

# At-line Solutions for Upstream Bioprocessing

In-process monitoring of critical quality attributes



## Upstream Bioprocess Applications

### Cell Culture Media

Monitoring of cell culture composition and changes and metabolism

### Automation

Automated high throughput sample tracking and analysis of bioreactor and cell culture samples

### Process Insights

Data analysis tools to correlate cell media and product attributes with process outcome



### Intact Drug Substance

Direct analysis of drug substance identity, modifications and variants

### Sample Preparation

Simplified sample preparation for in depth product and process monitoring

### PQA Monitoring

Site specific multiple attribute characterization of critical quality drug features

## Bioprocess Workflows from Start-to-Finish



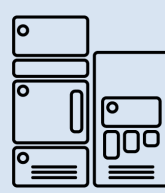
### Bioreactor Samples

Cell culture samples from bioreactors or upstream formats



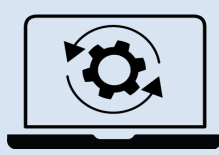
### Sample Preparation

Automated sample tracking & preparation for analysis



### Analysis

LC-UV & LC-MS analysis of critical process and product attributes



### Data processing

Streamlined data processing and reporting using compliant software



### Connected Bioprocess

Connected bioprocessing interfacing bioreactor data in a single software



### Accelerated Development

Accelerated cell line and process development at point of need

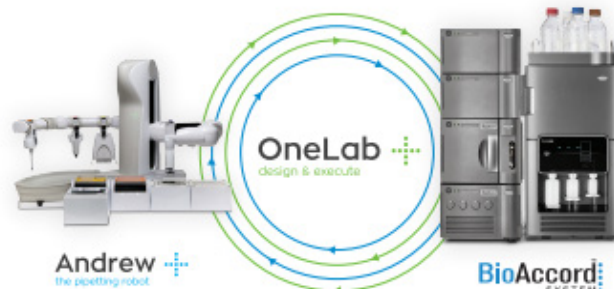
## Integrated Process Analytical Technologies

### Compact

Integrated LC-MS System with SmartMS technology for ease-of-use and robustness

### Compliance-ready

Ready for use in regulated development and GMP environments



### Standardized

Deployable and scalable solutions with reduced training requirements

### Optimized

Performance for proteins, peptides, released glycans and oligonucleotides

### Workflow driven

Built-in apps to automate sample tracking, preparation, data acquisition, processing and reporting