

## Technology Offer

# Novel antibody to carbonic anhydrase XII with therapeutic and diagnostic potential for solid tumors and eye diseases

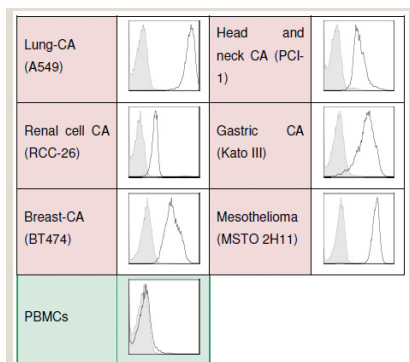
Reference Number: TO 01-00830



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## Challenge

Carbonic anhydrases (CAs) are a family of enzymes that catalyze the reversible hydration of carbonic acid to bicarbonate and protons, and thus participate in the maintenance of pH homeostasis in the body. Carbonic anhydrase XII (CA-XII), a member of the membrane-associated CAs has been associated with neoplastic processes and is expressed and serves as a potential histological and prognostic biomarker of various tumors. High expression of CA-XII in tumors, particularly under hypoxic conditions has further suggested that the enzyme may functionally participate in the invasion process and might be an attractive target for adjuvant therapies. In favor of this hypothesis, it has been shown *in vitro* that inhibitors to other members of the CA family can reduce the invasion capacity and proliferation of cancer cells. Moreover, CA-inhibitors are used to reduce intraocular pressure and thus to treat ocular hypertension as well as for the treatment of glaucoma.



CA-XII expression on human cancer cell lines using mAb

Source: HMGU, Prof. Zeidler

## Technology

The rat monoclonal antibody (mAb) generated is capable to specifically bind to an conformational epitope of CA-XII. The mAb shows unique properties with respect to its binding and biological activity: the mAb inhibits the activity of CA-XII specifically and much more efficiently than a known CA-XII inhibitor sulfonamide acetazolamide. In addition, metabolic activity in 3-dimensional multicellular tumor spheroids was significantly inhibited by the mAb. Mimicking hypoxic tumor conditions using a cell culture model the mAb inhibits the growth of different human cancer cell lines.

## Commercial Benefit and Opportunity

The mAb described is the first and only antibody identified that specifically inhibits the activity of CA-XII on living cancer cells. This is a proof of concept of the suitability of the mAb for therapeutic and diagnostic means of a disease associated with carbonic anhydrase XII activity.

The technology is available for exclusive or non-exclusive licensing as well as for joint collaboration for further validation, humanization and/or clinical development.

## Developmental Status

*In vitro* proof of principle studies were conducted with a variety of human cancer cell lines (see figure). The mAb is currently further characterized by means of inhibition assays as well as histological analyses. An *in vivo* model is currently established to determine the efficacy and specificity of the mAb.

## Patent Situation

An EP patent application has been filed in 2010. Further information available under CDA.

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