

**Senior research project
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Regulation of Settlement and Metamorphosis of *Capitella* larvae by Protein Nitrosylation

Nitric oxide (NO) is now a well known neurotransmitter that has been found to inhibit settlement and metamorphosis of several species of marine invertebrate larvae. This synthesis of NO by the enzyme nitric oxide synthase (NOS) helps to ensure that the larvae do not settle and metamorphosis until they come into chemosensory contact with natural chemicals in the environment which indicate beneficial habitats for their survival. In my lab, we have found that NO also is active in inhibiting settlement and metamorphosis of larvae of the polychaete annelid *Capitella* sp. I, and that inhibitors of NOS are able to induce settlement and metamorphosis. I would now like to explore the biochemical mechanism of action whereby NO prevents settlement. One of the known mechanisms of action of NO in other physiological systems is through protein nitrosylation by the NOS enzyme which takes place on cysteine sulfhydryls of regulatory proteins such as G-proteins. In our proposed study, we will biochemically measure the amount of protein nitrosylation in the *Capitella* larvae using a detection kit, and determine the effect of inducers of settlement and metamorphosis on the amount of protein nitrosylation that we see. Our hypothesis is that protein nitrosylation through NO production is involved in regulating settlement and metamorphosis of the *Capitella* larvae, and that levels of protein nitrosylation will decrease as settlement and metamorphosis proceeds.