

# A Support Vector Machine Approach to Identification of Proteins Relevant to Learning in a Mouse Model of Down Syndrome

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The drug memantine has been shown to improve learning ability in a Down Syndrome model of mice (Ts65Dn) exposed to Context Fear Conditioning (CFC), an existing technique for measuring the learning ability of normal mice which does not typically produce results in Ts65Dn mice. This work seeks to increase the understanding of how memantine affects the learning ability of Ts65Dn mice at the protein level by analyzing the expression of 77 proteins obtained from the brains of normal and Ts65Dn mice, with and without memantine and with and without exposure to CFC. Support Vector Machines are used for pairwise classification of the groups of mice based on protein expression. Feature selection is then used to choose the proteins whose levels appear to be significant for each classification. The majority of classifiers outperform previous analysis methods in terms of prediction accuracy, producing a reliable subset of proteins for further biological study.