DEVELOPMENT OF AN INTEGRATED LUMINEX-HAMILTON PLATFORM FOR HIGH-THROUGHTPUT MULTIPLEXED IMMUNOASSAYS

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**Background and aim**

Implementation of Multiplex Immunoassays by using Luminex technology is a powerful tool to achieve high throughput (HT), sensitivity and specificity. The use of 384-well plates for sample preparation, reaction and reading, both further enhance the HT fashion of assays and allows to rely on advantages intrinsic to automation (respect to manual) of lab protocols, such as higher precision and accuracy. Nevertheless, sample preparation/processing in 384-well plates, that is extremely time-consuming and error susceptible, constitute the bottleneck of the workflow. Thus, an automated platform integrating xMAP instruments and Hamilton workstations was designed for rapid and effective handling of samples in 384-well plates.

**Methods**

In the vaccine research field, the antibody quantification is an important tool to evaluate the vaccine immunogenicity. The novel platform in our lab allows samples processing (preparation and analysis) within a continuous workflow, with final multiplex IgG quantification in each single well.

**Results**

Here we show structure and components of the automated platform that we set-up and optimized using an xMAP FLEXMAP 3D and an Hamilton STARPlus Workstation. Two automatic shakers and one cooler were also integrated in the platform, whose modularity ensure flexibility and effectiveness. The throughput of the automated method for IgG quantification is of 384 data points/run, but further improvements are continuously ongoing. Preliminary results of a 5-plex immunoassay showed that the process we set-up provide data with high accuracy and precision, both intra- and inter-assay.

**Conclusions**

We designed and developed an automated platform integrating Luminex and Hamilton instrumentation, demonstrating its effectiveness in managing, processing and analyzing a huge number of clinical samples with an automated 384-wells format and high data robustness. The multiplex fashion of Luminex technology allow to further boost the throughput of the process.