

Plasma protein measurement from dried blood spot (DBS) and NoviPlex plasma separation cards by Shimadzu LCMS-8050

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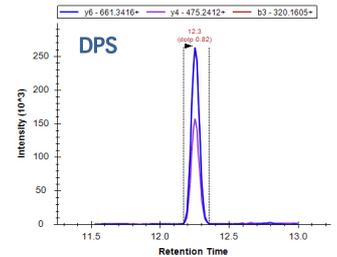
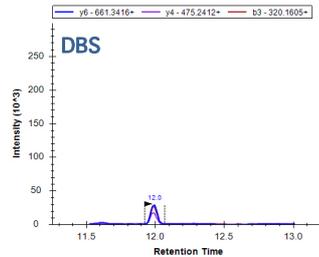
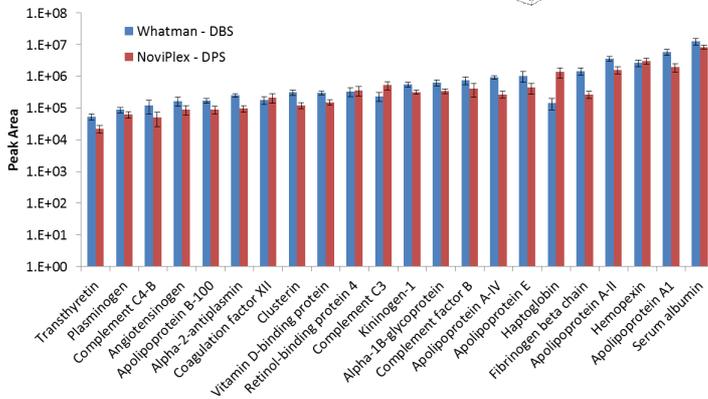
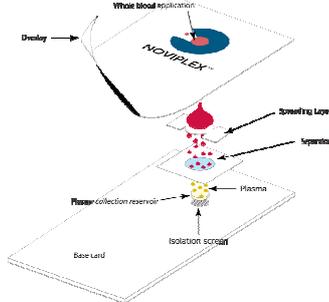
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Overview

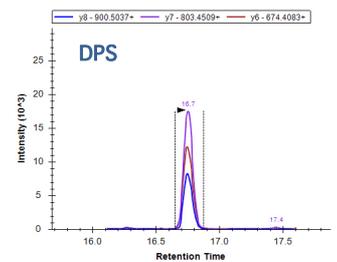
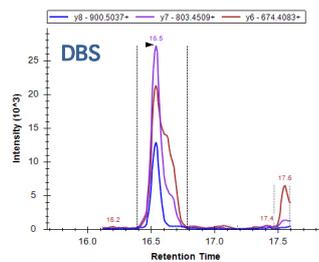
- An alternative to DBS (dried blood spots) is DPS (dried plasma spots) sampling, collecting a plasma sample by a membrane sample preparation technique. In this approach, a blood sample is applied to a layered series of membranes designed to selectively retain cellular components and allow plasma extraction by capillary action. This technology may help bridge the need for simple blood sampling whilst still providing a vehicle for convenient storage and transport.
- In this work PSC technology (NoviPlex cards) were compared qualitatively to DBS, monitoring a range of selected plasma proteins to evaluate suitability of DPS in protein research.
- Skyline and Shimadzu LCMS-8050 triple quadrupole mass spectrometer were used to assess the distribution of a series of peptide markers in DBS and DPS

LC/MS/MS method and Skyline data integration

Five volunteer blood samples were applied to Whatman DBS card and NoviPlex DPS cards, each with two replicates. Samples were prepared with reduction, alkylation and tryptic digestion, followed by sample clean-up by offline SPE. Plasma protein tryptic peptides (PeptiQuant WorkFlowPerformance Kits (MRM Proteomics)) were measured using the LC-MRM/MS (Shimadzu LCMS-8050). Skyline was used to predict MRM transitions and perform collision energy optimization experiments.



Haptoglobin, known to be linked to haemoglobin, was significantly lower on DBS compared to DPS. Cell lysis of red blood cells may have contributed to reduced levels of measured haptoglobin due to haemoglobin binding.



Some peptides exhibited more noticeable matrix effect from DBS compared to DPS such as apolipoprotein B-100.



Conclusions

- Preliminary qualitative data shows similar ion signal intensity and behaviour for peptides extracted from DBS and DPS.
- DPS has reduced matrix effects compared to DBS.
- DPS may provide a viable alternative to DBS for blood sampling research.