Cross-platform analysis of multiplex protein assays in serum and plasma of cancer patients

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Abstract

Numerous commercial platforms exist for the simultaneous detection of multiple cytokines and associated proteins for biomarker analysis in cancer. However, due to the dynamic range of circulating plasma proteins, with an overabundance of certain proteins such as albumin and low abundance of immune factors, choosing a suitable platform and matrix for multiplex analysis can be challenging. Therefore, we set out to comprehensively evaluate the performance of two distinct platforms, the fluorescent bead based Luminex assay from Biorad and the proximity extension based assay from Olink in 545 cancer patient samples. The assessments were conducted in two independent cohorts of radiation oncology patients comprising of 369 serum and 176 plasma samples. We focused on four essential performance metrics: detectability, batch effects, reproducibility and correlations. Our results revealed that the Olink platform demonstrated an overall higher detectability, less batch effects and better correlation both among and across platforms than Luminex. In general, serum had a better detectability than plasma in both platforms. We observed a poor correlation in overlapping assays shared between the Olink and Luminex platforms, although common markers were similarly expressed across cancer types. Finally, we demonstrated high reproducibility between the Olink qPCR based “Target 96” platform and the new NGS based “Reveal” platform; with over 1000 protein targets. Our study provides valuable insights into the comparative performance of two independent assays for multiplex protein analysis, and paves the way in protein biomarker discovery in oncology and beyond.

Do you have any conflicts of interest?

No, I do not have a conflict of interest.