HuProt™
Human Proteome Microarray
v4.0
~81% of the canonical proteome – as defined by the Human Protein Atlas* – on a glass slide.

**HuProt Applications**

- Body Fluid Biomarker Profiling (serum, plasma etc.)
- Antibody Specificity Testing
- Protein Binding
- DNA/RNA Binding
- Ubiquitylation
- Phosphorylation
- Small Molecule Binding
- PTM Assays

**NEW in v4.0**

**Expanded content:** >21,000 human proteins, encompassing 16,793 unique genes.

**Additional controls:** allow for the use of linear regression analysis, radio-labeled sample analysis and the use of different analytical software.

*www.proteinatlas.org/about/licence*
Sequenced Content and Expression

The HuProt™ human proteome microarray v4.0 contains >21,000 individually purified human proteins and splice variants, encompassing 16,793 genes (~81% of the canonical proteome as defined by the Human Protein Atlas*; see table, right) and 124 unique mouse gene symbols. Recombinant proteins are expressed in yeast (S. cerevisiae), purified and printed on glass slides in duplicate, along with control proteins. Recombinant proteins are expressed in yeast (S. cerevisiae), purified and printed on glass slides in duplicate, along with control proteins.

HuProt™ v4.0 content can be searched at https://collection.cdi-lab.com/public

Production and Quality Assurance

After expression, the N-terminal GST- and His6-tagged proteins are purified and printed on glass slides in duplicate, along with control proteins (GST, BSA, Histones, IgG, etc.). Slides are bar-coded for tracking/archiving. Each microarray batch is routinely evaluated by GST staining to insure printing quality and content.

Flexibility is built-in. The HuProt™ human proteome microarray is available on two types of glass surfaces: PATH™ and SuperEpoxy2™. Focused arrays can be designed out of biomarkers identified within the HuProt™ discovery phase. Efficient (up to 2x7) slide formats can be configured for a cost-effective and rapid approach to the validation phase.

CDI uses its Arrayjet Ultra Marathon II (photo) non-contact piezoelectric (inkjet) printer to manufacture microarrays with significant performance advantages over contact print methods:

- precise spot morphology (see figure, right)
- large batch sizes for large cohort analysis
- rapid production of custom configured arrays
- reduced inter- and intra-array variability
- greater data reproducibility (see below)

HuProt Human Proteome Coverage

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enzymes</td>
<td>83%</td>
</tr>
<tr>
<td>Protein kinases</td>
<td>89%</td>
</tr>
<tr>
<td>Peptidases</td>
<td>79%</td>
</tr>
<tr>
<td>Transporters</td>
<td>79%</td>
</tr>
<tr>
<td>Transcription factors</td>
<td>85%</td>
</tr>
<tr>
<td>Predicted membrane proteins</td>
<td>73%</td>
</tr>
<tr>
<td>GPCRs</td>
<td>65%</td>
</tr>
<tr>
<td>Nuclear receptors</td>
<td>94%</td>
</tr>
<tr>
<td>Predicted secreted proteins</td>
<td>85%</td>
</tr>
<tr>
<td>Plasma proteins</td>
<td>82%</td>
</tr>
<tr>
<td>CD markers</td>
<td>83%</td>
</tr>
<tr>
<td>Disease-related proteins</td>
<td>81%</td>
</tr>
<tr>
<td>Cand. cancer biomarkers</td>
<td>89%</td>
</tr>
<tr>
<td>Cand. cardiovasc. disease</td>
<td>91%</td>
</tr>
<tr>
<td>FDA-approved drug targets</td>
<td>79%</td>
</tr>
</tbody>
</table>

*www.proteinatlas.org/about/licence

Spot Morphology: The piezoelectric “inkjet” process allows the rapid production of high quality microarray slides time after time, with improved accuracy and reproducibility and excellent spot morphology with even pixel distribution.

R-squared values between 2 arrays within the same batch.

R-squared values of 2 batches printed within ~1 year interval.
HuProt™ Application Workflow Examples

**Antibody Specificity**

Less than 50 ng Ab/test

**Body Fluid Biomarker Profiling**

(sera, plasma etc.)

Less than 5 μl body fluid/test

Antibody is incubated with HuProt™ and binds with one (or more) proteins

Patient body fluid is incubated with HuProt™ and autoantibodies bind to proteins

Microarray washed and incubated with a fluorescent secondary antibody

Microarray washed and incubated with isotype-specific fluorescent secondary antibodies (anti-IgG, IgM, IgA)

Antibody-protein binding is analyzed and specificity is assessed

Antibody-protein binding is analyzed

HuProt™ allows for a quantum leap in assessing the quality of antibodies used in research and manufacturing

**White Paper:** cdi-lab.com/High-Spec_White_Paper.shtml

**Video Demo:** cdi-lab.com/Video.shtml
A Closer Look: 2-Phase Biomarker Discovery Workflow - powered by HuProt™

Summary

- Cost-effective, rapid tool for early, companion and predictive diagnostics
- Can be performed as a CDI service or by clients in-house
- Step-by-step training and continued support
- Rapid turnaround and comprehensive reporting

Phase 1 - Discovery

Samples of patients with the disease of interest as well as normal samples are tested on HuProt™. Typically, 50-100 samples for each category are used.

After bioinformatic analysis, profiles from both groups are compared and candidate biomarkers are identified.

Phase 2 - Validation

The biomarker candidates from the discovery phase are used to generate focused arrays. 14-64 arrays can be printed per slide dramatically reducing cost and allowing much larger cohorts of patient samples to be tested.

The robust, rapid validations of biomarkers eliminates problems associated with data overfitting.

The validated biomarkers are immediately transferable to ELISA-based assays or other commercial assay platforms.

Video Demo: cdi-lab.com/Video.shtml
Developed an antibody? The specificity will be critical to the success of your research. High-Spec® Antibody Cross-Reactivity Testing is offered to assess cross-reactivity to the largest number of human proteins - HuProt™ - BEFORE you publish. Read the new WHITE PAPER on commercial antibody specificity.

Access it here: cdi-lab.com/High-Spec_White_Paper.html

Call us toll-free at 844-539-6296 or email us at info@cdi-lab.com for more information or to obtain a quote and begin a project.

HuProt™ Human Proteome Microarray Literature Citations


Barry G et al. (2017) The long non-coding RNA NEAT1 is responsive to neuronal activity and is associated with hyperexcitability states. Nature Scientific Reports 7, Article number: 40127 doi: 10.1038/srep40127


Li H et al. (2016) Penetration of Congenital Heart Disease in a Mouse Model of Down Syndrome Depends on a Trisomic Potentiator of a Disomic Modifier. Genetics 203:763-70.


Visit cdi-lab.com/Resources.shtml for earlier publications.