Ella Speeds Up the Transition of Pediatric Sepsis Biomarkers from Validation to the Clinic at the University of Toronto

“Ella allows us to rapidly quantify biomarkers from hundreds of cryopreserved samples and correlate them to specific outcomes. Now we’re ready to validate that what we identified in frozen plasma samples correlates to fresh blood samples taken at the point-of-care. Ella’s simplicity and reproducibility will allow us to reliably test samples across different sites, enhancing triage especially in remote locations of developing countries where access to trained healthcare professionals is unlikely.”

— Aleks Leligdowicz, M.D./Ph.D., Department of Medicine, University of Toronto

Getting to the bottom of sepsis patient outcomes

Aleks is a member of Dr. Kevin Kain’s research team at the University Health Network in the University of Toronto. The team’s focus is pediatric infectious disease management in resource-limited areas, especially in Africa. Aleks is an adult critical care medicine doctor interested in validating novel biomarkers of immune and endothelial activation that predict outcomes in severe infections, including sepsis.

Sepsis is a heterogeneous syndrome with non-specific clinical indicators that predict patient outcome. It’s unclear what causes one person to recover while another succumbs to the infection. Aleks’ main goal was to define targets for point-of-care diagnostics that would enhance triage and predict how a patient will respond to treatment in order to prevent early mortality.

Searching for the right solution

Aleks was validating biomarkers in frozen samples from hundreds of children to generate statistically powerful data. But traditional ELISAs needed a specific skill level to reliably test a large quantity of samples and didn’t offer the multiplexing capabilities needed to rapidly validate the biomarkers of interest.

In the future she ultimately saw the validated biomarkers being used at the point-of-care in remote clinics, the emergency department, hospital wards, or in the intensive care unit to reliably triage and manage patients. However, the diagnostic tool used had to accommodate small sample volumes obtained from pediatric patients, and needed to be fast and simple. The six- to eight-hour wait time for results with traditional ELISA wasn’t acceptable, especially when evaluating an acutely ill patient requiring immediate triage and management decisions.

Simple Plex meets present and future needs

Aleks ran cryopreserved samples from over 400 patients using Ella’s Simple Plex assays and Luminex™ assays side-by-side and found the data correlated. The multiplexing capabilities of Ella and one-hour time to results let her quickly validate her biomarkers and correlate them to specific outcomes. The dynamic range of the assay at both the higher and lower limits of detection was also greater than any other assays used in the past, so she was able to reliably run healthy and disease-state samples on the same cartridge without additional dilution to get quantitative data.

The data Aleks generated on Ella was also very reproducible. The built-in triplicate data points the assay offers per sample meant she didn’t need to run samples in duplicate like she did with other platforms, saving her sample which was critical given hers were precious pediatric blood draws. Most importantly, Ella’s simple load
samples, buffer and go workflow meant that even someone with limited laboratory skills could reliably test a lot of samples and still get great data.

**Gearing up for remote clinics**

The data from the initial stage of this epidemiologic study is in press in *PLoS One*. Aleks is currently a post-doctoral fellow at the University of California, San Francisco where she plans to prove the targets identified in the cryopreserved samples correlate with samples obtained from adults with early sepsis who are admitted to the intensive care unit.

Ella’s simple workflow is a great benefit since her group will be working in very remote settings in Africa where access to healthcare professionals with years of training and expertise isn’t the reality. Plus, the long cartridge half-life, robust assay, and easy instrument operation means they can be confident about data reproducibility between multiple Ella systems at different sites. So she’ll be able to confidently validate results obtained in healthcare facilities from around the world.

Ella helps Aleks continue her work doing translational research that impacts lives, and lets her combine the potentials of both basic science and clinical medicine in areas involving the management of severe infections. The time she saves with Simple Plex assays gives her more time to finish other experiments and hit the outdoors with her husband on their road bikes.

**A recent publication**