Enabling Fast, Reliable, and Accessible Protein Quantification with Redox Electrochemical Detection (RED)

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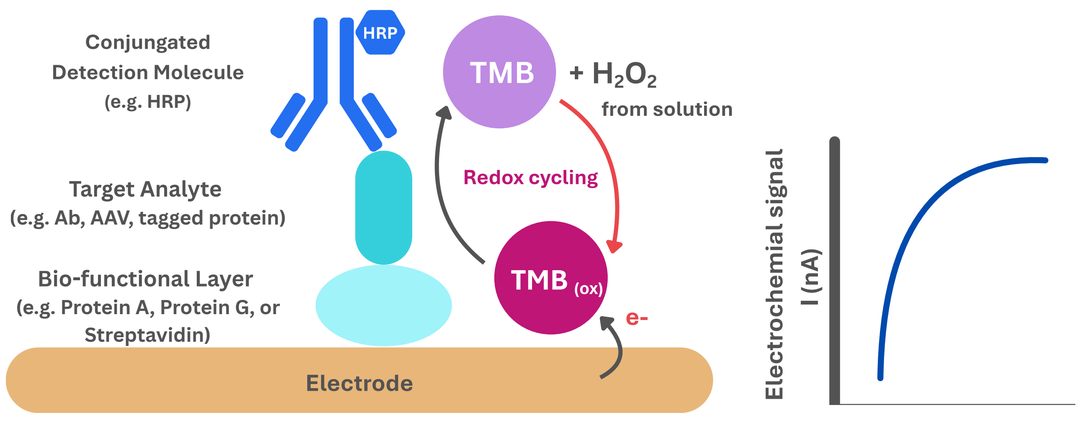
Background

Protein quantification is essential across biologics research and development – yet current tools like ELISA, BLI, and SPR require complex workflows and may struggle with crude samples or early-stage screening. These limitations increase the demand for platforms that combine speed, simplicity, and robustness.

Technology overview: what is RED?

Redox Electrochemical Detection (RED) is a sensor-based detection method that uses enzyme-mediated redox reactions to generate an electrical signal, directly measured via electrode sensors.

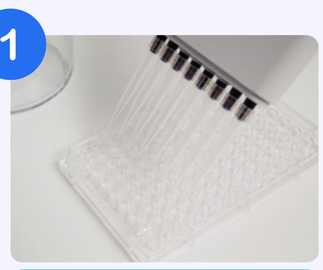
- No optics or fluidics
- Designed to tolerate crude samples
- Signal readout is direct and automated
- Supports different assay formats tailored to target biology



RED is implemented in the **Amperia™** platform – a compact benchtop system built on **patented** sensor technology, with disposable dip-style sensors and prefilled assay plates.

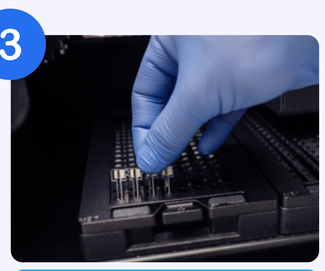
Workflow summary.

1. Prepare Assay Plate



2. Insert Plate

3. Add Sensors



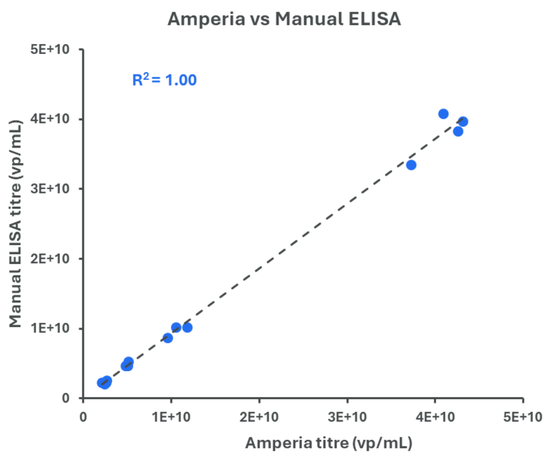
4. Run Assay

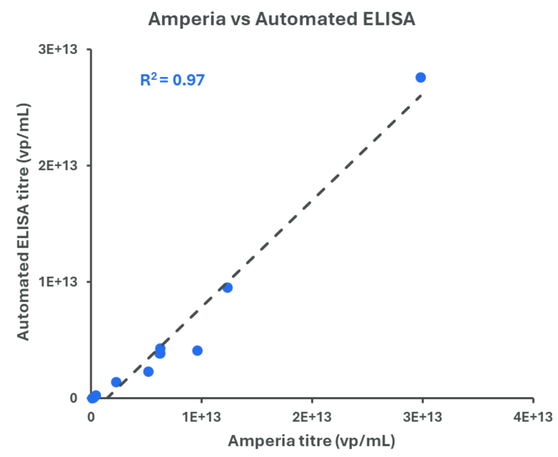
5. View Results

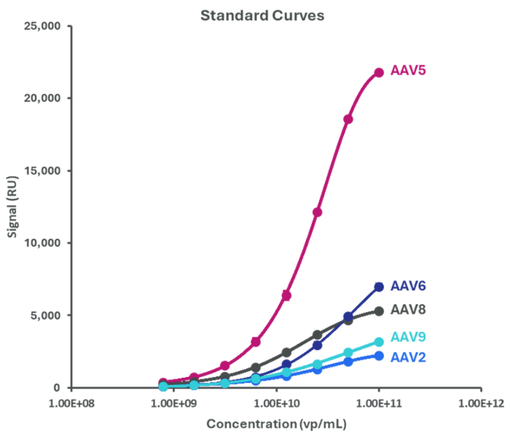
- Simple 5-step dip-and-read process
- Easy sample loading into standard plates
- Automated sensor handling
- Built-in analysis

Applications & results.

AAV Capsid Quantification

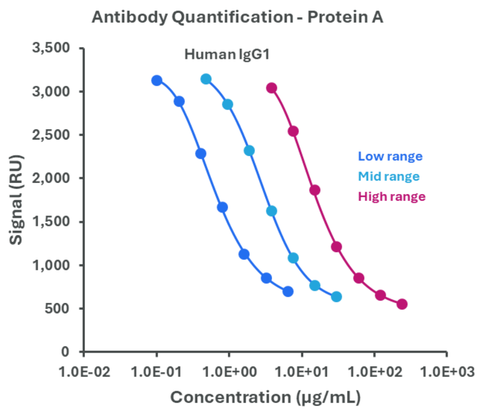


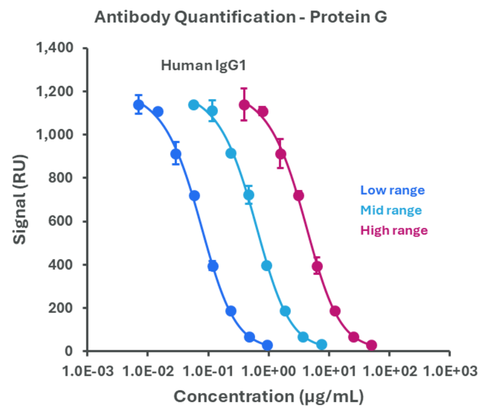




- Strong correlation with both manual and automated ELISA (R^2 = 1.00, 0.97)
- Quantitative curves across serotypes (AAV2, AAV5, AAV6, AAV8, AAV9)
- Robust performance across serotypes and assay runs
- Suitable for early-stage, minimally processed samples

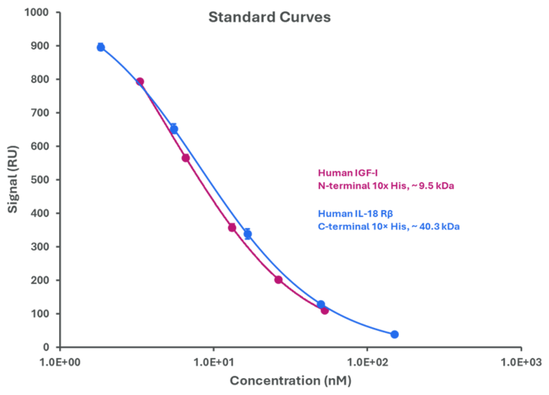
Monoclonal Antibodies (mAbs) Quantification





- Reliable quantification using Protein A and Protein G assays
- Reproducible standard curves across high, mid, and low ranges
- Compatible with multiple antibody species and subtypes
- Suitable for antibody quantification from discovery to process development

His-Tagged Protein Quantification



- Standard curves generated for His-tagged Human IGF-1 and IL-18 Rβ
- Reliable quantification from lysate-based samples
- Reproducible results across replicates
- Supports assessment of protein expression levels

Discussion & future directions.

Amperia™ uses Redox Electrochemical Detection (**RED**) to simplify protein quantification – eliminating the need for optics or fluidics. It delivers consistent results across targets such as AAV, mAbs, and His-tagged proteins, even in crude samples.

With a compact design, low training requirement, and target-specific assay formats, it supports early screening and upstream workflows. Ongoing work aims to expand assay offerings and enable integration with automated systems.

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