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Expression of Trans-Membrane Proteins *in vitro* Using a Cell Free System NATALIE WEISSE, University of Dallas, VINCENT NOIREAUX, University of Minnesota, JEROME CHALMEAU, University of Dallas — Trans-membrane proteins represent a significant portion of the proteins expressed by cells. The expression of proteins *in vitro*, however, remains a challenge. Numerous expression approaches have been developed with cell free expression (CFE) being one of the most promising. CFE is based on a transcription-translation system that has been extracted from *E. coli* bacteria. Adding the desired DNA allows expression of a selected protein, and in the presence of phospholipids the expression of trans-membrane proteins becomes possible. In order to express trans-membrane proteins in a closed native environment, the cell free system (CFS) is encapsulated with a phospholipid bilayer, creating an artificial cell. To verify protein expression, AquaporinZ (AqpZ), a well-known trans-membrane protein tagged with a green fluorescent protein (eGFP), was used so the expressed proteins could be seen under a fluorescent microscope. These artificial cells will serve as an experimental platform for testing the viability of the expressed trans-membrane proteins. Results from the manipulation of these artificial cells by attaching them to the slide surface through streptavidin-biotin bonding will be presented.

Richard Olenick
University of Dallas

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