**Introduction**

- The dried plasma spot (DPS) cards (Noviplex™, NovytiLabs), a novel miniaturized blood fractionation technology, enables collection of a 2.5 µL of plasma.
- DPS cards eliminates the need for venipuncture and specialized blood collection tubes commonly used to obtain plasma samples.
- DPS is especially attractive for the use in clinical metabolomics research.
- In this work, a quantitative metabolite profile was obtained for the first time by dried plasma spot cards and comparatively to the established ESTADA plasma methodology.
- The targeted quantitative metabolite analysis was carried out employing Absolute/IDQ® p180 Kit (Biocrates Life Sciences).

**Materials and methods**

**Noviplex™ and dried plasma spot cards**

- Volumetric plasma sample collection
- Plasma sampling volumes of 2.5 µL
- Independent of hematocrit
- 20 to 75 µL of whole blood is required
- Finger-stick
- Mouse tail bleed
- Rapid sample preparation for MS-based analysis

- 50 µL of EDTA whole blood sample was pipetted on to the labeled test area
- It was verified that control spot changed red

**Materials**

- Biocrates Absolute/IDQ® p180 Kit
  - 10 µL of sample (plasma/serum)
  - Quantification up to 188 metabolites
  - LC-MS/MS and FIA-MS/MS analysis
  - LC-MS/MS and FIA-MS/MS analysis
  - Isotope-labeled and chemically homologous internal standards are used for quantification
  - 3 hours sample preparation
  - Standardized assay in 96-Well plate format
  - Validated for several MS/MS platforms

**Methods**

- Sample preparation according to Absolute/IDQ® p180 Kit User Manual
- Sample extract dilution
  - 1:5 for FIA-MS/MS
  - 1:2 for LC-MS/MS

**Results**

Table 1. Concentrations of quantified metabolites in DPS samples

<table>
<thead>
<tr>
<th>Metabolite</th>
<th>Concentration in EDTA plasma, µM</th>
<th>Concentration in DPS, µM</th>
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</thead>
<tbody>
<tr>
<td>Amino Acids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glu</td>
<td>9.8 ± 0.8</td>
<td>1.3 ± 0.2</td>
</tr>
<tr>
<td>Arg</td>
<td>41.2 ± 9</td>
<td>18.4 ± 3.2</td>
</tr>
<tr>
<td>Leu</td>
<td>131.6 ± 14.4</td>
<td>9.2 ± 0.2</td>
</tr>
<tr>
<td>Thr</td>
<td>10.2 ± 0.1</td>
<td>3.7 ± 0.4</td>
</tr>
<tr>
<td>Gln</td>
<td>92 ± 10.1</td>
<td>19.3 ± 9.3</td>
</tr>
<tr>
<td>Phe</td>
<td>74.4 ± 7.7</td>
<td>46.4 ± 4.2</td>
</tr>
<tr>
<td>Asp</td>
<td>92 ± 10.1</td>
<td>20.3 ± 1.5</td>
</tr>
</tbody>
</table>

**Conclusions**

- The quantitative results for 127 endogenous metabolites in human blood samples using DPS cards were obtained.
- The analytical figures of merit for DPS and EDTA-plasma sampling methodologies were in a good agreement.
- The data transferability and comparability with the standard approach (EDTA plasma) is metabolite dependent.
- The DPS is ready for routine applications in targeted quantitative metabolomics.
- The DPS is an excellent sampling device for standardized comprehensive metabolome analysis with several advantages:
  - Very low sample volume (e.g. for translational longitudinal studies in mice and men)
  - Less invasive
  - Easy sample transport/shipping