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Effect of sea cucumber collagen diet on learning and memory in mice and molecular correlates

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Sea cucumber collagen indeed improves temporal and spatial memory was first demonstrated by Y-shaped maze and Morris maze experiments. We screened the brain hippocampus genes of the control (CB) and test (TB) mice using 36K mouse brain microarrays, and compared their hippocampus gene expression maps using an unsupervised clustering method. The results indicated that a total of 5,051 genes were screened. 308 genes were differentially expressed, of which 235 were up-regulated and 73 were down-regulated. Changes in the expression of these genes were confirmed by Western blot analysis. The up-regulated genes function in neurotransmission, signal transduction, memory, cell recognition, immune response, metabolism, and structure of ion channels and cells. The down-regulated genes are involved in long-term depression and biotin metabolism. Changes in the expression of these genes were induced by several signaling pathways, including protein kinase A, the mitogen activated protein/extracellular signal-regulated kinases, and the cAMP responsive element binding protein.