MDQuest MultiDrugQuant Kit™
for
Multi Drug Resistance Protein function measurement

MDQuest MultiDrugQuant™ Kit is designed to determine the functional activity of the three clinically most relevant drug efflux transporter proteins: namely MDR1, MRP1 and BCRP by flow cytometry.

Background

MDR is associated with drug-efflux transporter proteins located at physiological barriers. MDR is the principal mechanism by which many cancer develops resistance to chemotherapy or immunosuppressant drugs administered in different type of leukemia, cancers, autoimmune diseases and to patients who underwent transplantation. Conventional anticancer drugs (e.g.: doxorubicin, gefitinib, imatinib, irinotecan, methotrexate, mitoxanthrone, paclitaxel, tamoxiphen, topotecan, etc.) are substrates of MDR transporters. Moreover, MDR transporters play distinct role in immune response.

Rationale

Determination of MDR1, MRP1 and BCRP efflux function is your tool for:

- Drug-transporter interaction studies
- Drug-drug interactions (ADME)
- Drug-efflux modulation
- Studying transporter malfunction diseases
- Studying hematologic malignancies
- Studying systemic inflammatory diseases

Features

The MDQuest MultiDrugQuant™ Kit is designed to maximize the benefits of flow cytometry. Literature data suggest that the functional determination of MDR provides fast and more accurate results for the clinical lab than other methods, such as quantifying the expressions of the transporters at mRNA or protein level.

- 10 independent MDR1/MRP1 and BCRP measurements could be carried out in triplicate
- Uses highly selective inhibitors and probe substrates
- Compatible with cell surface markers
- Contains ready-to-use reagents
- Specimen: cell suspension peripheral blood cells, bone marrow
- The first results can be expected within 90 minutes
- The reagents work on every popular cell analyzer

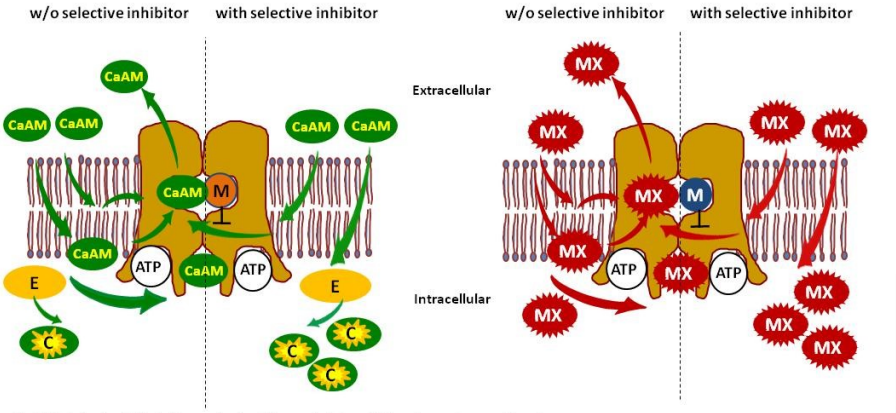
Calcein assay is protected by international patents

Principle of the test

For quantitative measurement of MDR1 and MRP1 activities in viable cells, MDQuest MultiDrugQuant™ 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 rapidly hydrolyzed by endogenous esterases. As a result of cleavage, 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.

Addition of selective inhibitors of MDR1 and MRP1 in excess blocks the dye extrusion activity of the relevant transporter and increases calcein accumulation 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. The difference is normalized to dye uptake measured in the presence of the inhibitor and the results of the expressed MDR activity factor (MAF) values. Thus the result of test becomes independent from factors influencing the cellular accumulation of calcein other than the activity of 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 interlaboratory 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 selective BCRP inhibitor. However, the BCRP-specific reporter substrate is directly fluorescent and does not require cleavage by intracellular esterases.



CaAM: Calcein-AM; C: free calcein; M: modulator; MX: mitoxantrone; E: esterases

Availability

PRODUCT	SIZE	CAT. NO
MDQuest MultiDrugQuant™ Kit	10 assays	MDQ0101R

Further information

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