Poster

[P25-6] P25-6: Immunosuppressive drugs (1): LC-MS/MS assay

Chair: Tsutomu Nakamura, Japan

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[P25-6-7] Automated sample preparation of whole blood - the need for speed

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Background

The sedimentation of whole blood makes automation challenging. Several approaches can be used such as lysation of the blood cells by freezing-thawing which gives a much slower sedimentation rate after homogenization; homogenization by air pipetting[1] or by sequential pipetting aspiration and dispensing cycles[2], or rocking with an integrated tilting device[3]. All these techniques add a substantial amount of time to the sample preparation process, either off-line (freezing) or on the automation platform. An effective approach is to adapt the standard tilting approach of a blood rocker to the automation.

Methods

The automation was performed on a Hamilton StarLet with eight 1000 L channels, equipped with automatic bar code reader, plate shaker and plate handler. Patient samples were placed in sample racks with 24 positions with a maximum of four racks per run. Filled racks were put on an off-line oversized blood rocker and agitated for at least 3 min. When prompted by the robot, the first two racks were manually de-capped and loaded onto the robot and pipetted with wide-boar 300 L tips at a 10 mm depth from the surface into a 96-well plate. After completion, the last two racks were loaded and pipetted. Patient target wells were defined by work lists from the LIMS together with bar code matching. The sample preparation was applied both to immunosuppressive samples and alcohol biomarker PEth samples

Results

With a 10 mm sub-surface aspiration of the sample, the pipetting of homogenized samples need to be completed within 9 min which is well within the robots limits for pipetting two full racks (48 samples). Sample preparation of a full 96-well plate for ISD or PEth is completed within 35 min. This includes agitation, decapping, loading, pipetting, shaking (5 min) and off-line centrifugation (5 min), Comparison of automated preparation with manual preparation of ISD and PEth showed equal or better accuracy and precision.

Conclusions

A fast and effective automation of whole blood sample preparation was implemented, based on off-line agitation and sub-surface pipetting, minimizing the time on the automation platform. The protocol is in routine work and processes 150 to 250 whole-blood samples/day.

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