

Expression of Acetylcholinesterase during development and regeneration in the cephalopod mollusk

***Octopus vulgaris*: Indications for a 'Non-Classical' Role**

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The *Octopus* arm is composed of a three-dimensional combination of longitudinally, transversely, and obliquely arranged muscle fibers, connective tissue and an axial nerve cord. In addition to its flexibility and interesting physiological capabilities, this so-called muscular hydrostat is capable of regeneration and, therefore, provides a great model system for comparing development and adult regeneration of muscular and neural tissue in a non-vertebrate organism.

In this study we examined the role of the multifunctional glycoprotein AChE during embryonic development and adult regeneration of the *O. vulgaris* arm. We identified a single highly conserved AChE H (hydrophobic) variant, which was expressed in undifferentiated, mesenchymal and highly proliferating tissue during the early stages of arm embryogenesis and adult morphogenesis. In later stages, at the establishment of an adult-like structure of the arm, AChE expression was mostly identified in typical neuronal (cholinergic) sites.

Our results suggest that the function of *O. vulgaris* AChE may be conserved throughout the animal's lifespan and is reactivated upon injury. We are currently attempting to understand a possible non-classical function of *O. vulgaris* AChE during embryonic development, by interfering with both the catalytic and the peripheral non-catalytic site of the enzyme using pharmacological inhibitors.