

Quantification of human IL-1 β using VICTOR Kira monochromator-based multimode plate reader.

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Introduction

Interleukin-1 beta (IL-1 β) is a pro-inflammatory cytokine involved in immune regulation, inflammation, and disease pathogenesis. Accurate measurement of IL-1 β is essential for immunology research and therapeutic studies. ELISA remains the gold standard for cytokine quantification due to its sensitivity and reproducibility. This application note demonstrates the performance of the VICTOR Kira™ multimode plate reader for human IL-1 β ELISA using the LEGEND MAX™ Human IL-1 β ELISA Kit (cat. no.: 437007)

The VICTOR Kira reader offers several advanced features that make it ideal for ELISA and other biochemical assays. Its monochromator-based optics covering a wavelength range of 230-1000 nm provide flexibility for precise wavelength selection. The instrument supports a high optical density (OD) range of up to 4.0, ensuring accurate readings even at saturation points. Low detection noise enhances sensitivity, while endpoint and kinetic reading modes allow for versatility in the assay. Additional features, such as plate shaking and temperature control, contribute to reproducibility and consistent assay performance.

VICTOR Kira monochromator-based multimode plate reader



Materials and methods

The LEGEND MAX Human IL-1β ELISA Kit (cat. no.: 437007) includes a pre-coated 96-well strip microplate, detection antibody (12 mL), human IL-1β standard, Avidin-HRP solution (12 mL), assay buffer, wash buffer (20X), substrate solution, stop solution, and plate sealers. The assay standard range is 2-125 pg/mL. The procedure involves adding standards and samples to pre-coated wells, incubating with a detection antibody and Avidin-HRP, then adding the substrate and stop solution. Absorbance was measured at 450 nm with a correction wavelength of 570 nm, using the VICTOR Kira multimode plate reader.



Figure 1: LEGEND MAX kit, BioLegend

Data analysis

Data analysis was performed using GraphPad Prism 10, which enabled nonlinear regression for curve fitting, calculation of R² values, and interpolation of unknown sample concentrations.

The 4PL curve fitting graph can also be plotted with the VICTOR Kira control software.

Results

The human IL-1β standard curve was generated using a four-parameter logistic (4PL) model on a log-log scale, yielding an excellent fit (R² = 0.99) and indicating strong agreement between observed and predicted values.

Two unknown samples were analyzed, yielding OD values of 0.740 and 0.770, corresponding to calculated concentrations of 30.38 pg/mL and 31.69 pg/mL, respectively. These results demonstrate accurate quantification within the assay’s dynamic range.

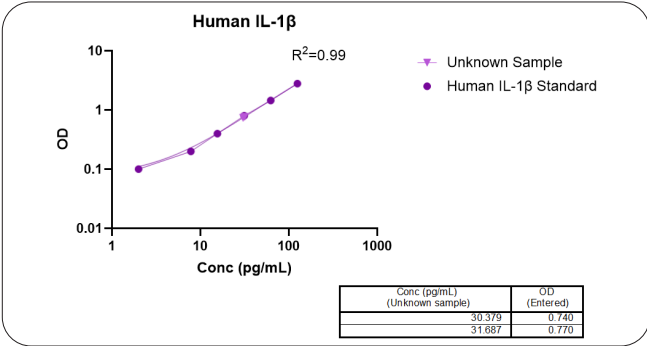


Figure 2: Human IL-1β ELISA standard curve

Conclusion

The VICTOR Kira reader delivered accurate detection across the full concentration range and demonstrated excellent reproducibility, aided by plate shaking and temperature control. Its monochromator optics allow dual-wavelength correction, which is essential for minimizing background interference. This study confirms the suitability of the VICTOR Kira multimode plate reader for ELISA assays. The measured dynamic range and assay linearity were in line with the LEGEND MAX Human IL-1β ELISA Kit manual.

