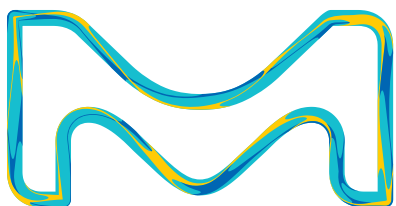


The fully automated

Auto2D® 2-D Electrophoresis Device

Rediscover the benefits of 2D electrophoresis



The life science business of Merck operates as MilliporeSigma in the U.S. and Canada.

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While one-dimensional protein gel electrophoresis techniques such as SDS-PAGE are routinely performed in the lab, these methods offer low separation capability. Two-dimensional gel electrophoresis (2-DE) separates proteins in complex samples by pI value and molecular weight, enabling the direct comparison of hundreds or thousands of proteins simultaneously with high resolution. When paired with analytical software, immunodetection, or mass spectrometry techniques, 2-DE provides a powerful tool that aids in protein identification and other proteomic analyses.

Two-dimensional gel electrophoresis has generally been regarded as difficult to perform and time-consuming, requiring advanced user training while offering low reproducibility and high inter-operator variability.

The **Auto2D® 2-D Electrophoresis Device** provides a fully automatable user-friendly solution for highly reproducible, rapid results and analysis.

- Fully automated to eliminate tedious handling steps
- Fast results in 1-2 hours
- High reproducibility
- Easy to use, with no advanced training required
- Lower inter-operator variability



Advantages of 2D gel electrophoresis

Higher resolution

Because proteins are separated by two independent parameters (isoelectric focusing and molecular weight) two-dimensional gel electrophoresis provides higher resolution compared to traditional SDS-PAGE, enabling the separation of thousands of proteins. For this reason, 2-DE remains one of the most popular techniques used in proteomics and protein analysis in complex samples such as plasma and serum.

26S Proteasome pTyr

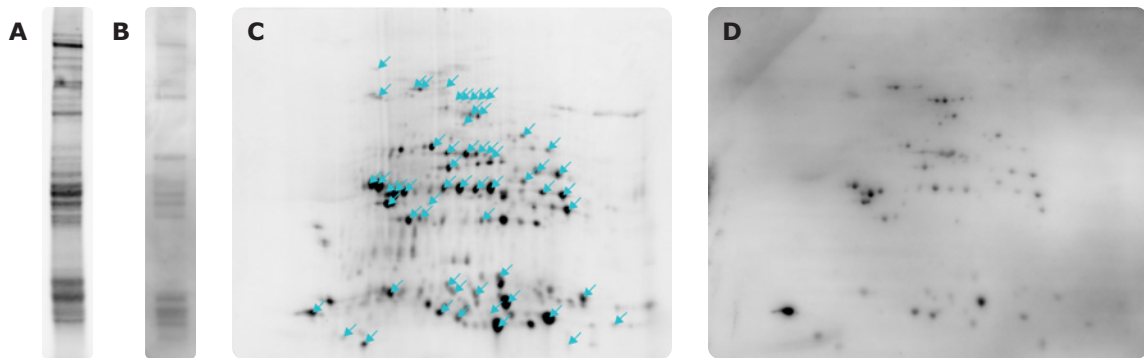


Figure 1. Detection of phosphorylated protein using 1D Western blotting vs. 2D Western blotting. 2D Western blotting was performed using the Auto2D® 2-D Electrophoresis Device.

A) 26S Proteasome labelled with Cy5 by SDS-PAGE, B) WB: Anti-Phosphotyrosine Antibody by SDS-PAGE, C) 26S Proteasome labelled with Cy5 by 2DE, D) WB: Anti-Phosphotyrosine Antibody by 2DE
Arrows on (C) show phosphorylated protein spots detected by Anti-Phosphotyrosine Antibody

More efficient workflow for protein identification

Utilization of two-dimensional gel electrophoresis can also improve workflows and simplify analysis in mass spectrometry and other protein analysis techniques. By separating proteins first by isoelectric focusing and molecular weight, 2-DE enables spot picking of a smaller selection of target proteins, reducing sample complexity for LC-MS/MS analysis. This can provide a significant advantage in protein identification when identifying targeted proteins such as proteins with different expression levels.

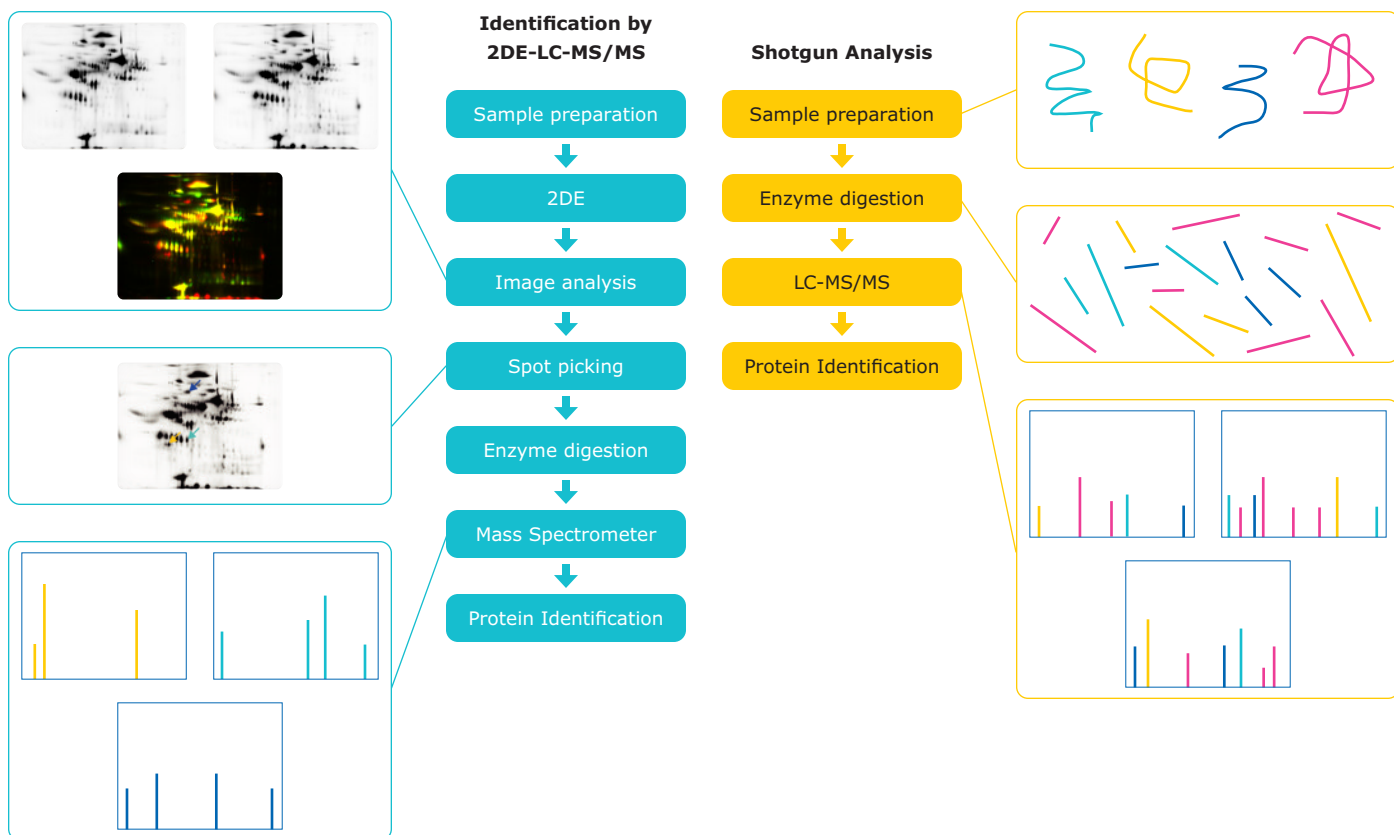


Figure 2. Comparison of workflows and analysis using 2DE-LC-MS/MS vs. shotgun analysis by LC-MS/MS alone. By spot picking from the 2-DE gel after imaging, mass spectrometry analysis is simplified.

Simplify 2-DE workflows with automation

The Auto2D® 2-D Electrophoresis Device fully automates two-dimensional gel electrophoresis, simplifying protein analysis and providing more consistent, reproducible results that are user-independent. The efficient engineering of the Auto2D® system significantly reduces the amount of time spent during sample loading, isoelectric focusing, equilibration, and SDS-PAGE from 4-24 hours to only 1-2 hours. This makes the Auto2D® device unique compared to other semi-automated 2-DE systems on the market.

2DE Workflow and Where Auto2D® Device Automates

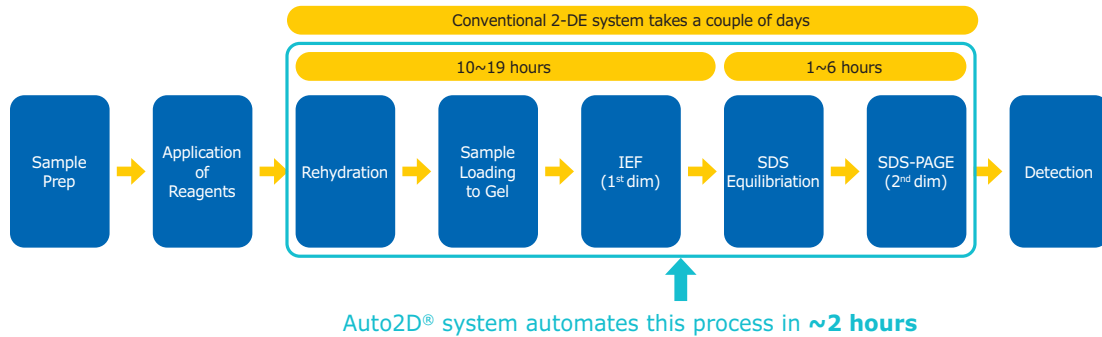


Figure 3. Two-dimensional gel electrophoresis workflow.

Advantages of the Auto2D® 2-D Electrophoresis Device:

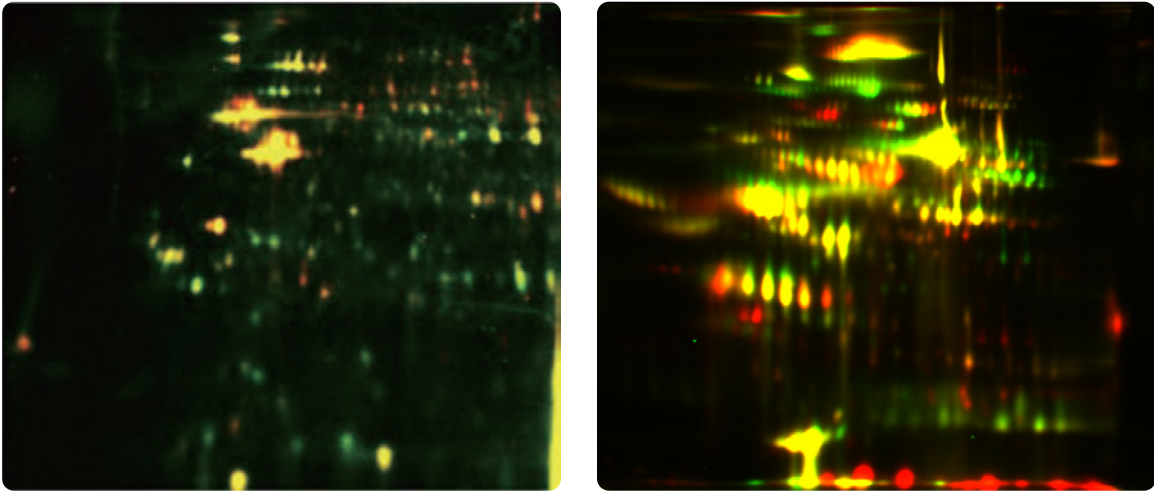
- Unique electronic control for high speed separation
- Easy to operate touch panel user interface with multiple protocols preprogrammed
- Multiple IEF chips and PAGE chips available for broad sample coverage
- Simple sample preparation by desalination procedure
- Automatic dyeing program eliminates manual operation for dyeing gels

Example applications

The Auto2D® 2-D Electrophoresis Device has been proven in applications including:

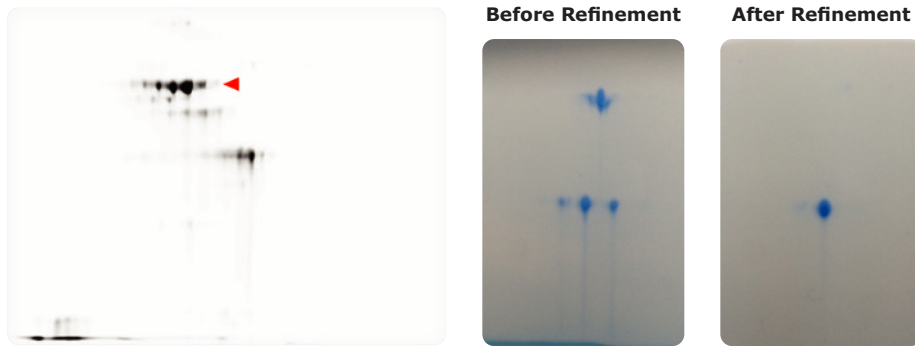
- Differential protein expression analysis in cancer research and elucidation of disease mechanisms
- Separation of purified proteins for crystallization or post-translational modification analysis
- 2D Western blotting in research areas such as allergy research or cell signaling pathway analysis
- Contaminating host cell protein (HCP) analysis in therapeutic protein and antibody bioprocessing

Differential protein expression analysis



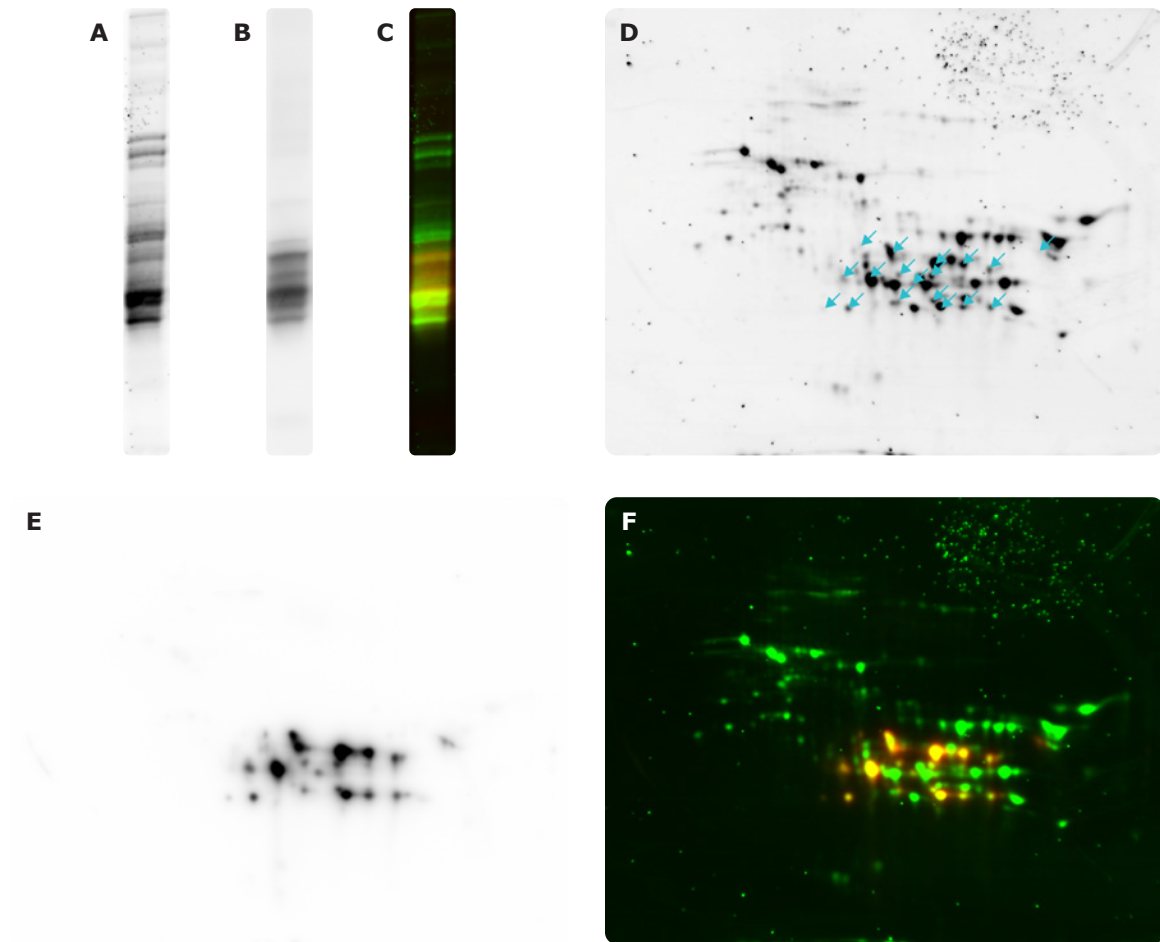
Differential protein expression in cells and plasma samples. Left: Differential protein expression analysis in cultured cells for cancer biomarker research. Green represents more abundant proteins in normal cells. Red represents cancer-specific protein spots. Yellow represents the overlap in protein expression. Right: Differential protein expression in plasma samples.

Protein separation



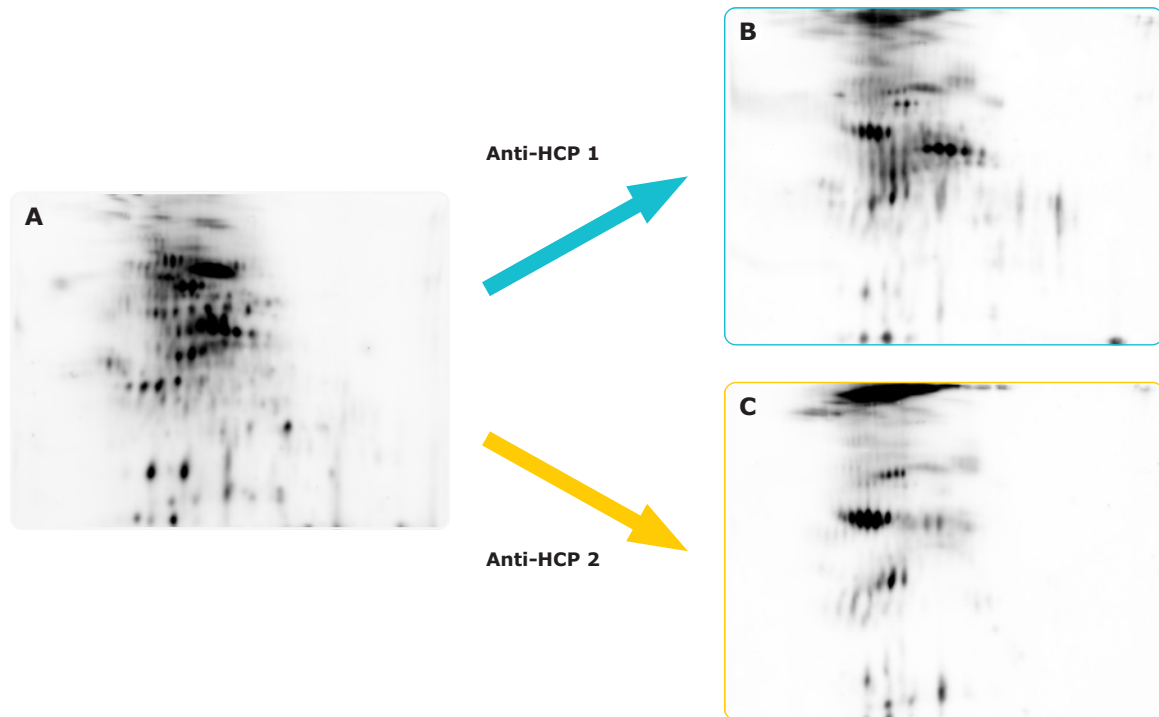
Protein separation and analysis for downstream applications. Left: Assessing microheterogeneities in therapeutic antibody drug products. Red triangle indicates spots for target antibody; lower spots are antibody missing regions. Right: Protein analysis before and after purification. 2-DE can be used to check whether the sample is homogeneous for crystallization and X-ray structural analysis.

2D Western blotting



2D Western Blotting. Flour extract proteins (detected by SYPRO Ruby) by SDS-PAGE (A), WB: Anti-Gliadin antibody by SDS-PAGE (B), and merge by SDS-PAGE (C). Flour extract proteins (detected by SYPRO Ruby), arrows indicate spots detected by Anti-Gliadin antibody (D). WB using Anti-Gliadin antibody (E), and merge (F).

HCP analysis



Anti-HCP antibody validation. 20 μ g of Cy3-labeled CHO HCP antigen from a commercial source was separated by 2D gel electrophoresis on the Auto2D[®] system using a pH 3-10 IEF chip and 12.5% PAGE chip (A). Proteins were then transferred to membranes and analyzed by Western blotting using two different anti-HCP antibodies (B, C). Data indicate that anti-HCP antibody 1 has broader coverage of host cell proteins, compared to anti-HCP antibody 2.

The Auto2D® 2-D Electrophoresis Device fully automates difficult 2D electrophoresis methods in a quick, easy, and reproducible way. Locate difficult-to-find proteins using the Auto2D® system in less than two hours with high reproducibility.

Ordering information

Product name	Quantity	Catalog number
Auto2D® Base Unit		
Auto2D® 2-D Electrophoresis Device	1 unit	BM-100
Auto2D® Special Consumables		
Electrode Chip	1 chip	BM-1E
Solution Chip	10 chips	BM-1S
Auto2D® Plus Special Consumables		
Electrode Chip Plus	1 chip	BM-1EP
Solution Chip Plus	10 chips	BM-1SP
Auto2D®/Auto2D® Plus Common Consumables		
IEF Chip pH 3-10	10 chips	BM-113010
IEF Chip pH 3-10NL	10 chips	BM-113010NL
IEF Chip pH 4-7	10 chips	BM-114070
IEF Chip pH 4-5.5	10 chips	BM-114055
IEF Chip pH 5-6.5	10 chips	BM-115065
IEF Chip pH 6-10	10 chips	BM-116010
IEF Chip pH 7-10	10 chips	BM-117010
PAGE Chip 6.5%	10 chips	BM-12065
PAGE Chip 7.5%	10 chips	BM-12075
PAGE Chip 10.0%	10 chips	BM-12100
PAGE Chip 12.5%	10 chips	BM-12125
Tris-Glycine Reagent Kit	1 kit	BM-1RYSJ1
Tris-Tricine Reagent Kit	1 kit	BM-1RYTJ1

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