

Acetylcholine and Nicotine Potentiate Currents in Cells Isolated from Sea Anemone *Nematostella vectensis*

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Nicotinic acetylcholine receptors (nAChRs) are important components of the peripheral and central nervous systems. *Nematostella vectensis*, the starlet sea anemone, is an important model system for studying the nervous system of Cnidarians. However, there are no reports of currents recorded from isolated *Nematostella* cells. In my study, I not only devised a method of isolating cells from *Nematostella* that can be used to characterize currents, but also found evidence for direct activation of these currents by nicotinic agonists. I isolated, 3 to 5 μm diameter spherical cells that were viable and could be maintained in culture for several weeks. Using whole cell patch clamp, I identified two currents: a linear current between -80 and $+80$ mV, and a voltage-dependent current seen at voltages above -20 mV. The voltage-dependent current increased significantly in the presence of either the endogenous neurotransmitter acetylcholine or nicotine, an agonist that selectively activates nAChRs. The effect of nicotine was dose dependent: $370 \mu\text{M}$ nicotine caused a 3.1-fold increase in current ($p=0.02$). Nicotine's effects on the voltage-dependent current correlate with its effect on the behavior of intact *Nematostella*. My research demonstrates a novel and powerful way to explore the nervous system of *Nematostella vectensis*.

Awards Won:

First Award of \$5,000

American Physiological Society: First Award of \$1,500

China Association for Science and Technology (CAST): Award of \$1,200