall immune system homeostasis.

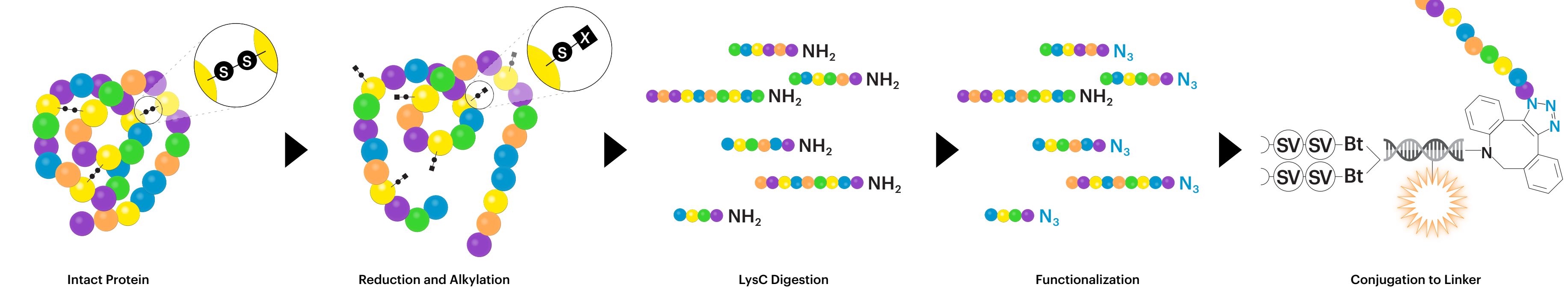
Results demonstrate that Platinum can be used to effectively identify various interleukins with single-molecule resolution in a simple workflow.



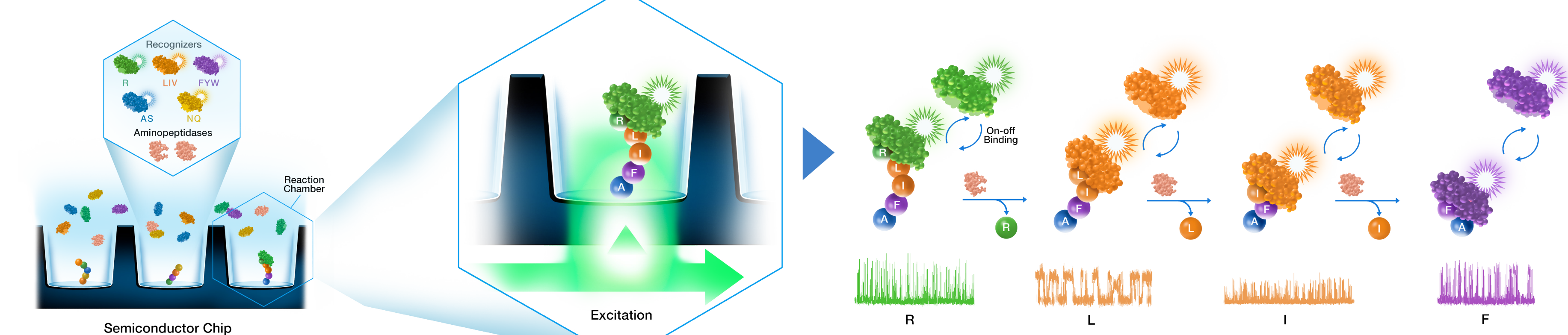
METHODS

- Proteins are reduced, alkylated, and digested with LysC.
- Peptides are functionalized, conjugated, and immobilized on the surface of a proprietary semiconductor chip.
- Fluorescently labeled N-terminal amino acid (NAA) recognizers and aminopeptidases are added to the semiconductor chip.
- Fluorescent intensity and duration of each NAA binding event generates a unique kinetic signature.
- Kinetic signatures are converted into amino acid calls to identify peptides and proteins.

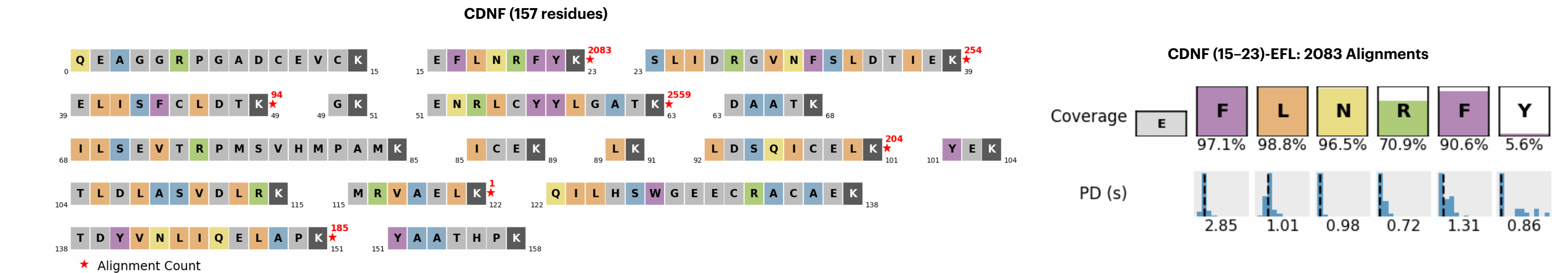
1. PREPARE



2. SEQUENCE



3. ANALYZE

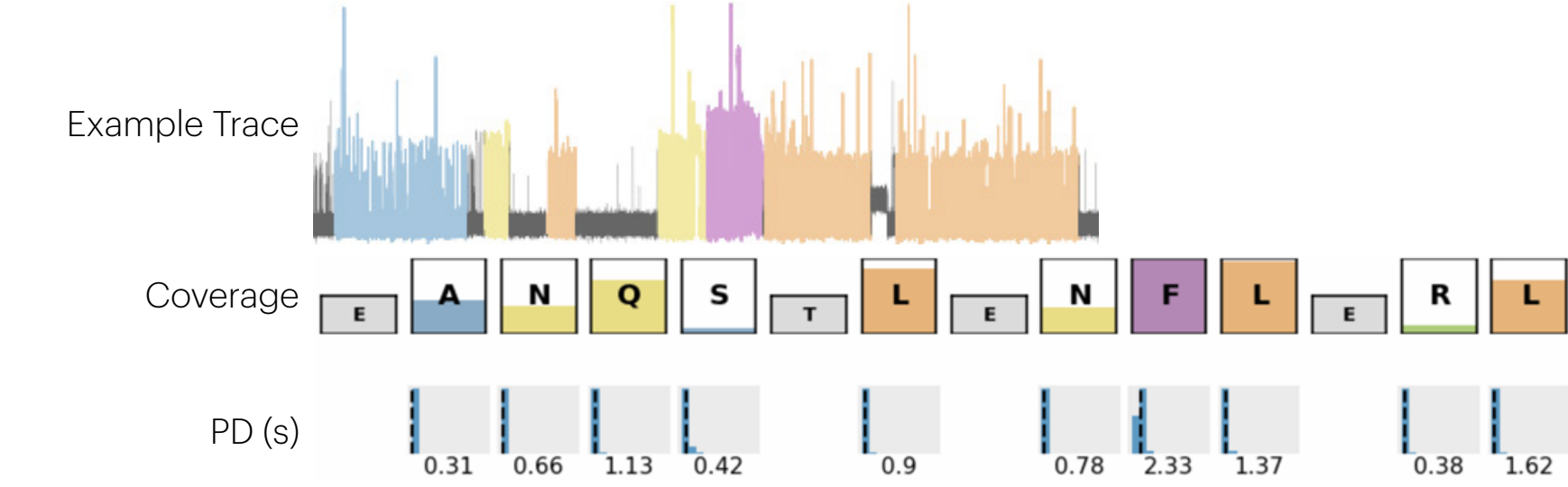


RESULTS

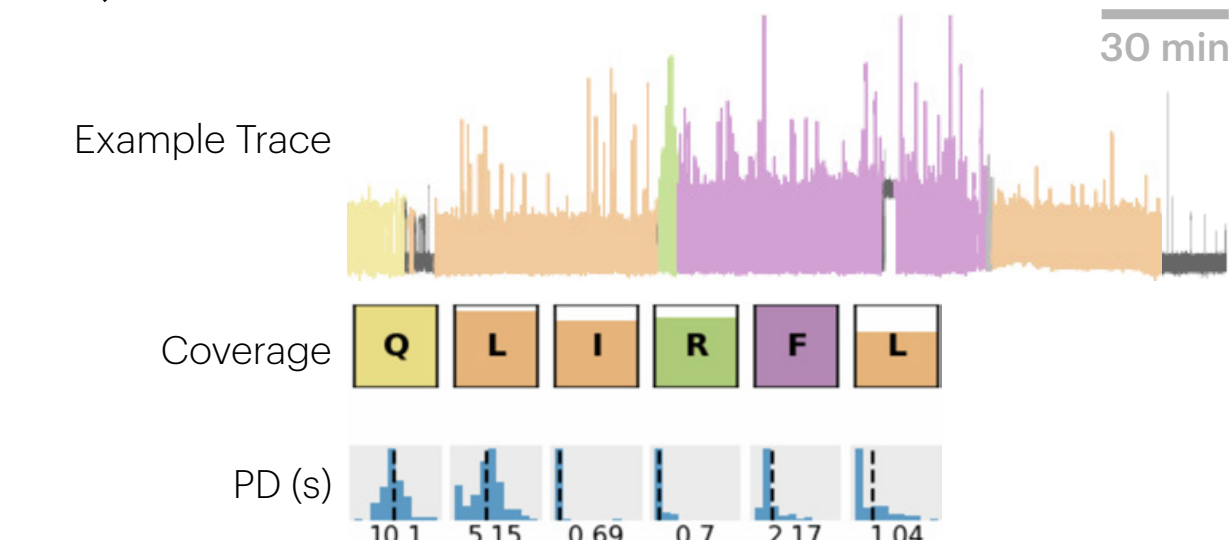
Interleukin Panel

IL-4

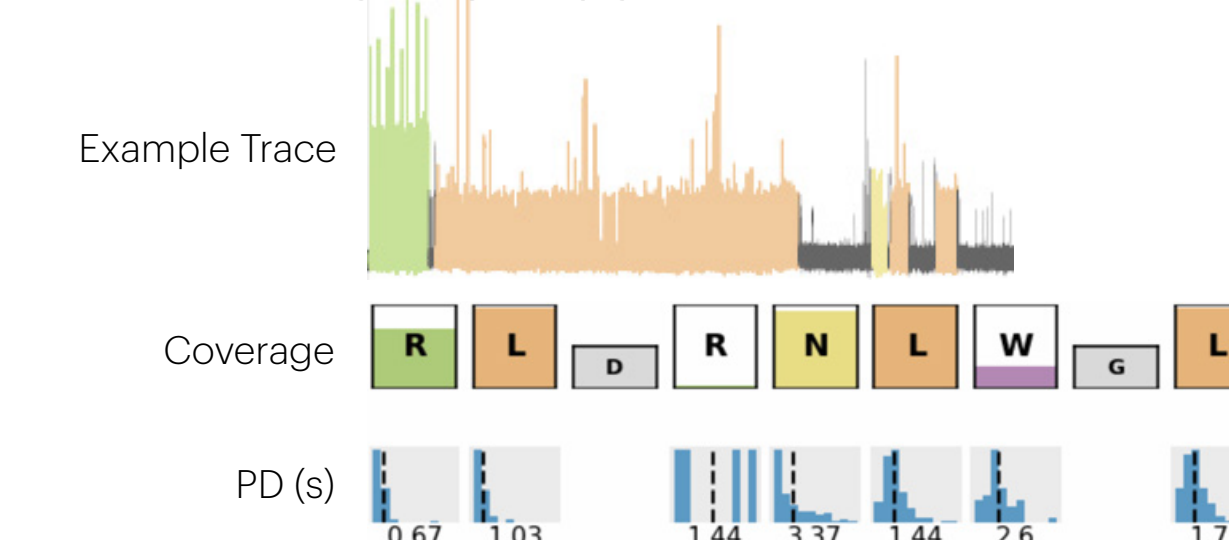
EAHQSTLENFLERLK



QLIRFLK

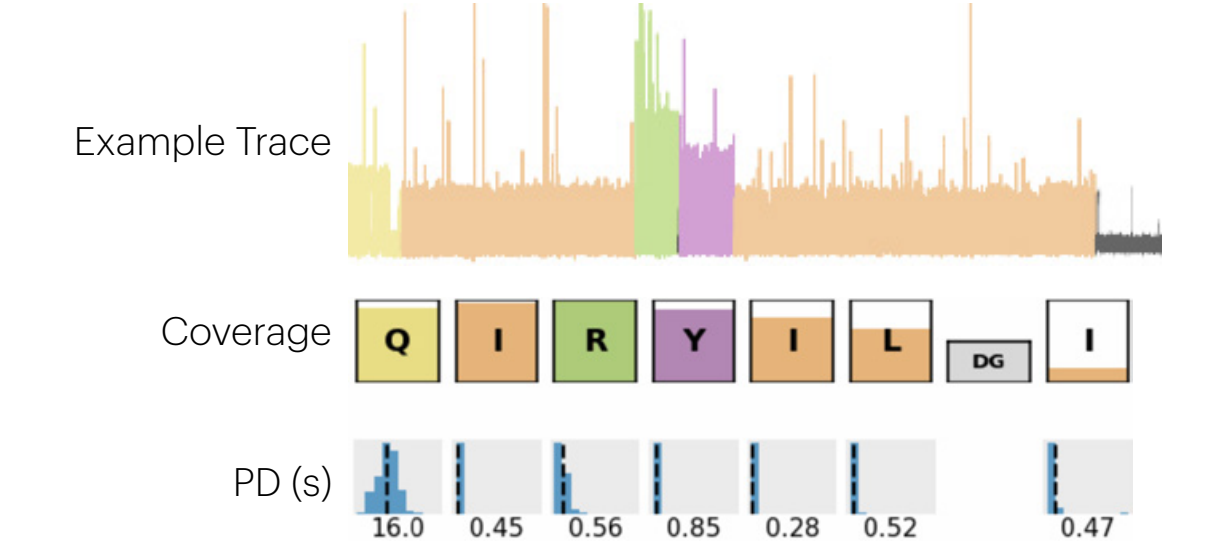


RLDRNLWGLAGLNSCPVK

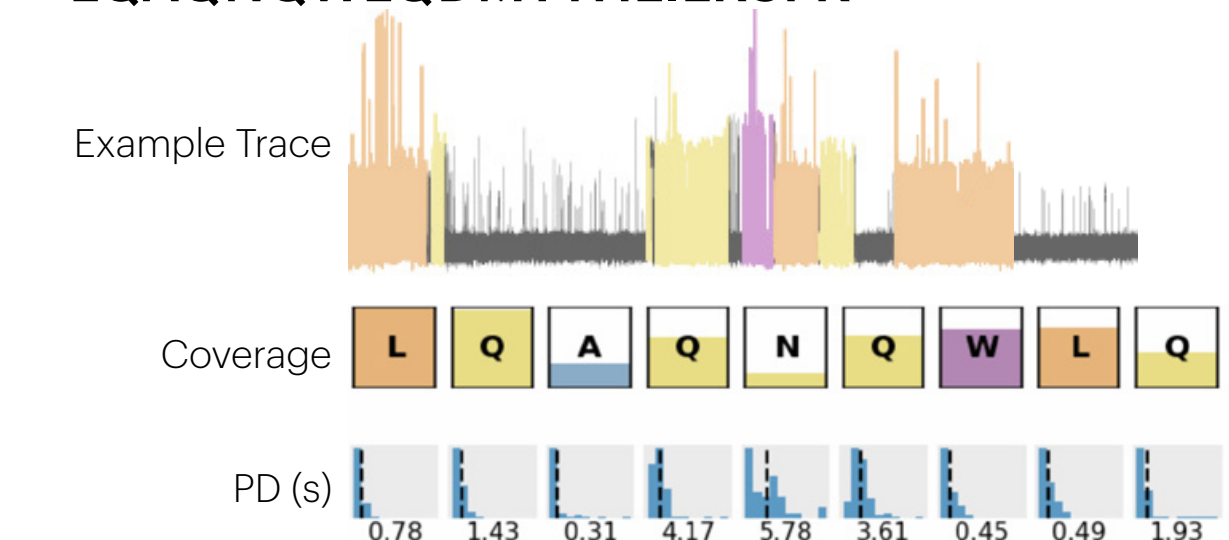


IL-6

QIRYILDGIALRK

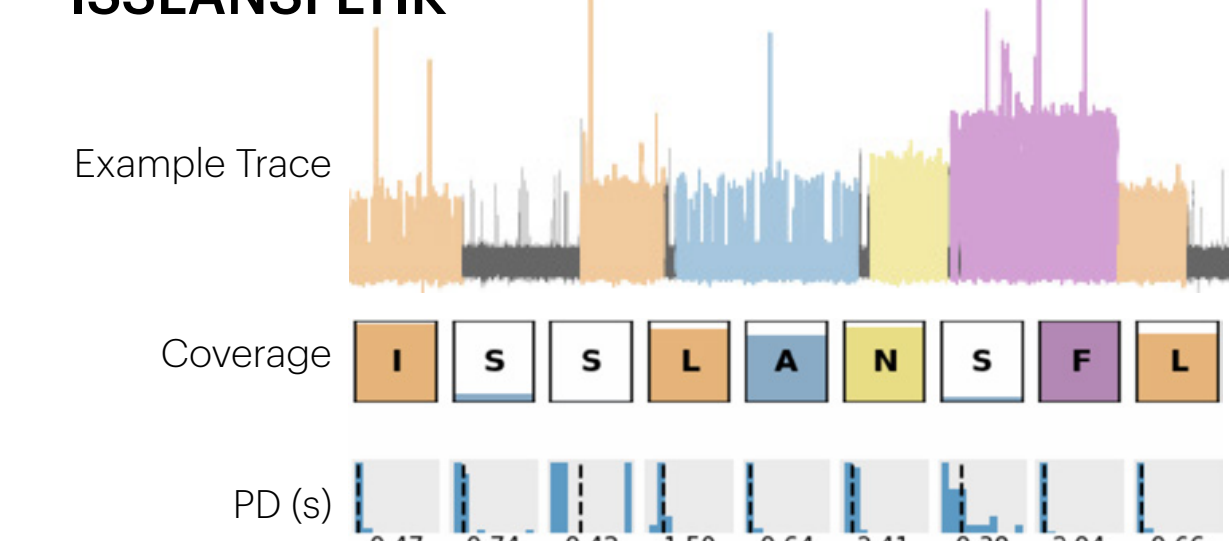


LQAQNWQLQDMTTHILRSFK



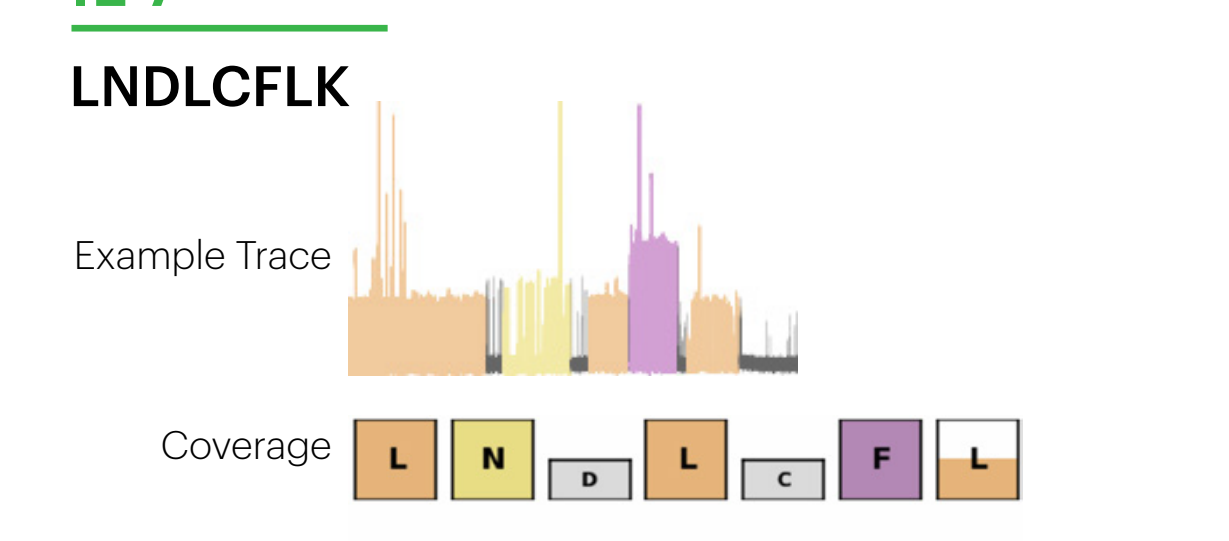
IL-20

ISSLANSLTIK



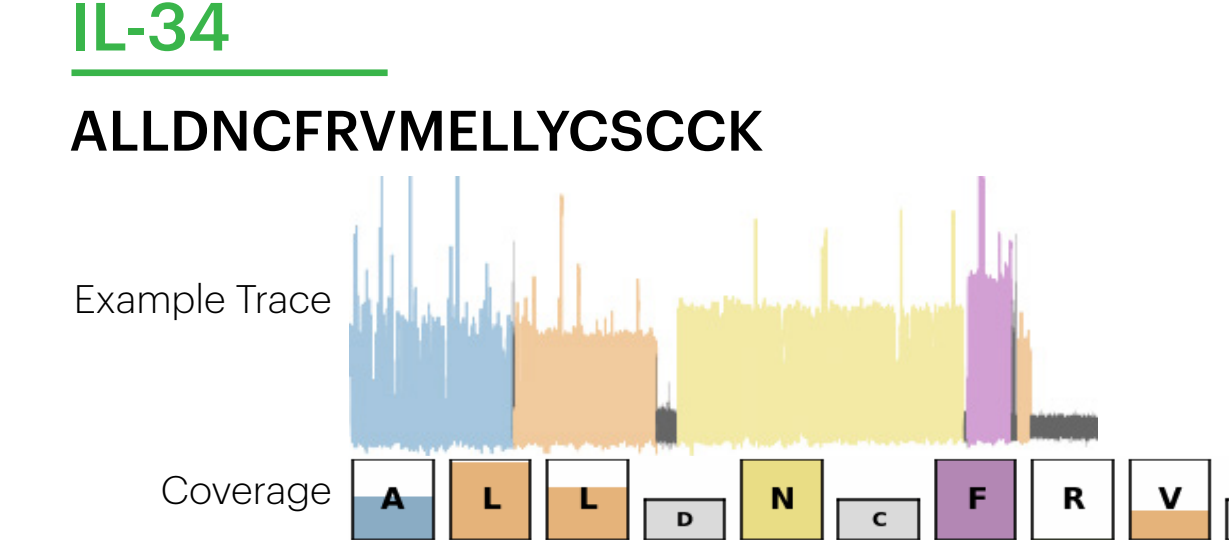
IL-7

LNDLCFLK



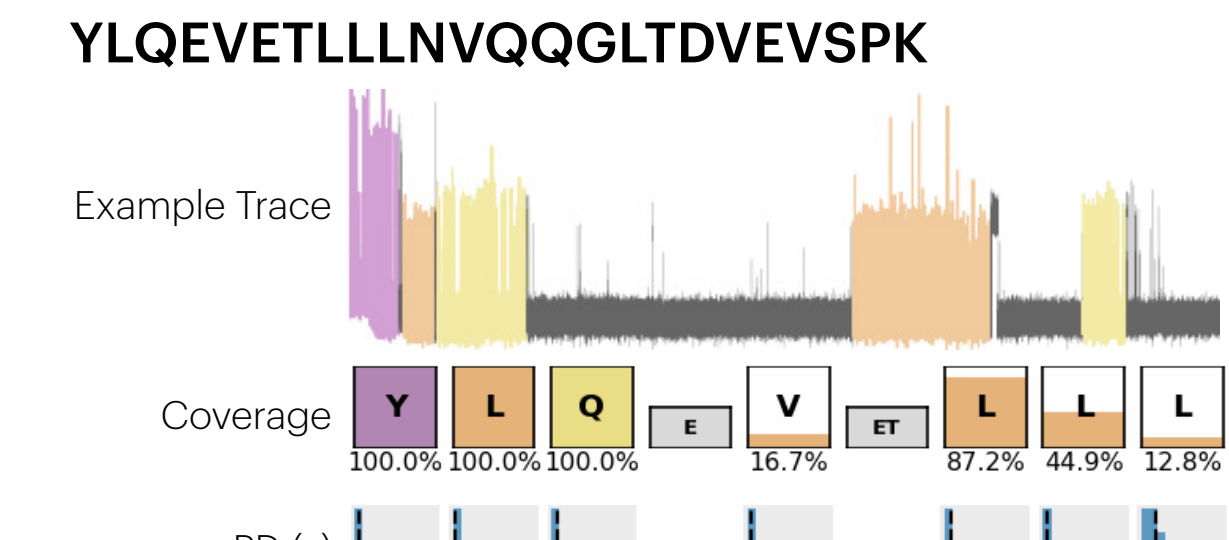
IL-13

IEVAQFVK



IL-34

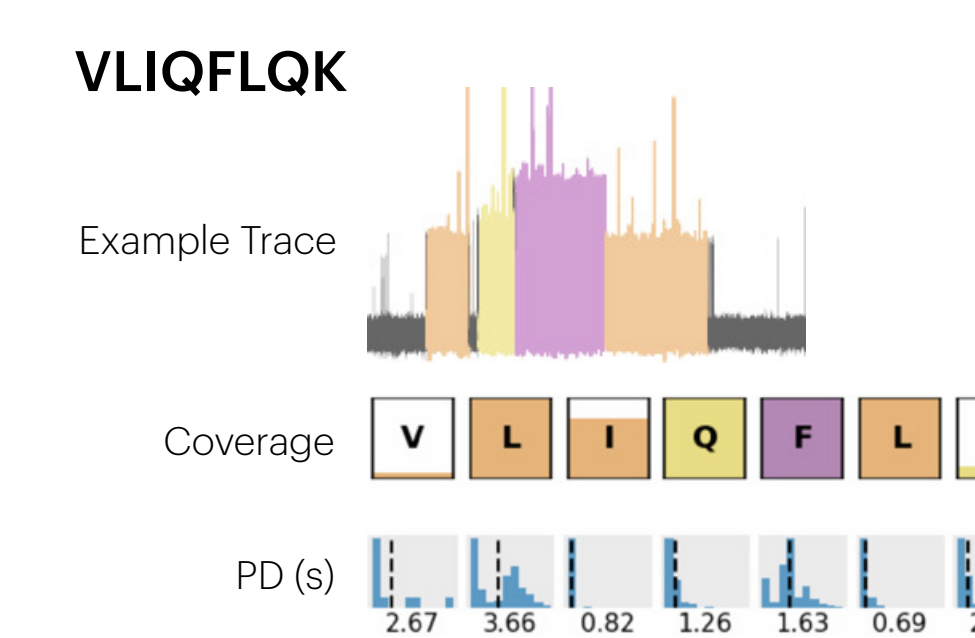
ALLDNCFRVMEILYCSCK



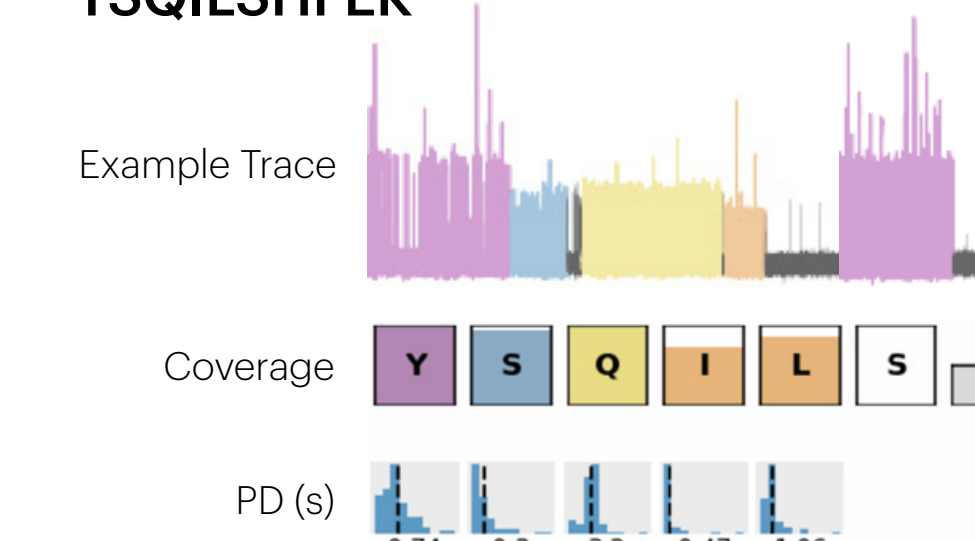
YLQEVETLLLNQVQGLTDEVSFK



VLIQFLQK

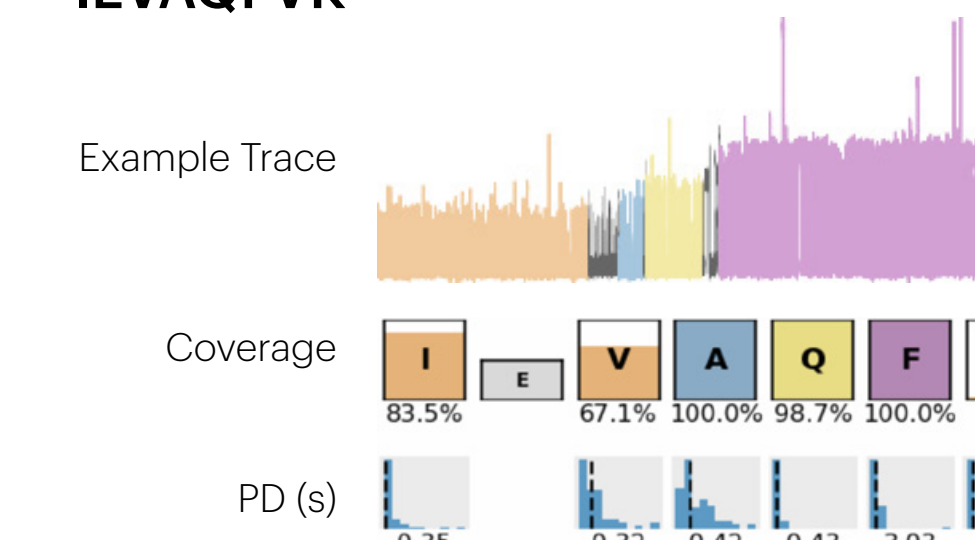


YSQILSHFEK

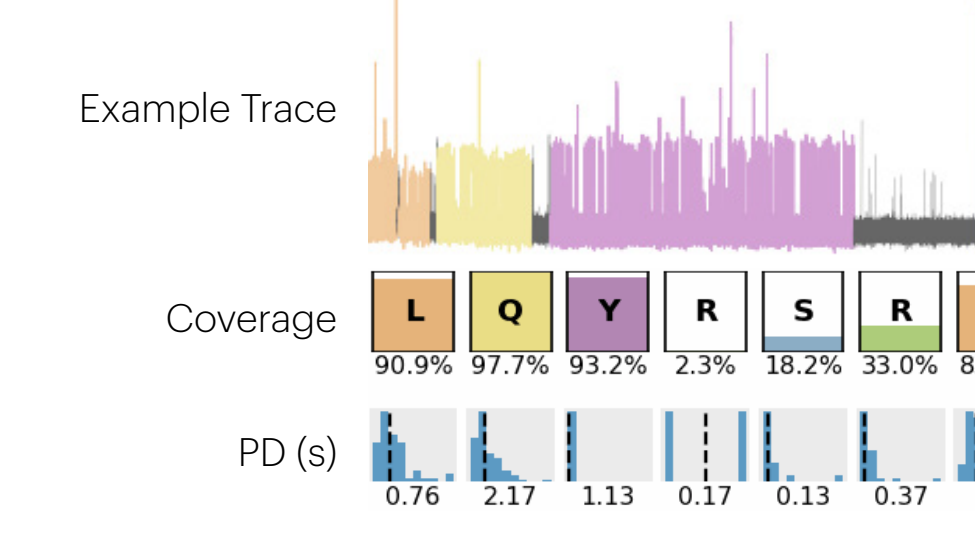


IL-13

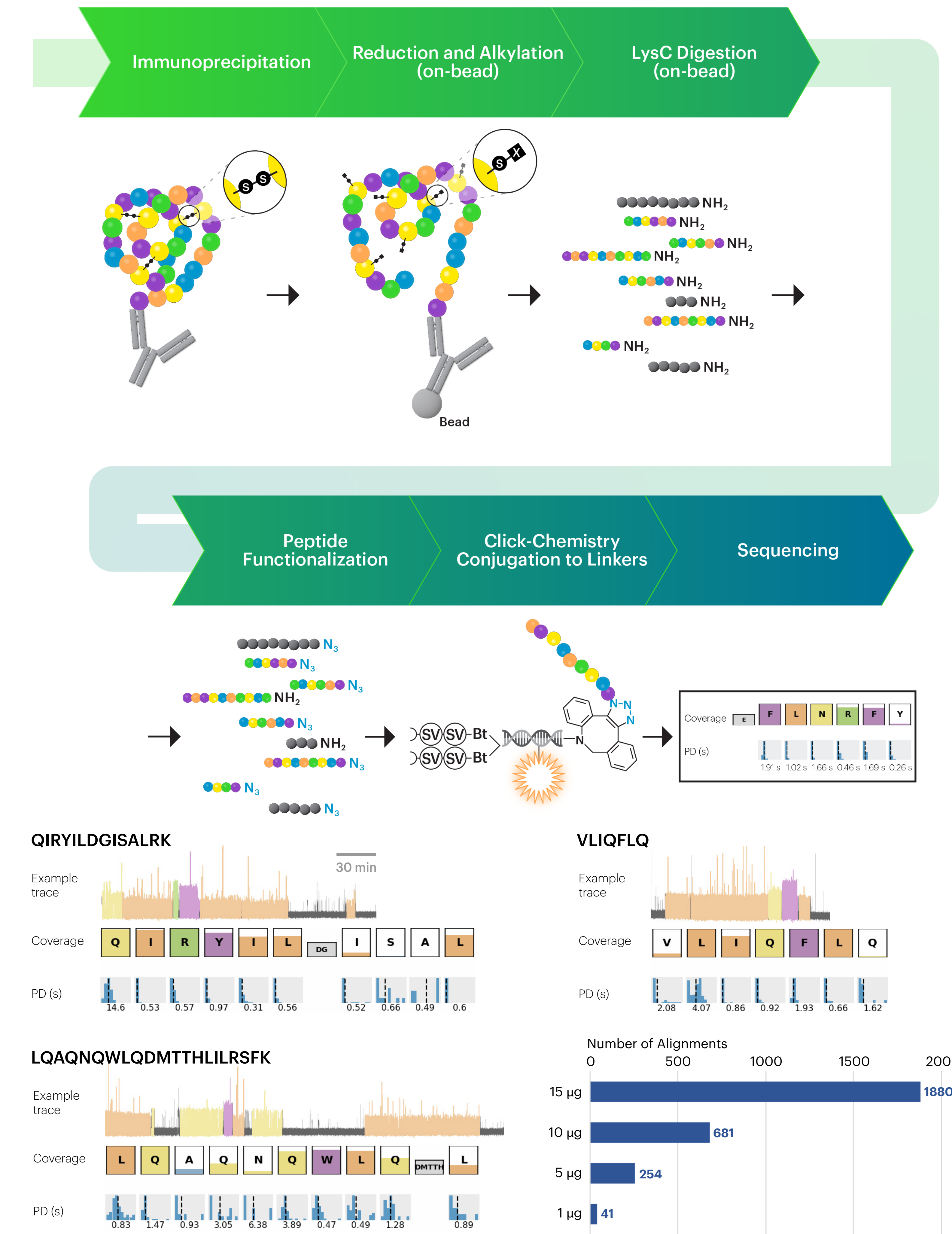
IEVAQFVK



LQYRSRLQYMK



IL-6 Immunoprecipitated from Human Serum



CONCLUSION

Quantum-Si's Platinum next-generation protein sequencing workflow provides insights into various proteins in the interleukin panel, including IL-4, IL-6, IL-7, IL-13, IL-20, and IL-34, with single-molecule resolution.

IL-6 immunoprecipitated from human serum was successfully sequenced with Platinum, showcasing the ability to enrich and sequence proteins from complex biofluids.

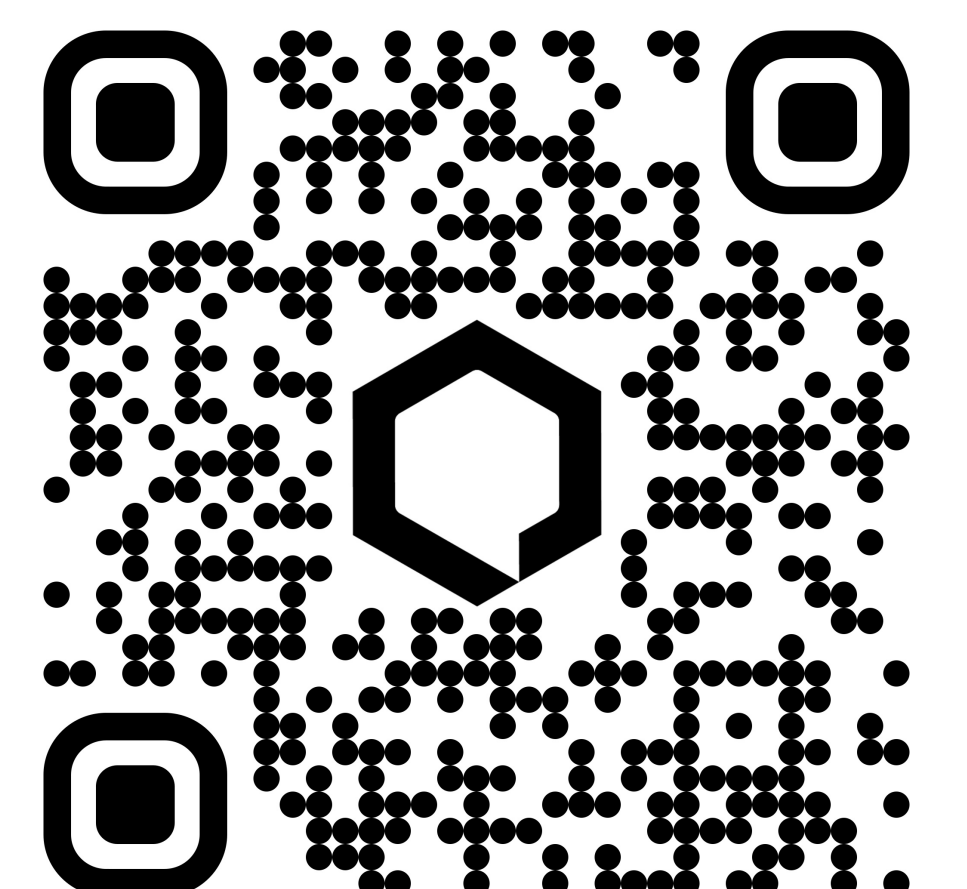
REFERENCE

Brian D. Reed et al, Science 2022, 378 (6166) 186–192.

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