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Method for Automated Protein Purification

Current procedures to purify proteins are long and tedious, involve many rounds of centrifugation and manual pipetting that is not only time-consuming, but hinders reproducibility and adversely impacts the quality of the purified product. Purifying by hand takes hours or days of work but can still result in product loss and only a product that is partially purified. Additionally, classical methods that require pumps and columns are not amenable to automation, and preclude any ability to purify multiple proteins at once.

A researcher at the Biodesign Institute of Arizona State University has developed a novel method for automated, high throughput protein purification. Up to 96 tagged proteins can be automatically purified from crude cell extracts with greater efficiency compared to existing manual batch methods. The entire purification protocol can be completed without any manual centrifuging steps and with minimal human interaction. This protocol is the fastest way to purify proteins with reduced product loss, minimized contamination and an increase in both the reliability and reproducibility of the process. The current automated procedure takes roughly 4 hours to complete for a protein with a single tag, though the use of a second tag can be added to the procedure. The use of a second tag would only add 1 hour to 2.5 hours to the procedure, dependent on the needs of the researcher.

This novel method significantly increases the speed for protein purification in a benchtop setting in a highly efficient, reliable and reproducible manner.

Potential Applications

- High throughput protein purification
  - Academic labs
  - Pharmaceutical labs
  - Industrial biotech labs

Benefits and Advantages

- Greater time efficiency

- 1 to 96 protein samples can be automatically purified from crude cell lysates in about 4 hours

- Improved quality of purified product compared to batch methods
- Better reproducibility and simultaneous purification of many proteins at once
- Allows for easy and effective downstream quantification and quality control
- Reduced product loss and minimized contamination from non-specific binding
- Does not require any centrifugation steps and only needs 2 pipette steps to add reagents
    - The pipette steps could be further automated
- Can use commercially available reagents