Proteomic and Phosphoproteomic Analysis of *Melipona quadrifasciata* Brain under Operant Learning

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Learning to anticipate future events based on experience with the consequences of their own behavior (operant conditioning) is a simple form of learning that humans share with most animals, including invertebrates. The bee *Melipona quadrifasciata* has been used in studies of learning by operant conditioning at behavioral level. In this work, the brain proteomes of *Melipona* bees trained by operant conditioning and non trained (control) were compared by using two-dimensional gel electrophoresis analysis within pI range of 3-10 and 4-7. Only one protein was detected as differentially expressed (up-regulated in trained bee) by computational gel image and statistical analysis. This protein was identified as arginine kinase by peptide mass fingerprinting and MS/MS peptide fragmentation using a MALDI-TOF/TOF mass spectrometer. Arginine kinase is an important component of the energy releasing mechanism in the visual system, but it may carry extra and unexpected functions in the brain. Preliminary analysis of phosphoproteomic maps revealed few differences between the samples. The identification and characterization of such phosphoproteins are under way.