

Abstract

Serotonin (5-HT) is an important neurochemical in the central nervous system and periphery that can influence behavior and physiological processes of animals. 5-HT has been described as a vasoactive agent in Gulf toadfish (*Opsanus beta*), and 5-HT has been thought to be involved in the response to hypoxia, or low environmental oxygen levels. In toadfish, the serotonin transporter (SERT) uptakes the extracellular 5-HT and the highest SERT mRNA expression is measured in their heart. *Aplysia californica* are also hypoxia-tolerant so it is of interest if they have high SERT mRNA expression in their hearts like toadfish. 5-HT concentrations in the hemolymph as well as SERT mRNA expression in *Aplysia californica* tissues were quantified. Hemolymph 5-HT concentrations were determined by ELISA. SERT mRNA expression was quantified by qPCR on cDNA synthesized from total RNA that was isolated from extracted from the nervous tissue, gill, gastrointestinal tract, heart, and hepatopancreas. Hemolymph 5-HT concentrations were in the nM range and were comparable with mammals and fish. The nervous tissue and gill had the highest SERT mRNA expression, with the nervous tissue showing higher levels of mRNA expression than any other tissue type. The undetectable levels of SERT mRNA expression measured in *Aplysia* heart suggests that, unlike toadfish, the heart plays a minor role in controlling hemolymph 5-HT.