Glutamine Synthetase (GS-6)

Mouse anti-human Glutamine Synthetase Monoclonal Antibody (Clone GS-6)

REFERENCES AND PRESENTATIONS[1]

- **ready-to-use (manual or LabVision AutoStainer)**
  MAD-000688QD–3
  MAD-000688QD–7
  MAD-000688QD–12
- **Ready-to-use (MD-Stainer)**[2]
  MAD-000688QD-3/V
  MAD-000688QD/V
- **concentrated**
  MAD-000688Q - 1:50 recommended dilution

COMPOSITION
Anti-human Glutamine Synthetase mouse monoclonal antibody purified from serum and prepared in 10mM PBS, pH 7.4, with 0.2% BSA and 0.09% sodium azide
INTENDED USE IVD: Immunohistochemistry (IHC) on paraffin embedded tissues. Not tested on frozen tissues or Western-Blotting
CLONE: GS-6
Ig ISOTYPE: IgG_{2a}
SPECIES REACTIVITY: In vitro diagnostics in humans. Not tested in other species
DESCRIPTION AND APPLICATIONS:
Glutamine synthetase (GS) catalyzes the synthesis of glutamine from glutamate and ammonia in the mammalian liver. In normal liver, GS expression is seen in pericentral hepatocytes, but not in mid-zonal or periportal hepatocytes. Glutamine, the end product of GS activity, is the major energy source of tumor cells. Based on findings from experimental hepatocarcinogenesis, GS positive tumor cells are believed to be derived from GS positive hepatocytes. Thus, anti-GS has been suggested as a marker for hepatocellular carcinoma (HCC). GS immunoreactivity has been seen in a majority of HCC (37 of 53 cases, 70%), including 7 of 10 cases of early HCC (70%) and 12 of 22 (59%) for low grade HCC. In nonmalignant nodules, GS overexpression was only seen in 3 high grade dysplastic nodules (HGDN,13.6%). In these cases, GS overexpression was restricted to 11.5%-50% of hepatocytes, whereas in HCC the majority of cases (28 of 53, 53%), including early HCC (60%), showed diffuse immunostaining (>50% tumor cells). Overall, the sensitivity, specificity, and positive and negative predictive values of anti-GS for HCC detection were 69.8%, 94.2%, 92.5%, and 75.4%, respectively. A panel composed of antibodies against HSP70, GPC3, and GS has been proposed to be very useful in distinguishing between dysplastic and early malignant hepatocellular nodules arising in cirrhosis. The "all positive" phenotype is restricted to approximately half of early HCC to well-differentiated HCC but has never been reported in dysplastic lesions, whereas the reverse phenotype, "all negative", has been shown to be a feature of the majority of HGDN and of all low grade dysplastic nodules.

IHC POSITIVE CONTROL: Hepatocellular carcinoma, normal liver

VISUALIZATION: Cytoplasmic

IHC RECOMMENDED PROCEDURE:
- 4µm thick section should be taken on charged slides; dry overnight at 60ºC
- Deparaffinise, rehydrate and HIER (heat induced epitope retrieval) – boil tissue in the Pt Module using Vitro S.A EDTA buffer pH8[3] for 20 min at 95ºC. Upon completion rinse with 3-5 changes of distilled or deionised water followed by cooling at RT for 20 min
- Endogenous peroxidase block - Blocking for 10 minutes at room temperature using peroxidase solution (ref. MAD-021540Q-125)
- Primary antibody: incubate for 20 minutes [The antibody dilution (when concentrated) and protocol may vary depending on the specimen preparation and specific application. Optimal conditions should be determined by the individual laboratory]
- For detection use Master Polymer Plus Detection System (HRP) (DAB included; ref. MAD-000237QK)
- Counterstaining with haematoxylin and final mounting of the slide

STORAGE AND STABILITY: Stored at 2-8ºC. Do not freeze. Once the packaging has been opened it can

[1] These references are for presentation in vials of Low Density Polyethylene (LDPE) dropper. In case the products are used in automated stainers, a special reference is assigned as follows:
- / L: Cylindrical screw-cap vials (QD-3 / L, QD-7 / L, QD-12 / L).
- / N: Polygonal screw-cap vials (QD-3 / N, QD-7 / N, QD-12 / N).
For different presentations (references / volumes) please contact the supplier.

[2] For Technical specifications for MD-Stainer, please contact your distributor.

[3] Ref: MAD-004072R/D

Vitro S.A.
Calle Luís Fuentes Bejarano 60 Ed. Nudo Norte Local 3 41020 Sevilla (Spain)
Tel: +34 954 933 200. vitro@vitro.bio ; www.vitro.bio

be stored until the expiration date of the reagent indicated on the label. If the reagent has been stored under other conditions to those indicated in this document, the user must first check its correct performance taking into account the product warranty is no longer valid.

WARNINGS AND PRECAUTIONS:

1. Avoid contact of reagents with eyes and mucous membranes. If reagents come into contact with sensitive areas, wash with copious amounts of water.
2. This product is harmful if swallowed.

3. Consult local or state authorities with regard to recommended method of disposal.
4. Avoid microbial contamination of reagents.

SAFETY RECOMMENDATIONS:

This product is intended for laboratory professional use only. The product is NOT intended to be used as a drug or for domestic purposes. The current version of the Safety Data Sheet for this product can be downloaded by searching the reference number at www.vitro.bio or can be requested at regulatory@vitro.bio.

BIBLIOGRAPHY

1. Clancy KP, Berger R, Cox M, Bleskan J, Walton KA, Hart I, Patterson D. Localization of the L-glutamine synthetase gene to chromosome 1q23. Genomics. 1996 Dec 15;38(3):418-20
2. Gunnersen D, Haley B. Detection of glutamine synthetase in the cerebrospinal fluid of Alzheimer diseased patients: a potential diagnostic biochemical marker. Proc Natl Acad Sci U S A. 1992 Dec 15;89(24):11949-53
3. Häberle J, Görg B, Rutsch F, Schmidt E, Toutain A, Benoist JF, Gelot A, Suc AL, Höhne W, Schliess F, Häussinger D, Koch HG. Congenital glutamine deficiency with glutamine synthetase mutations. N Engl J Med. 2005 Nov 3;353(18):1926-33
4. Rose C, Jalan R. Congenital glutamine deficiency with glutamine synthetase mutations. N Engl J Med. 2006 Mar 9;354(10):1093-4
5. Di Tommaso L, Franchi G, Park YN, Fiamengo B, Destro A, Morenghi E, Montorsi M, Torzilli G, Tommasini M, Terracciano L, Tornillo L, Vecchione R, Roncalli M. Diagnostic value of HSP70, glypican 3, and glutamine synthetase in hepatocellular nodules in cirrhosis. Hepatology. 2007 Mar;45(3):725-34
6. Bioulac-Sage P, Laumonier H, Rullier A, Cubel G, Laurent C, Zucman-Rossi J, Balabaud C. Over-expression of glutamine synthetase in focal nodular hyperplasia: a novel easy diagnostic tool in surgical pathology. Liver Int. 2009 Mar;29(3):459-6
7. Shafizadeh N, Kakar S. Diagnosis of well-differentiated hepatocellular lesions: role of immunohistochemistry and other ancillary techniques. Adv Anat Pathol. 2011 Nov;18(6):438-45
8. Bioulac-Sage P, Cubel G, Balabaud C, Zucman-Rossi J. Revisiting the pathology of resected benign hepatocellular nodules using new immunohistochemical markers. Semin Liver Dis. 2011 Feb;31(1):91-103
9. Lagana SM, Salomao M, Bao F, Moreira RK, Lefkowitch JH, Remotti HE. Utility of an immunohistochemical panel consisting of glypican-3, heat-shock protein-70, and glutamine synthetase in the distinction of low-grade hepatocellular carcinoma from hepatocellular adenoma. Appl Immunohistochem Mol Morphol. 2013 Mar;21(2):170-6

LABEL AND BOX SYMBOLS

Explanation of the symbols of the product label and box:

	Expiration date
	Temperature limit
	Manufacturer
	Sufficient content for <n> assays
	Catalog number
	Lot code
	Refer to the instructions of use
	Medical product for *in vitro* diagnosis.
	Material safety data sheet