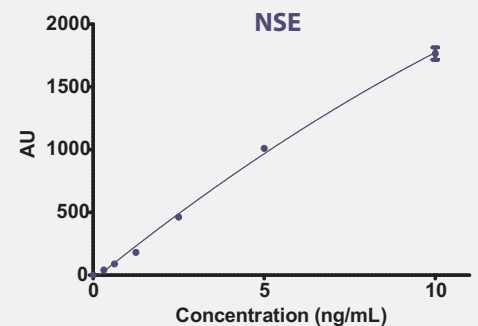
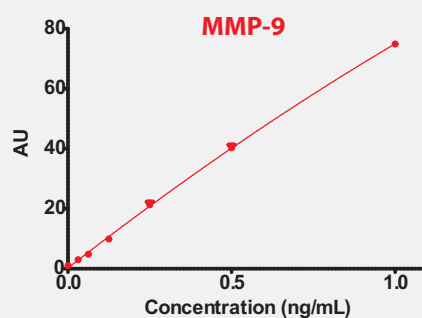
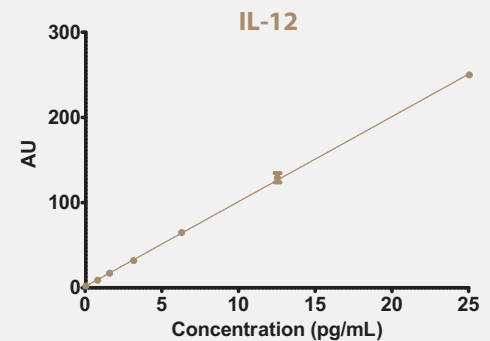
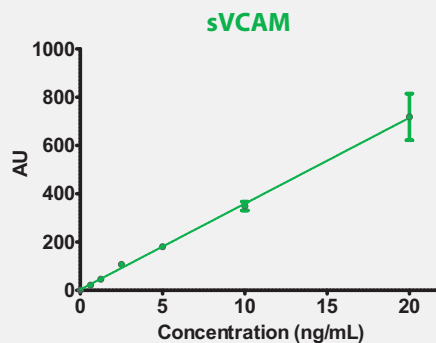


Analysis of Traumatic Brain Injury Biomarkers on the Zplex® System

The diagnosis of children brought to emergency departments for inflicted traumatic brain injuries (eg. shaken baby syndrome) is especially challenging due to the presence of nonspecific symptoms (eg. vomiting or fussiness) and caregivers who rarely provide an accurate history of the trauma. The clinical analysis of a specific set of biomarkers in the serum can potentially help in identifying a child with an inflicted Traumatic Brain Injury (iTBI) thereby enabling proper diagnosis and treatment. Using the Zplex® System and panelPlus™ multiplex technology, we have been able to analyze four candidate biomarkers implicated in iTBI (IL-12, sVCAM, MMP-9 and NSE)¹ with high sensitivity, low sample requirements and exceptional analysis speed needed for developing a future clinical diagnostic test for pediatric patients.

To quantify serum concentrations of IL-12, sVCAM, MMP-9 and NSE, calibration curves were generated using recombinant versions of each biomarker as calibrants. Capture antibodies for the four biomarkers were each conjugated with separate oligonucleotides using panelPlus™ Labeling Kits. The conjugates were then placed within a Zplex® System, which then automated the following process:

- 1) Hybridization of the capture antibody conjugates onto 4-plex TipChips™
- 2) Treatment with a mixture containing known concentrations of IL-12, sVCAM, MMP-9 and NSE, followed by biotinylated detector antibodies
- 3) Detection by chemilumescence using streptavidin-HRP and luminol, and then image captured by a built-in CCD camera



Highlights:

- The calibration curves demonstrate the sensitivity of the Zplex® System, detecting to levels as low as 0.78pg/mL for the biomarker IL-12, as well as broad dynamic range into the ng/mL levels for other biomarkers examined in the same assay
- High sensitivity of the assay allows for serum dilutions of between 10-100 fold in order to reduce background signals and ultra-low serum volumes necessary for pediatric applications (< 5µL)
- Fast assay times (eg. 1 hour)
- panelPlus™ technology enables customization of protein microarrays for the further assessment of additional biomarker candidates

¹R.P. Berger, S. Ta'asan, A. Rand, A. Lokshin, P. Kochanek; Pediatric Research, Vol 65, No. 1 (2009), pages 97-102



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SYSTEM

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