ANALYTICAL EVALUATION OF THE QUANTIPLASMA 300 (QP300) MONOCLONAL ANTIBODY CHIP

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Introduction: Plasma proteome profiling with monoclonal antibody (mAb) library based protein chips is a promising new opportunity in biomarker discovery that can be used to identify novel plasma markers in a wide variety of diseases. An example of the mAb libraries used on protein chips of Randox Ltd. (UK) is the QuantiPlasma™ (Biosystems International Kft, Hungary) system that could help the identification of novel biomarkers in different types of cancer. After the feasibility biochip containing 69 mAb-s (QP69), recently a "discovery" version of this system – the QP300 kit – has been introduced that covers 290 different human plasma protein epitopes in one sample. The mAbs – recognizing the different protein epitopes – are immobilized on 9x9 mm ceramic chips and a biotinylated plasma protein tracer is competing with plasma proteins in the tested sample for mAb binding. The amount of the bound tracer is determined by a streptavidin-peroxidase conjugate and a chemiluminescence substrate. We aimed to evaluate the analytical properties of the new QP300 system.
Methods: The performance of QP300 system was tested on the Evidence Investigator analyzer platform of Randox Ltd.. In the case of each mAb the interassay variability of the maximal relative light unit measured in the presence of the tracer alone (RLUmax) was determined first. Then aliquots of one plasma sample – diluted 300.times – were tested in ten subsequent experimental days and an interassay variability of the measured RLU and RLU/RLUmax rates were calculated. Finally an interoperator variability was also determined as the 10 replicates were prepared by 2 operators.
Results and Conclusions: The RLUmax values ranged from 45 to 102,500 and were below 1,500 only in the case of 30 mAbs, resulting in slightly higher interassay %CVs. The interassay and interoperator %CVs were typically <15%. The RLU values of the tested plasma sample were lower (50 to 71,175), and the number of mAbs with RLU<1,500 was somewhat higher (55) but the interassay and interoperator RLU %CVs were also typically <15%. The RLU/RLUmax rate was within the optimal inhibition range (20% to 80%) in the case of 214 mAbs, meaning that both increase and decrease in the plasma protein concentration can be measured. The interassay and interoperator %CVs were typically <15% in the case of this parameter, too.

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