

**BETAINE TRANSPORT IN GIANT FIBER LOBES OF THE SQUID  
*LOLLIGUNCULA BREVIS***

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**ABSTRACT:** Although it is known that cephalopods and other marine molluscs accumulate organic osmolytes to prevent cellular water loss in the high salinity of seawater, very few studies on molluscs, and no studies on cephalopods have been performed to characterize the underlying transport processes. We used [<sup>3</sup>H] betaine to quantify the uptake of betaine into giant fiber lobe motor neurons of the squid *Lolliguncula brevis*. We found that betaine uptake was Na<sup>+</sup> and Cl<sup>-</sup> dependent with a specific uptake rate of 7.7 fmoles [<sup>3</sup>H] betaine/μg protein/min. In addition, we found that 100 μM niflumic acid blocked 85% of betaine uptake. As expected for an osmoregulatory transporter, exposure to hypotonic seawater inhibited betaine uptake by 95%. These data indicate that squids use the betaine transporter to accumulate betaine, and support previous electrophysiological recordings of a betaine-induced Na<sup>+</sup>-dependent Cl<sup>-</sup> current that is thought to be linked to the betaine transporter.

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