Glutamine Synthetase
Clone: GS-6
Mouse Monoclonal

**Intended Use**
For In Vitro Diagnostic Use.

This antibody is intended for use in Immunohistochemical applications on formalin-fixed paraffin-embedded tissues (FFPE), frozen tissue sections and cell preparations. Interpretation of results should be performed by a qualified medical professional.

**Immunogen**
Human Glutamine Synthetase aa. 1-373.

**Summary and Explanation**
Glutamine synthetase (GS) is an enzyme that plays an essential role in the metabolism of nitrogen by catalyzing the condensation of glutamate and ammonia to form glutamine. GS is present predominantly in the brain, kidneys, and liver. GS in the brain participates in the metabolic regulation of glutamate, the detoxification of brain ammonia, the assimilation of ammonia, recycling of neurotransmitters, and termination of neurotransmitter signals. In normal liver, GS expression is seen in pericentral hepatocytes, but not in mid-zonal or perportal hepatocytes.

GS positive tumor cells are believed to be derived from GS positive hepatocytes. GS immunoreactivity has been seen in a majority of hepatocellular carcinoma (HCC), including cases of early HCC (70%) and for low grade SCC (59%). In nonmalignant nodules, GS overexpression is only seen in 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 (53%), including early HCC (60%), showed diffuse immunostaining (>50% tumor cells). 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. Staining of hepatocellular lesions with anti-GS antibody have been useful in the differential diagnosis of focal nodular hyperplasia (FNH), hepatic adenoma (HCA), and dysplastic nodules, and low grade hepatocellular carcinoma. In the case of FNH, GS stains in a characteristic “map-like” pattern, thus differentiating it from HCA, in which GS staining is usually absent, but may occasionally be present at the border of the lesion or around the veins inside the tumor.

**Presentation**
Glutamine Synthetase is a mouse monoclonal antibody derived from cell culture supernatant that is concentrated, dialyzed, filter sterilized and diluted in buffer pH 7.5, containing BSA and sodium azide as a preservative.

**Precautions**
1. For professional users only. Ensure results are interpreted by a medical professional.
2. This product contains sodium azide (NaN3), a toxic chemical which may react with plumbing to form highly explosive build-ups of metal azides. Upon disposal, flush with large volumes of water to prevent sodium azide build-up.
3. Ensure proper handling procedures are used with reagent. Always wear proper laboratory equipment such as laboratory coat and gloves when handling reagents.
4. Unused solution should be disposed of according to local and federal regulations.
5. Do not ingest reagent. If reagent ingested, contact a poison control center immediately.
6. For complete recommendations for handling biological specimens please refer to the CDC document, “Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories.”

**Storage**
Store at 2-8°C. Do not use after expiration date listed on package label. Temperature fluctuations should be avoided. Store appropriately when not in use, and avoid prolonged exposure to room temperature conditions.

**Specimen Preparation**
**Paraffin sections:** The antibody can be used on formalin-fixed paraffin-embedded (FFPE) tissue sections. Ensure tissue undergoes appropriate fixation to ensure best results. Pre-treatment of tissues with heat-induced epitope retrieval (HIER) is recommended using Bio SB ImmunDNA Retriever with Citrate (BSB 0020-BSB 0023), ImmunDNA Retriever with EDTA (BSB 0030-BSB 0033) or ImmunDNA Digestor (BSB 0108-0112). See reverse side for complete protocol. Tissue should remain hydrated via use of Bio SB Immun/DNA Washer solutions (BSB 0029 & BSB 0042).

**Frozen sections and cell preparations:** The antibody can be used for labeling acetone-fixed frozen sections and acetone-fixed cell preparations.

**Presentations**

<table>
<thead>
<tr>
<th>Catalog Num.</th>
<th>Antibody Type</th>
<th>Dilution</th>
<th>Volume/Qty</th>
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<td>BSB 2929</td>
<td>Tinto Prediluted</td>
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<td>BSB 2933</td>
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<td>BSB 2934</td>
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<tr>
<td>BSB 2935</td>
<td>Control Slides</td>
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<td>5 slides</td>
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**Antibody Type**
Mouse Monoclonal

**Clone:** GS-6

**Isotype:** IgG2a

**Localization:** Cytoplasmic

**Species Reactivity:** Human, Mouse, Rat

**Reactivity:** Paraffin, Frozen

**Dilution:** Ready-to-Use
**Staining Procedure**

1. Cut and mount 3-5 micron formalin-fixed paraffin-embedded tissues on positive charged slides such as Bio SB Hydrophilic Plus Slides (BSB 7028).
2. Air dry for 2 hours at 58°C.
3. Deparaaffinisize, dehydrate and rehydrate tissues.
4. Subject tissues to heat epitope retrieval using a suitable retrieval solution such as ImmunoDNA Retriever with Citrate (BSB 0020-BSB 0023) or EDTA (BSB 0030-BSB 0033).
5. Any of three heating methods may be used:
   a. **TintoRetriever Pressure Cooker or Equivalent**
      Place tissues/slides in a staining dish or coplin jar containing the ImmunoDNA Retriever with Citrate or EDTA, and place in the pressure cooker. Add 1-2 inches of distilled water to the pressure cooker and turn heat to high. Incubate for 15 minutes. Open and immediately transfer slides to room temperature.
   b. **TintoRetriever PT Module or Water Bath Method**
      Place tissues/slides in a pre-warmed staining dish or coplin jar containing the ImmunoDNA Retriever with Citrate or EDTA at 95°-99°C. Incubate for 30-60 minutes.
   c. **Conventional Steamer Method**
      Place tissues/slides in a pre-warmed staining dish or coplin jar containing the ImmunoDNA Retriever with Citrate or EDTA in a Steamer, cover and steam for 30-60 minutes.
6. After heat treatment, transfer slides in ImmunoDNA Retriever with Citrate or EDTA to room temperature and let stand for 15-20 minutes.
7. For manual staining, perform antibody incubation at ambient temperature. For automated staining methods, perform antibody incubation according to instrument manufacturer's instructions.
8. Wash slides with IHC wash buffer or DI water.
9. Continue IHC staining protocol.

**Recommended IHC Protocol**

<table>
<thead>
<tr>
<th>Step</th>
<th>ImmunoDetector AP/HRP</th>
<th>PolyDetector AP/HRP</th>
<th>PolyDetector Plus HRP</th>
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</thead>
<tbody>
<tr>
<td>Peroxidase/AP Blocker</td>
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<td>5 min.</td>
<td>5 min</td>
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<tr>
<td>Primary Antibody</td>
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<td>30-60 min.</td>
<td>30-60 min.</td>
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<td>1st Step Detection</td>
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<td>30-45 min.</td>
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<td>5-10 min.</td>
<td>5-10 min.</td>
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<tr>
<td>Counterstain</td>
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<td>Varies</td>
<td>Varies</td>
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</tbody>
</table>

**Symbol Key**

- **IVD**: In Vitro Diagnostic Medical Device
- **REF**: Reference Number
- **LOT**: Lot Number

**Product Limitations**

Due to inherent variability present in immunohistochemical procedures (including fixation time of tissues, dilution factor of antibody, retrieval method utilized and incubation time), optimal performance should be established through the use of positive and negative controls. Results should be interpreted by a medical professional.

**References**