SOLVO MDQ Kit™ CE IVD

MultiDrug Resistance protein function measurement

Novelty

SOLVO MDQ Kit™ is the first biomarker-based diagnostic kit for the detection of MDR protein function by flow cytometry. It is designed to determine the functional activity of the three clinically most relevant drug efflux proteins: MDR1, MRP1, and BCRP.

Background

Multidrug Resistance (MDR) is associated with drug-efflux transporter proteins located at physiological barriers. MDR is the principal mechanism by which many cancers develop resistance to chemotherapy or immune suppressant drugs administered in different types of leukemia, cancers, autoimmune diseases and to patients who underwent transplantation. Conventional anticancer drugs (e.g.: *Doxorubicin, Gefitinib, Imatinib, Irinotecan, Methotrexate, Mitoxantrone, Paclitaxel, Tamoxiphen, Topotecan, etc.*) are substrates of MDR transporters. Moreover, MDR transporters play a distinct role in immune response.

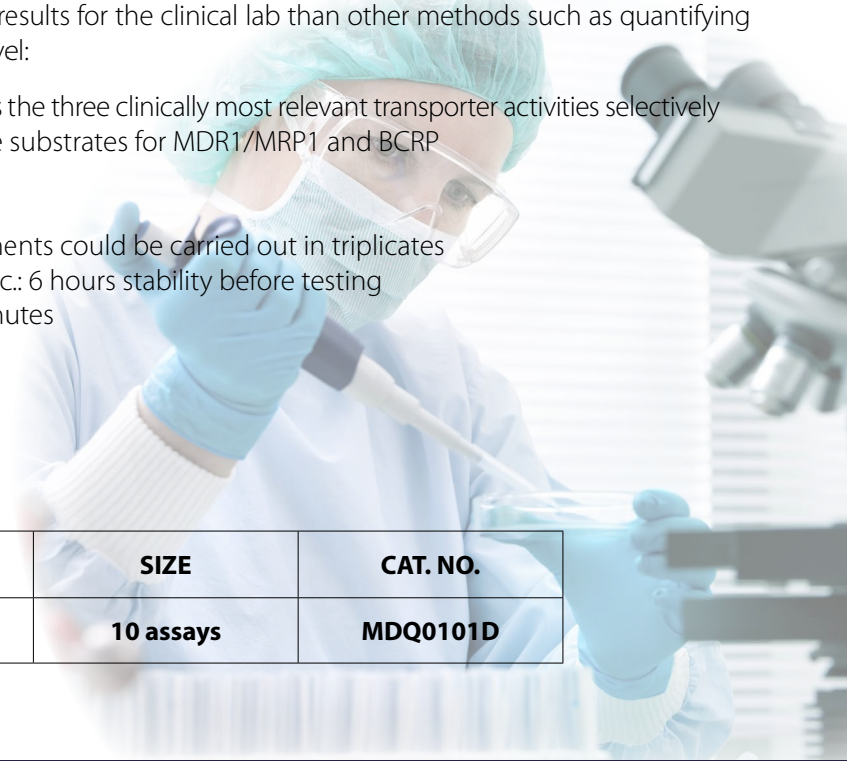
Clinical relevance

- The incidence of MDR in previously untreated cancer cases is approximately 40%
- MDR protein function is an independent negative prognostic biomarker in AML
- MDR protein function can be correlated with disease activity in autoimmune diseases such as RA
- MDR protein activity can be correlated with treatment response in RA to DMARDs and TNF-α inhibitors
- MDR protein activity determination is a safety measure for patients on highly demanding cytotoxic/immune suppressant drugs

Features

The *SOLVO MDQ Kit*™ is designed to maximize the benefits of flow cytometry. Literature data suggests that functional determination of MDR provides fast and more accurate results for the clinical lab than other methods such as quantifying the expression of the transporters at mRNA or protein level:

- The kit contains two proprietary assays and measures the three clinically most relevant transporter activities selectively
- Uses highly selective inhibitors and different probe substrates for MDR1/MRP1 and BCRP
- Compatible with cell surface markers
- Contains ready-to-use reagents
- 10 independent MDR1/MRP1 and BCRP measurements could be carried out in triplicates
- Specimen: cell suspension, blood, bone marrow etc.: 6 hours stability before testing
- The first test results can be expected within 90 minutes



Availability

PRODUCT	SIZE	CAT. NO.
SOLVO MDQ Kit™ CE IVD	10 assays	MDQ0101D

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Principle of the test

For quantitative measurement of MDR1 and MRP1 activities in viable cells, SOLVO MDQ Kit™ applies the proprietary Calcein-assay technology. This assay utilizes the fluorogenic dye calcein-acetoxymethyl ester (calcein-AM), which is a hydrophobic, non-fluorescent compound that readily penetrates the cell membrane. After entering the living cell, calcein-AM is rapidly hydrolyzed by endogenous esterases. As a result of the cleavage, a highly fluorescent free acid derivative of the dye is formed, which becomes trapped in the cytoplasm due to its hydrophilic character. Since calcein-AM is an excellent substrate of both MDR1 and MRP1, the activity of these efflux transporters results in a lower cellular accumulation of the fluorescent calcein (Figure 1a). Addition of selective inhibitors of MDR1 and MRP1 in excess blocks the dye extrusion activity of the relevant transporter and increases calcein acccumulation in the cells. Activities of MDR1 and MRP1 transporters are reflected by the difference between the amount of calcein accumulated in the presence or absence of the selective inhibitors. This difference is normalized to the dye uptake measured in the presence of the inhibitor and the results of the test are expressed in MDR activity factor (MAF) values. Thus, the result of the test becomes independent from factors influencing the cellular accumulation of calcein other than the activity of the multidrug transporters. These variables include the differences in cellular properties (membrane composition, intracellular esterase activity, cell size, cell surface, etc.); and the methodological differences (e.g. use of different equipment, amplification, and individual variables). Since the influence of these factors is diminished by the simple normalization approach mentioned above, the intra- and inter-laboratory comparison of MAF values is possible.

BCRP activity is measured using a similar principle: intracellular accumulation of the fluorescent BCRP-specific reporter substrate is measured in the presence and absence of the selective BCRP-inhibitor (Figure 1b). However, the BCRP-specific reporter substrate is directly fluorescent and does not require cleavage by the intracellular esterases.

Figure 1a – MDR1 and MRP1 activities in Acute Myeloid Leukemia on CD45+ cells

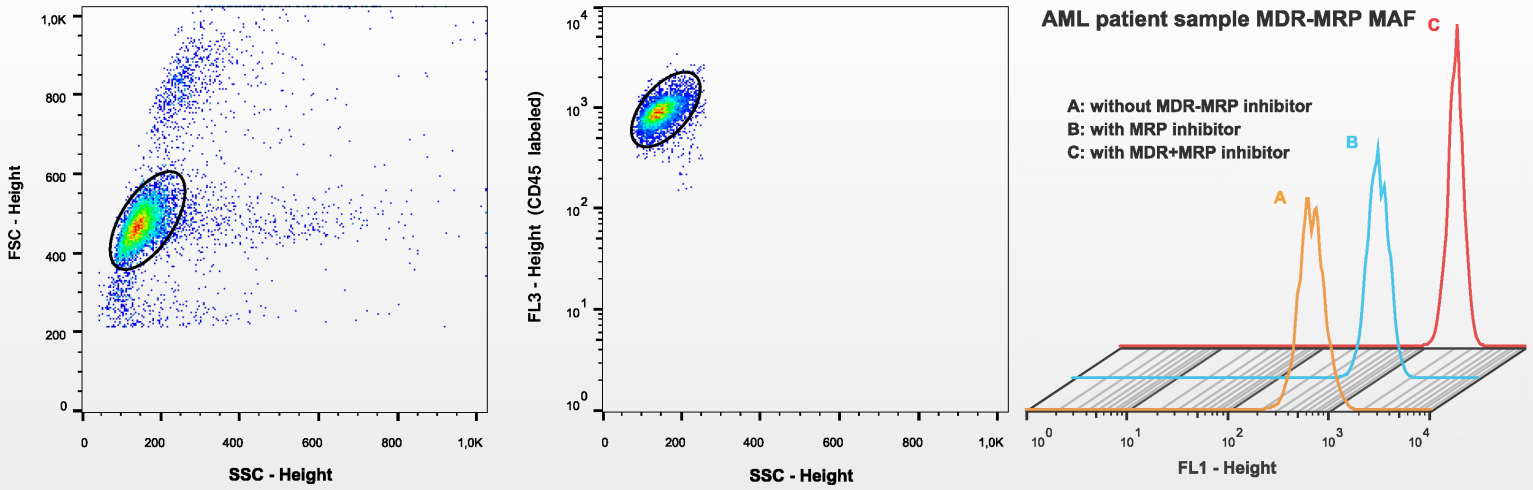
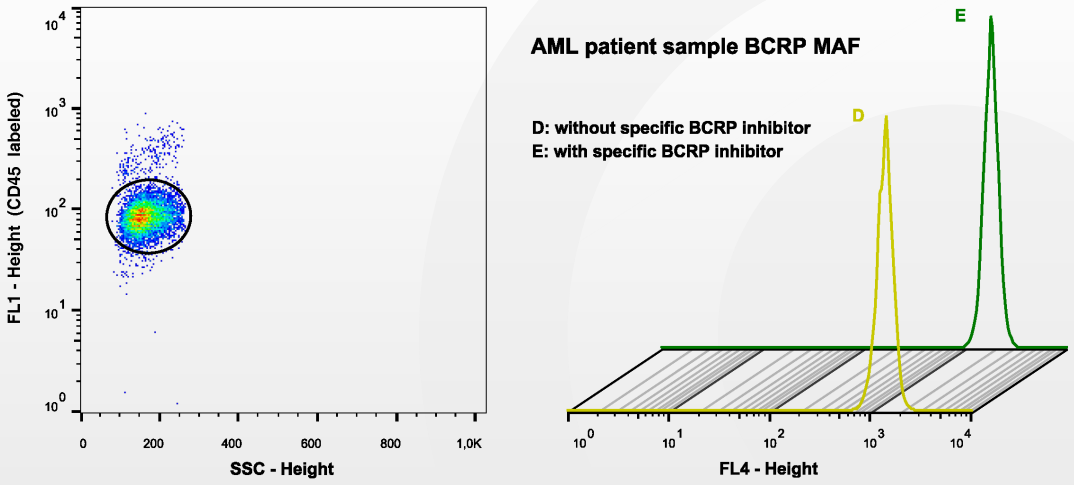


Figure 1b – BCRP activities in Acute Myeloid Leukemia on CD45+ cells



References

For further information and references check our website at: http://www.solvomdqkit.com/product/laboratory-specialists

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