

Proximity ligation for visualization of protein-protein interactions in cancer cell signaling and early cancer detection through novel blood based biomarkers

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The *in situ* proximity ligation assay (*in situ* PLA) is a novel method for detecting protein-protein interactions in native fixed cells and tissue samples. The assay provides localized single molecule data visualized by fluorescence microscopy and quantified by objective counting. Target protein interaction pairs are bound by primary antibodies in a standard immunostaining reaction, and when bound within a few tens of nanometres distance of each other, an amplified single molecule DNA based reporter is generated. The amplification product of the reporter is visible as a bright spot and remains locally attached to the site of the interaction also revealing sub cellular localization.

A large number of cell signalling study examples will be presented showing the utility of the technology and how it can provide novel insights in cancer pathway behaviour. The ability to study protein-protein interactions *in situ* using co-incidence binding by pairs of primary target specific antibodies opens a new realm of biomarker opportunities based on activity of proteins rather than abundance.

Another incarnation of the PLA technology takes advantage of the protein to DNA conversion for use in multiplexed quantification of putative biomarkers in plasma samples. Data from multiplexed PLA in a colorectal cancer biomarker study will be presented detecting 75 proteins in 2 micro litres of plasma with 5 log linear range with sensitivities down to low femto Molar. A pilot study of 140 samples will be presented.

Biography

Dr. Fredriksson is the Chief Scientific Officer at Olink Bioscience (Uppsala, Sweden) and has been a key figure in inventing and developing the proximity ligation assay for protein detection. After obtaining his PhD in molecular medicine in 2002 at Uppsala University he spent four years at Stanford University implementing PLA into a sensitive high throughput cancer biomarker research tool. He is a co-founder and board member of Olink, focused on the commercialization of the *in situ* and *in solution* PLA technologies.