# Opentrons Flex®
# Absorbance Plate Reader Module



The Opentrons Flex Absorbance Plate Reader Module is a fully automated solution for absorbance-based assays. Capable of detecting absorbance in the 450–1000 nm range, it is optimized for a broad array of applications, including protein quantification, sample normalization, cell viability assays, and bacterial growth monitoring.

**Engineered for seamless integration with the Opentrons Flex liquid handler, this module facilitates complete walkaway automation, enabling high-throughput data collection with minimal manual intervention. Paired with the Opentrons Flex Gripper, it automates every step from plate transfer to measurement, ensuring consistent and reproducible results.**


**Protein quantification (BCA/Bradford)**


**ELISA**


**Mass spec sample prep**


**Cell viability and growth assays**

**Wide application range:** Ideal for protein quantification, normalization, cell viability assays, and bacterial growth monitoring, covering absorbance measurements at wavelengths from 450–1000 nm. This module is perfect for researchers focusing on proteomics, cell biology, and microbiology.
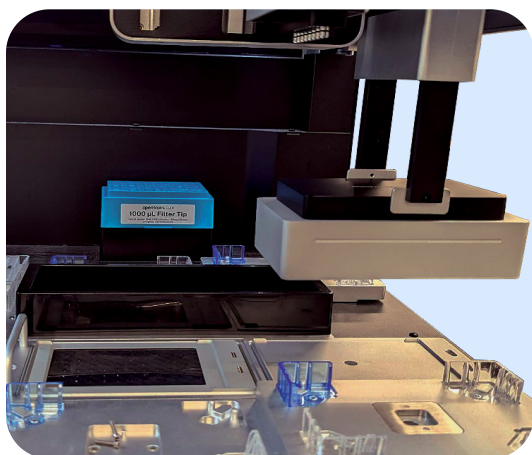


**Full walkaway automation:** Paired with the Opentrons Flex Gripper, this module enables complete walkaway automation. From plate loading to data collection, every step is automated, freeing up valuable time for your team.

**High-throughput capability:** Automate multiple plates in a single run, significantly increasing your throughput while maintaining accuracy and reproducibility across all samples.
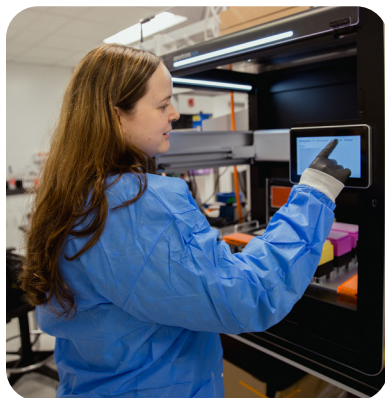


**User-friendly software:** Control the absorbance plate reader directly from the Opentrons App, offering an intuitive interface for setting up assays, running protocols, and analyzing data in real time.

# Application case study: Protein quantification and normalization with the Opentrons Flex Absorbance Plate Reader

Forty artificial bovine serum albumin (BSA) samples at varying concentrations were created via serial dilution. Protein concentrations from these samples were quantified and normalized in a fully automated workflow on the Opentrons Flex (Fig. 1). Absorbance measurements from the samples and standards were taken (Fig. 2) and protein concentrations were interpolated from a standard curve (Fig. 3). Normalizations were carried out and confirmed by a second measurement using the Plate Reader (Fig. 4).
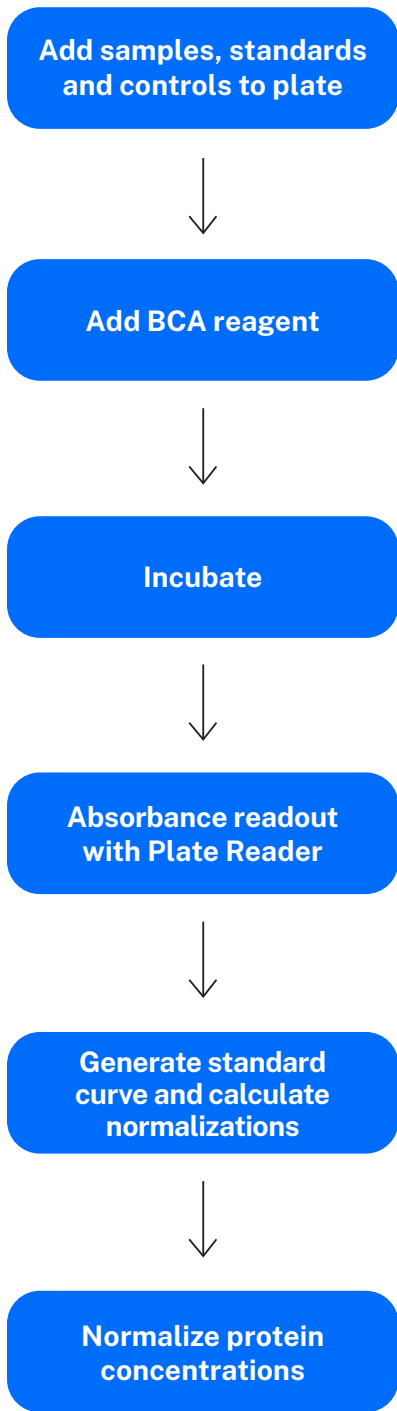


**Add samples, standards and controls to plate**

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**Add BCA reagent**

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**Incubate**

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**Absorbance readout with Plate Reader**

↓

**Generate standard curve and calculate normalizations**

↓

**Normalize protein concentrations**

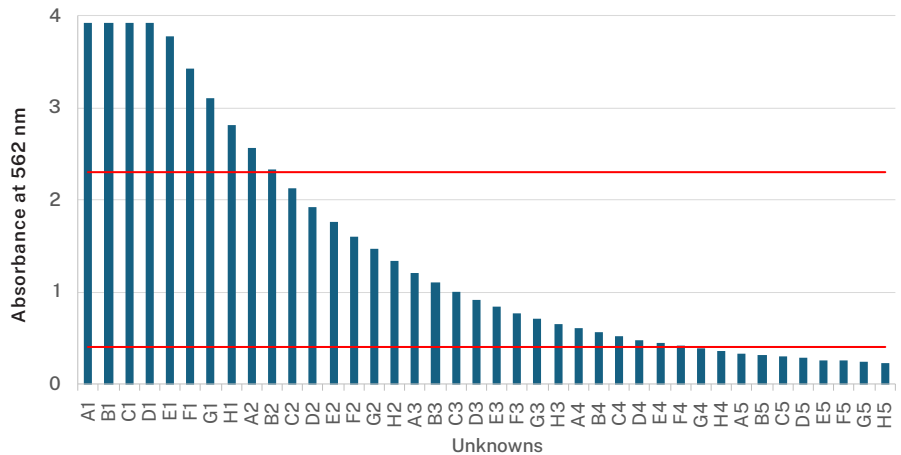**Figure 1:** Automated protein quantification and normalization workflow



**Figure 2:** BCA absorbance measurements of protein samples extracted from bovine serum albumen using the Opentrons Flex absorbance plate reader. Red lines indicate the upper and lower bounds of the standard curve. The concentrations of samples outside these bounds could not be assessed.
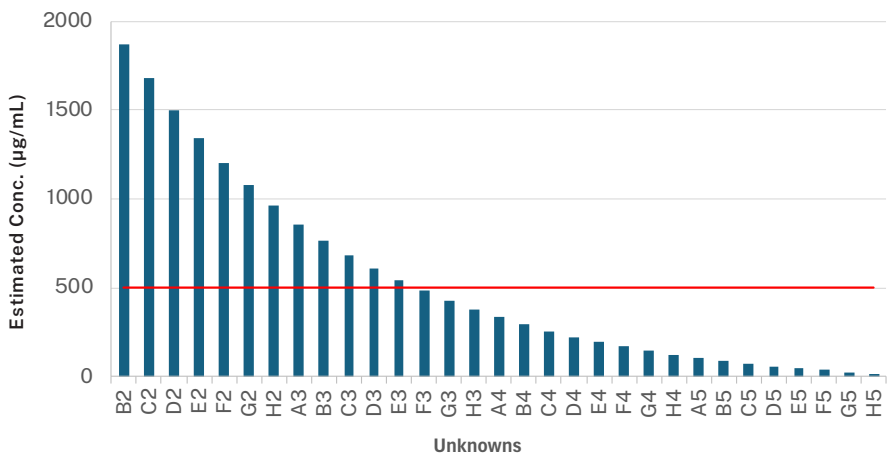


**Figure 3:** Concentrations of proteins calculated using absorbance measurements of the Opentrons Flex absorbance plate reader. A standard curve was used to correlate absorbance with concentration values. The red line indicates the target concentration. Samples with concentrations lower than the target concentration did not undergo normalization.
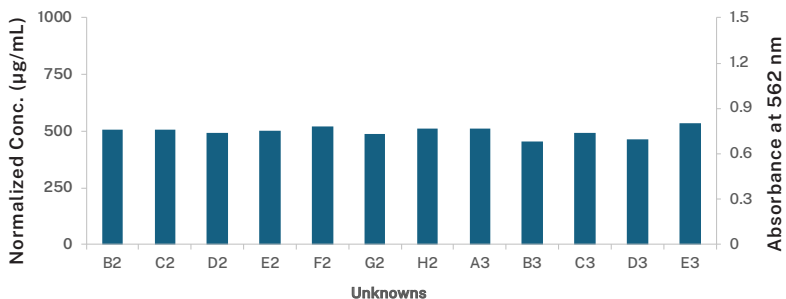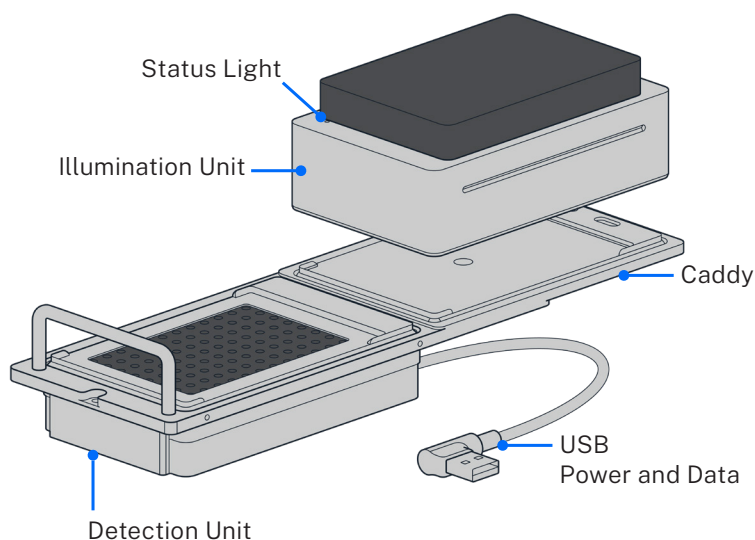


**Figure 4:** Absorbance and concentration values of proteins measured using the Opentrons Flex Absorbance Plate Reader after samples were normalized.

## Components



- Status Light
- Illumination Unit
- Detection Unit
- Caddy
- USB Power and Data

## Specifications

| Specification | Description |
|---|---|
| Module dimensions | Reader: 9.6 x 15.5 x 5.7 cm (w/l/h)<br>Adapter: 8.6 x 12.8 x 1.7 cm (w/l/h) |
| Module weight | ~790 g |
| Composition | Aluminum |
| Microplate type | 96-well microplates (flat-bottomed) |
| Wavelength filter settings | 450 nm, 562 nm, 600 nm, 650nm; custom wavelengths available |

## Measurement Specifications

| Measurement method | Absorbance |
|---|---|
| Measurement techniques | Endpoint and kinetic |
| Detection | 96 photodiodes |
| Measurement range | 0–4.0 optical density (OD) |
| Resolution | 0.001 OD |
| Accuracy | The maximum deviation between the determined value and the true value.<br>At 405 nm:<br>■ ≤ 1.5% + 0.010 OD from 0.0–2.0 OD<br>■ ≤ 3% + 0.010 OD from 2.0–3.0 OD<br>At or above 450 nm:<br>■ ≤ 1% + 0.010 OD from 0.0–2.0 OD<br>■ ≤ 1.5% + 0.010 OD from 2.0–3.0 OD |
| Reproducibility | The maximum deviation between the determined values when the measurement is repeated directly.<br>■ ≤ 0.5% + 0.005 OD from 0.0–2.0 OD<br>■ ≤ 1% + 0.010 OD from 2.0–3.0 OD |
| Linearity | The maximum deviation between the true and the determined increase of the value.<br>At 405 nm:<br>■ ≤ 1.5% from 0.0–2.0 OD<br>■ ≤ 3% from 2.0–3.0 OD<br>At or above 450 nm:<br>■ ≤ 1% from 0.0–2.0 OD<br>■ ≤ 1.5% from 2.0–3.0 OD |

## NEED MORE INFORMATION?

- For general sales information, email info@opentrons.com
- For services and installation, email support@opentrons.com
- Want to speak to a sales rep? Call us between 9:00 AM - 6:00 PM EST. Mon - Fri, +1 (646) 212-3703