

Development and validation of a quantitative UPLC-MSMS method for capillary PEth 16:0/18:1 in 10 µl volumetric DBS devices

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Our department has been running a quantitative UPLC-MSMS PEth method requiring 150 µl venous blood since 2016. This method has a simple sample preparation and a short analytical runtime (~2.2 min), making it very suitable for high throughput.

There has been a growing interest and desire for capillary self-sampling lately. The benefits of self-sampling is that it is less invasive, it can be done at home and you don't need trained health-personnel to be able to collect the sample. Several commercial self-sampling products are available on the market and by choosing a volumetric product you avoid some of the hematocrit issues that you have with traditionally dry blood spot sampling. As a supplement to our venous PEth method, we want to offer our customers a capillary PEth method.

To give our customers some liberty when it comes to sampler preferences, we decided to develop a volumetric absorptive microsampling (VAMS) method for analysis of capillary PEth with two different sampling devices; Capitainer®B Vanadate card from Capitainer and Mitra® device from Neoteryx/Trajan.

To the largest possible extent, we have kept the sample preparations and analytical settings for the capillary VAMS method to be as equal to our venous PEth method as possible. In practice, we have developed a sample extraction method for Capitainer®B Vanadate and Mitra® 10 µl VAMS samples. Calibrators and quality control samples are spiked during the sample extraction thus making it possible to analyze samples from the Capitainer®B Vanadate card and the Mitra® device simultaneously in the same set-up. The only change we have done in regard to our routine analytical UPLC-MSMS method is to increase the injection volume.

The PEth VAMS method is undergoing validation, and the results look promising. The calibration range is 0.03-4.0 µM. The between-assays accuracies of Capitainer®B Vanadate was $\geq 79.5\%$ ($CV \leq 13.4\%$) and Mitra® $\geq 95.8\%$ ($CV \leq 5.9\%$). Hematocrit level do not affect extraction yield, and the internal standard PEth-d₅ neutralize the hematocrit dependent matrix effects. Included in the validation is a method comparison between our venous routine PEth method and the new capillary VAMS method that we would like to present.