Argonne NATIONAL LABORATORY

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Synthesizing Membrane Proteins Using In Vitro Methodology (IN-06-099)

A cell-free, *in vitro* protein synthesis method

The Invention

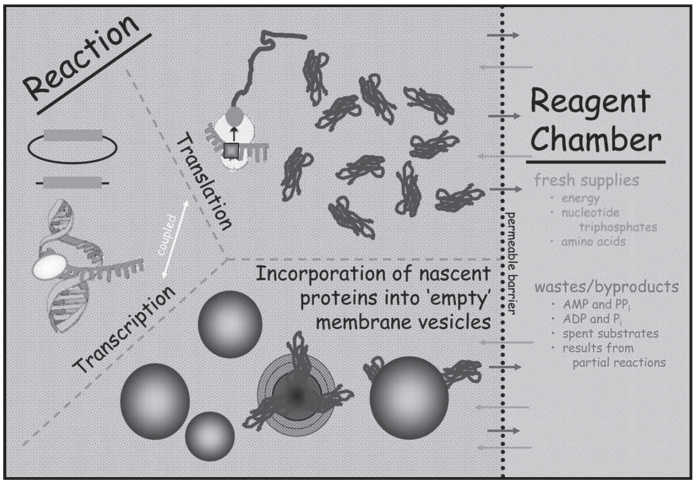
Scientists at Argonne National Laboratory have created an *in vitro*, cell-free expression system that caters to the production of protein types that are challenging to study: membrane proteins, membrane-associated proteins, and soluble proteins that require complex redox cofactors.

The functions performed by these challenging to study proteins are extremely important for all organisms. Previously, researchers studying these proteins needed to produce them in large quantities within living cells using a more complex, time-consuming process that was frequently complicated by protein-protein aggregation, lack of sufficient environments that were compatible for the newly-synthesized proteins, and/or cell death.

Using the *in vitro* method, scientists set up a reaction that produces only the target protein in an environment that facilitates its folding into functional form and long-term storage. As larger numbers and a wider array of difficult proteins are approachable, this method is expected to drive advances in science and deepen our understanding of life.

Benefits

Without the need for a host cell, scientists can synthesize proteins—even proteins that are toxic or fragile in composition—more quickly and more easily than by conventional methodologies. This powerful approach for targeting difficult-to-study proteins is anchored by direct integration of specially prepared membrane vesicles—which are ready for insertion of new proteins—into the cell-free synthesis reaction.



Schematic view of the invented method and system

Applications and Industries

- Medical research
- Pharmaceuticals and the development of new drugs and therapies
- Agriculture and agrochemical production
- Biofuels production

Developmental Stage

Ready for commercialization

Availability

Available for licensing

Patent Information

US Patent 8,455,231

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U.S. DEPARTMENT OF ENERGY

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