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P27. TRANSPOSABLE ELEMENTS IN OCTOPUS NEURAL TRANSCRIPTOME

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By sequencing Octopus vulgaris transcriptome we found high frequency of retroelements embedded in transcripts, similar to what reported in mammals. In particular, short interspersed elements (SINEs) are more abundant in transcribed long non coding RNAs (lncRNAs) than in protein coding genes. Both lncRNAs and SINEs are enriched in transcripts expressed in the octopus brain. We also found a long interspersed element (LINE), fully competent for retrotransposition and expressed in nervous tissues. In situ hybridization provided evidence of a diffuse expression of LINE mRNAs in the great majority of amacrine cells constituting the posterior buccal, frontal- and vertical lobes of the octopus brain (supra-esophageal mass) and in some large motor neurons in the sub-esophageal mass and arm nerve cord. By using a custom antibody designed for the O. vulgaris LINE, we identified a discrete number of neural cells immunoreactive to the LINE-Ab (e.g., large cells of the vertical lobe) and fibers positive to O. vulgaris LINE in selected areas of the octopus brain. Transposable elements are known to generate germinal and somatic genomic heterogeneity in mammals, and contribute to neural mosaicism in mammalian brain such as in the hippocampus and the cortex. Our findings suggest that a convergent evolutionary process, driven by transposable elements, has led to the evolution of mammalian-like molecular traits in the nervous system of the cephalopod mollusk Octopus vulgaris, possibly contributing to develop its neural plasticity and cognitive abilities.