SYSY Antibodies

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GAD2 (GAD65)

Cat.No. 198 104; Polyclonal Guinea pig antibody, 100 µl antiserum (lyophilized)

Data Sheet

Reconstitution/ Storage	100 µl antiserum, lyophilized. For **reconstitution** add 100 µl H_2O, then aliquot and store at -20°C until use. Antibodies should be stored at +4°C when still lyophilized. Do not freeze! For detailed information, see back of the data sheet.
Applications	**WB**: 1 : 1000 (AP staining) **IP**: yes **ICC**: 1 : 500 up to 1 : 2000 **IHC**: 1 : 500 **IHC-P (FFPE)**: 1 : 300 **ExM**: external data (see remarks)
Immunogen	Recombinant protein corresponding to the amino terminus of mouse GAD2 (UniProt Id: P48320)
Reactivity	Reacts with: human (Q99259), rat (P18088), mouse (P48318). Other species not tested yet.
Specificity	Specific for GAD 2 / GAD 65.
Matching control	198-1P
Remarks	**ExM**: This antibody has been successfully applied and published for this method by customers (see application-specific references).

TO BE USED IN VITRO / FOR RESEARCH ONLY
NOT TOXIC, NOT HAZARDOUS, NOT INFECTIOUS, NOT CONTAGIOUS

Background

The **g**lutamic **a**cid **d**ecarboxylases GAD1 and GAD2, also referred to as GAD67 and GAD65 respectively, synthesize γ-aminobutyric acid (GABA), the major inhibitory neurotransmitter in the central nervous system. Therefore, GADs are widely used markers for the GABAergic system (1). The hydrophilic GAD1 can heterodimerize with the membrane achored GAD2 and a part of GAD1 is targeted to inhibitory nerve terminals by this mechanism (2). Although both proteins exhibit significant differences in their N-terminus they share high homology in the rest of the molecule (3).
GAD1 and 2 also occur in rodent pancreatic islets of Langerhans, whereas human islets mainly express GAD2 which has been identified as a major autoantigen in type 1 diabetes (3).

For more information on protein expression pattern, please refer to the overview image in our SYSY Antibodies ATLAS.

Selected References for 198 104

Nrg1 haploinsufficiency alters inhibitory cortical circuits.
Navarro-Gonzalez C, Carceller H, Benito Vicente M, Serra I, Navarrete M, Domínguez-Canterla Y, Rodríguez-Prieto Á, González-Manteiga A, Fazzari P
Neurobiology of disease (2021) 157: 105442. . **WB, IHC; tested species: mouse**

Cerebrospinal fluid-contacting neuron tracing reveals structural and functional connectivity for locomotion in the mouse spinal cord.
Nakamura Y, Kurabe M, Matsumoto M, Sato T, Miyashita S, Hoshina K, Kamiya Y, Tainaka K, Matsuzawa H, Ohno N, Ueno M, et al.
eLife (2023) 12: . . **IHC, EXM; tested species: mouse**

Structure of excitatory synapses and GABAA receptor localization at inhibitory synapses are regulated by neuroplastin-65.
Herrera-Molina R, Sarto-Jackson I, Montenegro-Venegas C, Heine M, Smalla KH, Seidenbecher CI, Beesley PW, Gundelfinger ED, Montag D
The Journal of biological chemistry (2014) 28913: 8973-88. . **ICC; tested species: mouse**

Acid sphingomyelinase activity regulates in vitro CREB activation in murine primary neurons.
Zeitler S, Füermann F, Monti J, Reichel M, Gulbins E, Kornhuber J, Fejtova A, Rhein C
Behavioural brain research (2026) 508: 116206. . **ICC; tested species: mouse**

Chronic benzodiazepine treatment triggers gephyrin scaffold destabilization and GABAAR subsynaptic reorganization.
Chapman CA, Povysheva N, Tarr TB, Nuwer JL, Meriney SD, Johnson JW, Jacob TC
Frontiers in cellular neuroscience (2025) 19: 1624813. . **ICC; tested species: rat**

ATP Synthase Abundance in Neuronal Extracellular Vesicles Reflects Changes in the Mitochondria of Parent Neurons.
Yao PJ, Nogueras-Ortiz C, Pucha KA, Kapogiannis D
Journal of extracellular vesicles (2025) 148: e70140. . **ICC; tested species: rat**

Control of contextual memory through interneuronal α5-GABAA receptors.
Zhu M, Abdulzahir A, Perkins MG, Chu CC, Krause BM, Casey C, Lennertz R, Ruhl D, Hentschke H, Nagarajan R, Chapman ER, et al.
PNAS nexus (2023) 24: pgad065. . **IHC; tested species: mouse**

Neuronal Autophagy Regulates Presynaptic Neurotransmission by Controlling the Axonal Endoplasmic Reticulum.
Kuijpers M, Kochlamazashvili G, Stumpf A, Puchkov D, Swaminathan A, Lucht MT, Krause E, Maritzen T, Schmitz D, Haucke V
Neuron (2021) 1092: 299-313.e9. . **ICC; tested species: mouse**

GABA bouton subpopulations in the human dentate gyrus are differentially altered in mesial temporal lobe epilepsy.
Alhourani A, Fish KN, Wozny TA, Sudhakar V, Hamilton RL, Richardson RM
Journal of neurophysiology (2020) 1231: 392-406. . **IHC; tested species: human**

Optogenetic "low-theta" pacing of the septohippocampal circuit is sufficient for spatial goal finding and is influenced by behavioral state and cognitive demand.
Mouchati PR, Kloc ML, Holmes GL, White SL, Barry JM
Hippocampus (2020) 3011: 1167-1193. . **IHC; tested species: rat**

Access the online factsheet including applicable protocols at https://sysy.com/product/198104 or scan the QR-code.

FAQ - How should I store my antibody?

Shipping Conditions

- All SYSY antibodies and control proteins/peptides are shipped lyophilized (vacuum freeze-dried). In this form, they remain stable without loss of quality at ambient temperatures for several weeks.

Storage of Sealed Vials after Delivery

- **Unlabeled** and **biotin-labeled antibodies** and **control proteins** should be stored at **4°C** before reconstitution. **Do not freeze lyophilized antibodies**. Temperatures below 0°C may impair performance.
- **Fluorescence-labeled antibodies** should be reconstituted immediately upon receipt. Long-term storage of lyophilized fluorophore-conjugates may cause aggregation.
- **Control peptides** should be stored at -20°C before reconstitution.

Long Term Storage after Reconstitution (General Considerations)

- **Do not use frost-free ("no-frost") freezers.** These units periodically warm to remove ice buildup, causing freeze–thaw cycles that can damage antibodies.
- Store vials in areas with minimal temperature fluctuation - preferably toward the back of the freezer, not on the door.
- Aliquot reconstituted antibodies and store at –20°C to –80°C.
- Avoid very small aliquots (<20 µL), as evaporation and adsorption to tube surfaces can reduce antibody concentration and activity.
- Use the smallest practical storage vial to minimize surface area.
- Adding glycerol to a final concentration of 50% prevents freezing at -20°C, allowing storage in liquid form and effectively avoiding freeze–thaw cycles.

Product Specific Hints for Storage

Control proteins / peptides

- Store at -20°C to -80°C

Monoclonal Antibodies

- **Ascites and hybridoma supernatant:** Store at -20°C to -80°C
  Prolonged storage at 4°C is not recommended, as proteases present in ascites may degrade antibodies.
- **Purified IgG:** Store at -20°C to -80°C
  Adding a carrier protein (e.g., BSA) enhances long-term stability.
  Many SYSY antibodies already contain carrier proteins - refer to the respective datasheet for details.

Polyclonal Antibodies

- **Crude antisera:** Can be stored at 4°C with antimicrobials added, but -20°C to -80°C is preferred
- **Affinity-purified antibodies:** Less stable than antisera; store at -20°C to -80°C
  Adding a carrier protein such as BSA improves long-term stability.
  Most SYSY antibodies already contain carrier proteins - refer to the respective datasheet for details.

Fluorescence-labeled Antibodies

- Store as a liquid with 1:1 (v/v) glycerol at -20°C, and protect from light exposure

Avoid repeated freeze-thaw cycles for all antibodies!

FAQ - How should I reconstitute my antibody?

Reconstitution

- All purified SYSY antibodies are lyophilized from PBS. To reconstitute the antibody in PBS, add the volume of deionized water specified in the corresponding datasheet. If a larger final volume is desired, first add the recommended amount of water, then adjust with PBS and, if needed, add a stabilizing carrier protein (e.g., BSA) to a final concentration of 2%. Some SYSY antibodies already contain albumin; please take this into account before adding additional carrier protein.

For complete reconstitution, carefully remove the vial cap. After adding water, briefly vortex the solution. To collect the liquid at the bottom of the vial, place the vial inside a 50 ml centrifuge tube padded with paper and centrifuge briefly.

- If desired, small amounts of azide or thimerosal may be added to prevent microbial growth. This is particularly recommended when storing an aliquot at 4°C.
- After reconstitution of fluorescence-labeled antibodies, add glycerol 1:1 (v/v) to achieve a final concentration of 50%. This prevents freezing at –20°C and keeps the antibody in liquid form, effectively avoiding freeze–thaw cycles.
- Glycerol may also be added to unlabeled primary antibodies as a general measure to prevent freeze–thaw damage.
- For further guidance, please refer to our **storage tips** and recommendations for reconstituted antibodies, control peptides, and control proteins.