A novel method for overexpression of membrane proteins in *E. coli*

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The project aims to establish a novel approach for analyzing brain function. We suggested to obtain a large-scale expression of mammalian membrane proteins in Escherichia coli, by a method developed in our laboratory and to analyze the function of these transporters by reconstitution into liposomes in the laboratory of Prof. Yoshinori Moriyama. Folloving the expression of the membrane proteins crystalization attempts will be carried out.

Over the past two year, the research groups have collaborated in testing the functionality of human transporters produced in E. coli, and found that they are fully active. Part of the results was published in a recent common paper (Leviatan, S., Sawada, K., Moriyama, Y. and Nelson N. (2010). A combinatorial method for overexpression of membrane proteins in E. coli. J Biol Chem. 285, 23548-23556.). This collaboration yielded a major break through since the common believe is that membrane proteins produced in bacteria are usually inactive. Therefore, so far the collaboration opened the door for the study the structure biology of neurotransmitter transporters. Using this breakthrough technology on the expression and preparation of membrane proteins, we will develop a platform to study the structure and function of neurotransmitter transporters involved in human neurotransmission as well as other membrane proteins of medical importance.