

## Product Information

### Anti-VGLUT1

Developed in Rabbit  
IgG Fraction of Antiserum

Product Number **V 0389**

### Product Description

Anti-VGLUT1 is developed in rabbit using a synthetic peptide corresponding to a region near the C-terminus of human VGLUT1 (amino acids 504-520), conjugated to KLH as immunogen. The VGLUT1 sequence is identical in rat VGLUT1. This sequence has partial homology to VGLUT2. Whole antiserum is fractionated and then further purified by ion-exchange chromatography to provide the IgG fraction of antiserum that is essentially free of other rabbit serum proteins.

Anti-VGLUT1 recognizes VGLUT1 (60 kDa). Applications include the detection of VGLUT1 by immunoblotting. Staining of VGLUT1 in immunoblotting is specifically inhibited with the VGLUT1 immunizing peptide (amino acids 504-520).

Glutamate is the major excitatory neurotransmitter in the mammalian central nervous system (CNS).<sup>1</sup> Packaging and storage of glutamate in glutaminergic neuronal vesicles requires an ATP-dependent vesicular glutamate uptake system, which utilizes the electrochemical proton gradient as a driving force.<sup>2,3</sup> VGLUT1 (vesicular glutamate transporter 1, originally termed BNPI and characterized as a Na<sup>+</sup>/P<sub>i</sub> transporter) is a 60 kDa protein responsible for vesicular glutamate uptake.<sup>4-7</sup> Uptake of glutamate by VGLUT1 has all the functional characteristics previously reported for a vesicular transporter with a membrane potential ( $\Delta\psi$ ) as the predominant driving force. In contrast to the Na<sup>+</sup>-dependent plasma membrane glutamate transporters, VGLUT1 is highly specific for L-glutamate, it displays low substrate affinity (1mM) and is stimulated by physiologically relevant concentration of Cl<sup>-</sup> ions.

Overexpression of VGLUT1/BNPI in mammalian cell lines results in transport of glutamate into isolated intracellular vesicles. VGLUT1 expression is confined to subpopulations of glutaminergic axon terminals where it is exclusively localized on small synaptic vesicles.<sup>6,7</sup> VGLUT1-containing synaptic vesicles immuno-isolated from rat brain are enriched in glutamate-uptake activity but display only marginal GABA uptake activity.<sup>6</sup> VGLUT1-expressing cells release glutamate in a quantal manner, monitored by reporter cells expressing a nondesensitizing variant of

the AMPA glutamate receptor. In addition, GABAergic neurons in culture release glutamate in addition to GABA when VGLUT1 is exogenously expressed.<sup>6</sup> Recently, a second VGLUT isoform was cloned (82% identity to VGLUT1) and named differentiation-associated Na<sup>+</sup>/P<sub>i</sub> transporter (DNPI) or VGLUT2.<sup>8-11</sup> The mRNA of VGLUT2 displays a complementary distribution to VGLUT1. VGLUT2 is a highly selective glutamate transporter, H<sup>+</sup>-dependent and requires Cl<sup>-</sup> ions. VGLUT2 is enriched in synaptic vesicles and selective for a distinct class of glutaminergic nerve terminals.<sup>12</sup> In general, VGLUT1 is associated with neuronal pathways that exhibit activity-dependent potentiation, whereas VGLUT2 is expressed in sensory and autonomic pathways that display high fidelity neurotransmission. VGLUT1 and VGLUT2 isoforms may account for glutamate uptake by synaptic vesicles from all glutaminergic neurons.

### Reagent

Anti-VGLUT1 is supplied as a solution in 0.01 M phosphate buffered saline, pH 7.4, containing 15 mM sodium azide.

### Precautions and Disclaimer

Due to the sodium azide content, a material safety data sheet (MSDS) for this product has been sent to the attention of the safety officer of your institution. Consult the MSDS for information regarding hazards and safe handling practices.

### Storage/Stability

For continuous use, store at 2-8 °C for up to one month. For prolonged storage, freeze in working aliquots at -20 °C. Repeated freezing and thawing is not recommended. Storage in frost-free freezers is also not recommended. If slight turbidity occurs upon prolonged storage, clarify the solution by centrifugation before use. Working dilutions should be discarded if not used within 12 hours.

### Product Profile

A minimum working dilution of 1:1,000 is determined by immunoblotting (chemiluminescent substrate) using a synaptic vesicle (SV) fraction of rat brain.

Note: In order to obtain the best results using different techniques and preparations, we recommend determining the optimal working dilutions by titration.

### References

1. Storm-Mathisen, J., et al., Nature, **301**, 517 (1983).
2. (1983).
3. Maycox, P.R., et al., J. Biol. Chem., **263**, 15423 (1988).
4. Tabb, J., et al., J. Biol. Chem., **267**, 15412 (1992).
5. Ni, B., et al., Proc. Natl. Acad. Sci. USA, **91**, 5607 (1994).
6. Bellocchio, E.E., et al., J. Neurosci., **18**, 8648 (1998).
7. Takamori, S., et al., Nature, **407**, 189 (2000).
8. Bellocchio, E.E., et al., Science, **289**, 957(2000).
9. Aihara, Y., et al., J. Neurochem., **74**, 2662 (2000).
10. Bai, L., et al., J. Biol. Chem., **276**, 36764 (2001).
11. Takamori, S., et al., J. Neurosci., **21**, RC182 (2001).
12. Herzog, E., et al., J. Neurosci., **21**, RC181 (2001).
13. Varoqui, H., et al., J. Neurosci., **22**, 142 (2002).

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