Automation solutions for the processing of dried blood spot (DBS) samples

- Full traceability, from the barcoded blood collection card to the test result
- Validated combination of test systems and automation solutions from EUROIMMUN and PerkinElmer for DBS as sample material
- Flexible and scalable solutions for every laboratory size and different throughputs
Automation solutions for laboratories with high sample throughput

**EUROLabWorkstation ELISA (ELW ELISA)**

- Fully automated high-throughput ELISA processing from the primary sample to the final result
- Direct loading of samples into the system using 96-well plates
- Highest capacity of up to 15 microplates
- 100% traceability during the entire process due to bar- and QR coding

**DBS Holder**

The DBS Holder supports the automated processing of DBS samples with the ELW ELISA. It is used to hold down the punched-out membrane pieces in the extract at the bottom of the wells while the extract is transferred from the plate to the reaction tubes.

**DBS workflow**

<table>
<thead>
<tr>
<th>1 Puncher</th>
<th>2 Extraction</th>
<th>3 DBS Holder</th>
<th>4 ELW ELISA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic punching of DBS</td>
<td>Manual addition of 500 μl buffer per two punched-out membrane pieces</td>
<td>Holding the punched-out DBS to the bottom of the wells</td>
<td>Direct loading of the 96-well plate containing DBS Holders and DBS extracts</td>
</tr>
<tr>
<td>Available punchers from PerkinElmer, Inc.:</td>
<td>Incubation in conventional incubator at +37 °C for one hour</td>
<td></td>
<td>Parallel processing of up to 15 plates</td>
</tr>
<tr>
<td>- DBS Puncher™</td>
<td></td>
<td></td>
<td>High-speed analysis of samples</td>
</tr>
<tr>
<td>- Panthera Puncher™ 9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example of the DBS workflow using the ELW ELISA**

- Anti-SARS-CoV-2 ELISA (IgG)
- 1,390 samples
- 135 tests/h

**For comparison: further examples of DBS workflows**

**With four incubators**

- Anti-SARS-CoV-2 NCP ELISA (IgG) 1,390 samples
- Anti-SARS-CoV-2 QuantiVac ELISA (IgG) 1,220 samples
- Anti-SARS-CoV-2 ELISA (IgG) 1,200 samples

**With eight incubators**

- Anti-SARS-CoV-2 NCP ELISA (IgG) 1,390 samples
- Anti-SARS-CoV-2 QuantiVac ELISA (IgG) 1,220 samples
- Anti-SARS-CoV-2 ELISA (IgG) 1,200 samples

*Incubators are not part of the standard scope of delivery
Note: One diagram bar corresponds to one system run.
Automation solutions for laboratories with low to medium sample throughput

We offer different options of ELISA automation suitable for your throughput

**EUROIMMUN Analyzer I**
- Up to 180 samples
- Up to seven ELISA plates in parallel
- Four heatable incubators

**EUROIMMUN Analyzer I-2P**
- Up to 144 samples
- Up to three ELISA plates in parallel
- Two heatable incubators

**Sprinter XL**
- Up to 160/240 samples
- Up to six ELISA plates in parallel
- Four heatable incubators

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**DBS workflow**

1. **Puncher**
   - Automatic punching of DBS
   - Available punchers from PerkinElmer, Inc.:
     - DBS Puncher®
     - Panthera Puncher™

2. **Extraction**
   - Manual addition of 250 µl buffer per punched-out membrane piece (also possible with two membrane pieces using 500 µl buffer)
   - Incubation in conventional incubator at +37 °C for one hour

3. **EURO-MappingTool**
   - Software to support the complete traceability of all samples during the DBS workflow
   - Conversion of the puncher-generated plate layout into individual sample barcodes for printing

4. **Liquid handling**
   - Manual sample transfer from the extraction plate to the barcoded sample tubes

5. **Automated ELISA systems**
   - Loading of barcoded sample tubes into the system as a standard
   - Simple extension of routine operations by processing of DBS samples

**Example of the DBS workflow using the EUROIMMUN Analyzer I**

- Anti-SARS-CoV-2 ELISA (IgG)
  - 176 samples
  - 37 tests/h
  - EUROIMMUN Analyzer I

**For comparison: further examples of DBS workflows**

- **EUROIMMUN Analyzer I**
  - Anti-SARS-CoV-2 NCP ELISA (IgG)
    - 180 samples

- **EUROIMMUN Analyzer I-2P**
  - Anti-SARS-CoV-2 NCP ELISA (IgG)
    - 144 samples

- **Sprinter XL**
  - Anti-SARS-CoV-2 NCP ELISA (IgG)
    - 240 samples

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*Note: One diagram bar corresponds to one system run.*
**Instruments for automated punching of DBS** (available from PerkinElmer, Inc.)

The DBS Puncher® and Panthera Puncher™ 9 support the tracking of samples due to the automated identification of barcodes.

**DBS Puncher®**
- Up to two 96-well plates in parallel
- Width x depth x height: 42 cm x 48 cm x 30.5 cm

**Panthera Puncher™ 9**
- Up to 9 96-well plates in parallel
- Width x depth x height: 87.6 cm x 74 cm x 56 cm
- Automatic adjustment of the punching pattern to the size and form of the dried blood spot

**Order information**

<table>
<thead>
<tr>
<th>Category</th>
<th>Test system/Instrument</th>
<th>Function</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBS</td>
<td>EUROMMUN Blood collection card (100 pieces)</td>
<td>Cards for blood uptake</td>
<td>ZV 9711-01100</td>
</tr>
<tr>
<td></td>
<td>PerkinElmer Panthera Puncher™ 9</td>
<td>Automated punching of DBS in up to nine 96-well plates</td>
<td>2081-0010*</td>
</tr>
<tr>
<td></td>
<td>PerkinElmer DBS Puncher®</td>
<td>Automated punching of DBS in up to two 96-well plates</td>
<td>1296-071*</td>
</tr>
<tr>
<td></td>
<td>DBS Holder</td>
<td>Holding punched-out DBS filter paper in place at the bottom of the deep-well plate (1 ml)</td>
<td>ZG 9701-01100-001</td>
</tr>
<tr>
<td></td>
<td>Deep well plate (1 ml)</td>
<td>For use with the DBS Holder</td>
<td>ZG 9956-0132</td>
</tr>
<tr>
<td>Automation</td>
<td>EUROMappingTool</td>
<td>Conversion of plate barcodes into barcodes for sample tubes</td>
<td>YG 9730-0101</td>
</tr>
<tr>
<td></td>
<td>EUROLabWorkstation ELISA</td>
<td>Automated high-throughput processing of ELISA samples</td>
<td>YG 0851-0101</td>
</tr>
<tr>
<td></td>
<td>EUROMMUN Analyzer I/I-2P</td>
<td>Automated processing of ELISA samples</td>
<td>YG 0014-0101, YG 0015-0101, YG 0033-0101-3, YG 0033-0101-23</td>
</tr>
<tr>
<td></td>
<td>Sprinter XL 160/240 ELISA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* PerkinElmer product

**Further required materials**
- For ELW ELISA: EUROMMUN Combi Rack Type Q (order no. ZG 0855-0101-1), EUROMMUN Rack Label Set for Combi Rack Type Q (order no. ZG 0859-0101-30), at least software version 2.3
- For EUROMappingTool: Label Printer Zebra ZD410 (order no. YG 0280-0101-1) and corresponding labels (e.g. ZG 0279-0101-X) for printing of barcodes, and barcode scanner

For further information visit our website at www.euroimmun.de/en/automation=dbs/