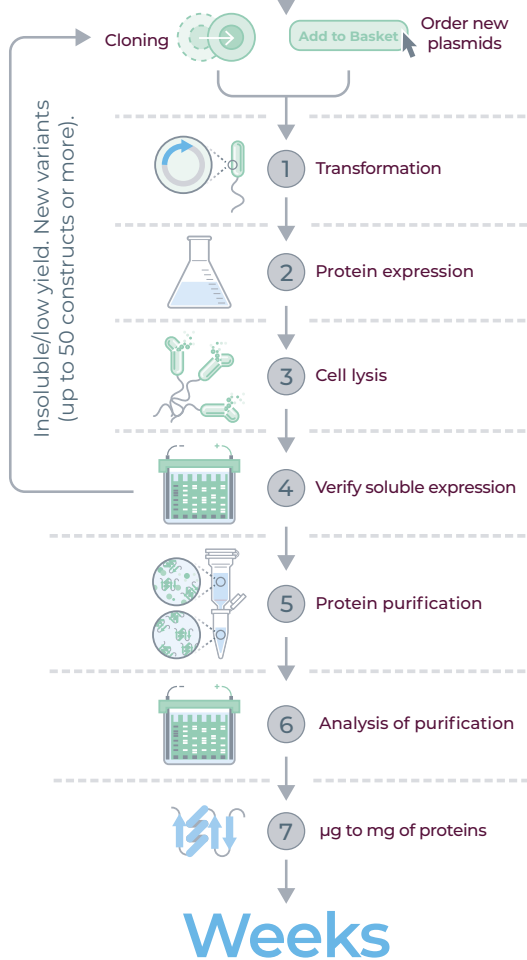


Shortened timelines to soluble, active proteins

The protein expression conundrum:

Lengthy project timelines and laborious workflow



Conventional methods to optimize and obtain protein can take weeks to months especially if the expressed proteins are not soluble, not stable or not active, resulting in a repeat of the above workflow with new constructs. This leads to frustration, high cost and time loss.

The solution:

The eProtein Discovery™ System
Protein-in-hand in 48 hours



2 days

An automated protein expression and purification system that performs 192 expression and 30 purification screen in 24 hours. Scale-up protein expression the next day to get protein in-hand for downstream applications.

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The eProtein Discovery™ system

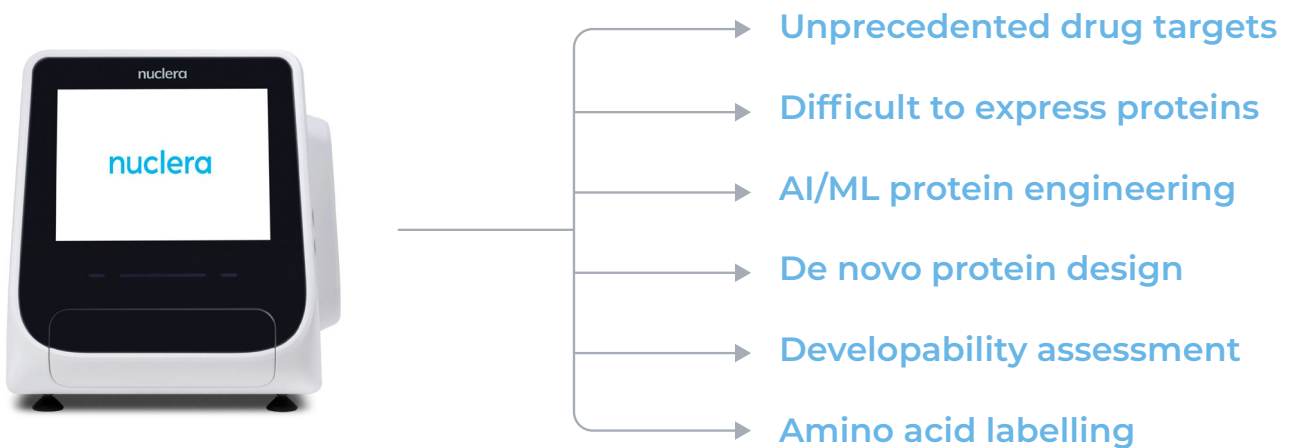
Introducing a benchtop system for rapid protein expression and purification screening. Using Nuclera’s eProtein Discovery™ system, scientists can evaluate expression screens of 24 constructs with customizable cell-free blends in parallel. The construct that gives the highest yield can be selected for an off-cartridge protein purification scale up, delivering microgram quantities of purified protein in-hand **in less than 48 hours**. Nuclera’s technology integrates cell-free protein synthesis (CFPS) and digital microfluidics on eProtein Discovery Cartridges, allowing rapid progress on protein projects through a benchtop, automated, high throughput protein access system.

One system, incremental gains:



The costs to obtain protein is vastly reduced using the eProtein Discovery system as less equipment and expertise are required.

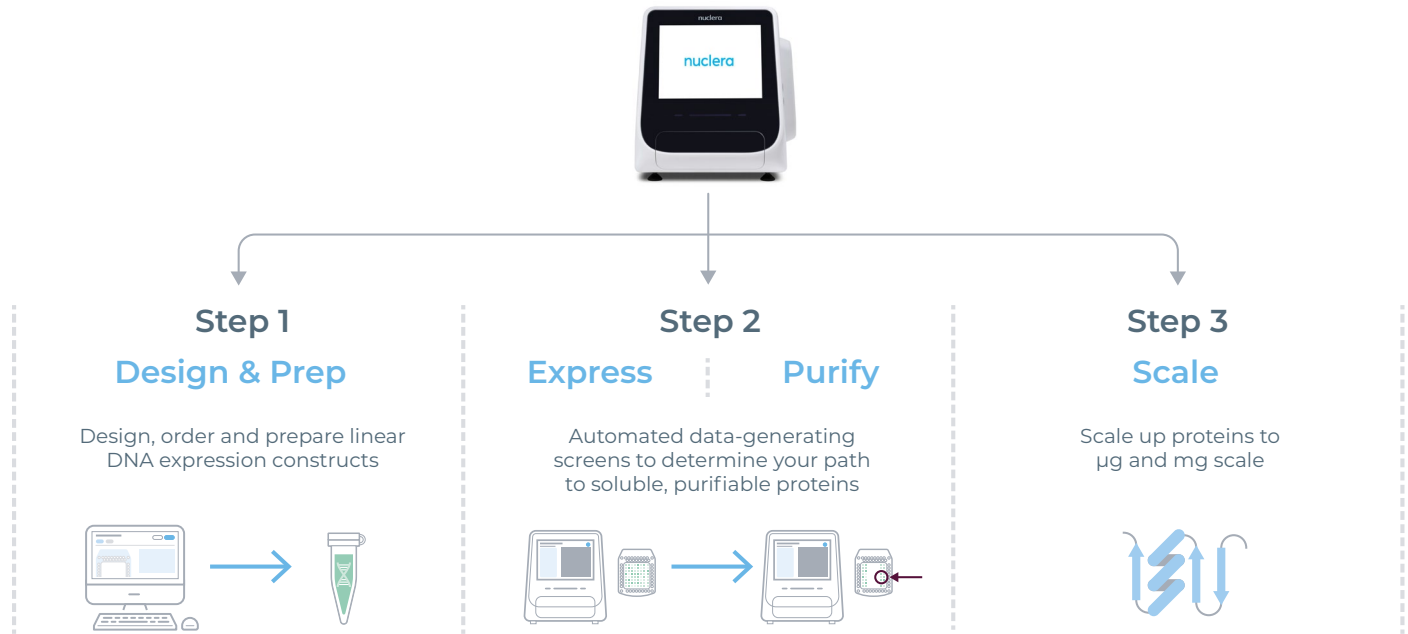
One system, remarkably varied applications:



Protein Discovery Workflow

Streamline your path to protein-in-hand with 3 simple steps:

- ▷ **Step 1:** Design and prepare DNA constructs
- ▷ **Step 2:** Automated protein expression and purification screen on cartridge
- ▷ **Step 3:** Scale up on the bench

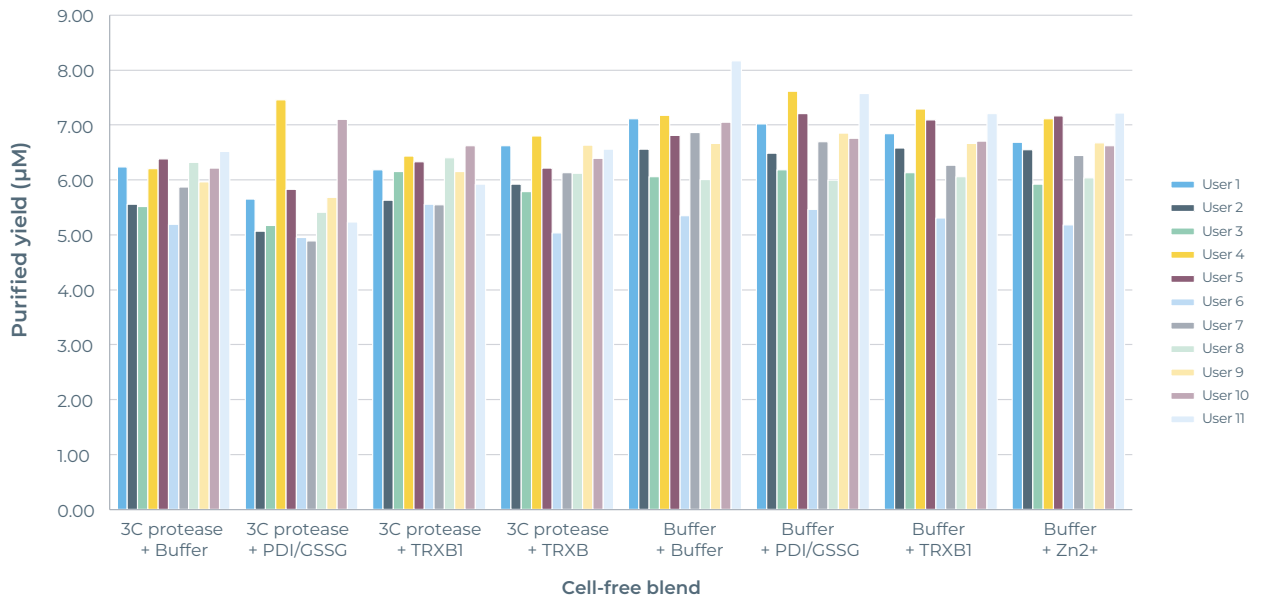


Explore multiple expression combinations in parallel, on one instrument



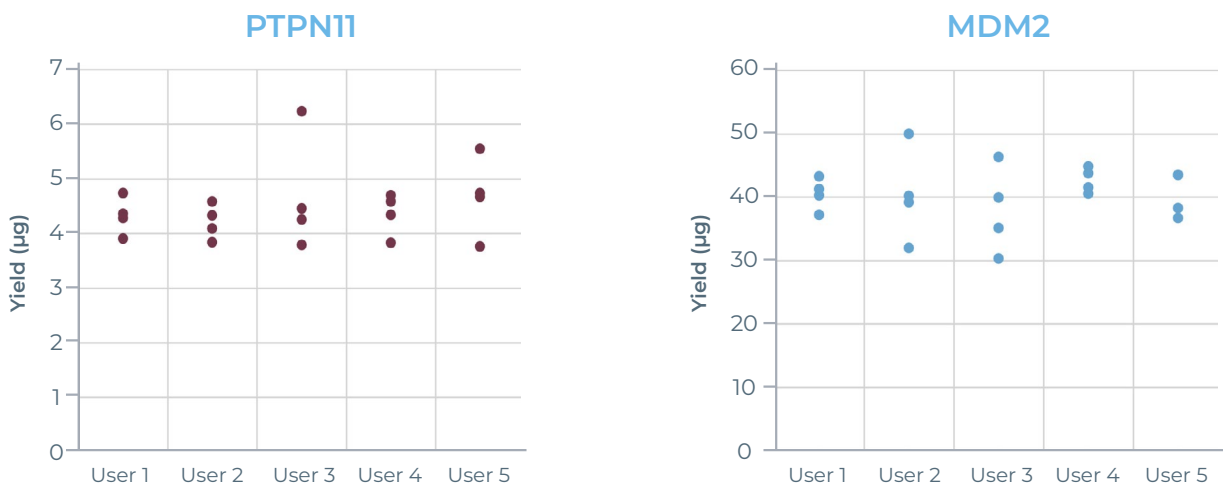
Evidence 1: Consistent and reproducible readouts

Reproducible cartridge screen results were obtained across different runs.



Target protein BTK (392-659) was screened for expression and purified yield measured on the eProtein Discovery instrument by 11 independent users, using multiple equivalent instruments. Coefficient of variation across instrument runs are calculated to be <15%, consistent with batch-to-batch variations observed with cell-based expression and purification systems.

Reproducible and repeatable scale-up yield



Scale-up reproducibility across 5 different users working on the same protein. Each purified protein was determined to be >95% pure using a GelAnalyzer. Yield was determined using a fluorescence complementation assay. Coefficient of variation across scale-up repeats is 13% (PTPN11) and 11% (MDM2), consistent with batch-to-batch variations observed in cell-based expression and purification.



Evidence 2: Proven success with drug targets

The eProtein Discovery system was used to guide scale up of drug target proteins and has produced many purified proteins with high yields.

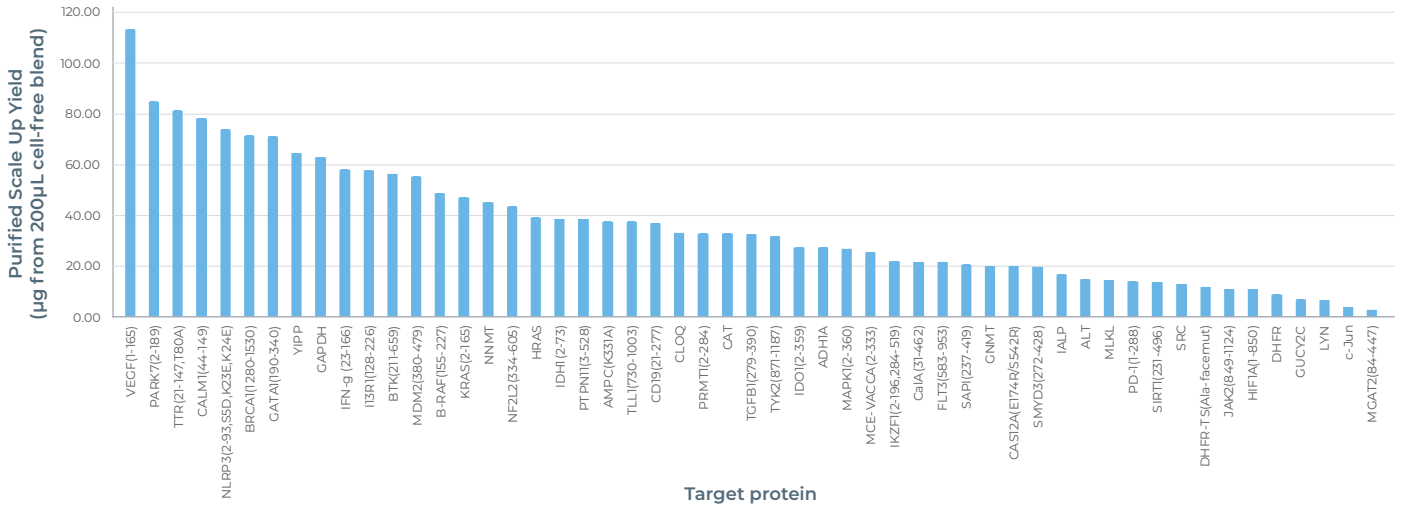
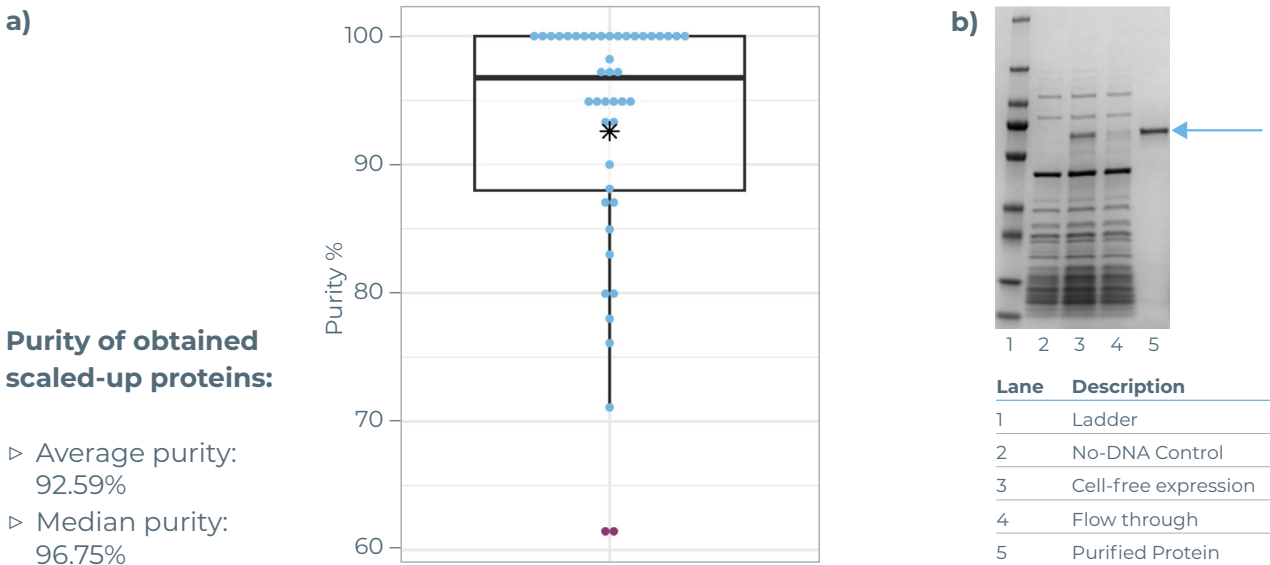


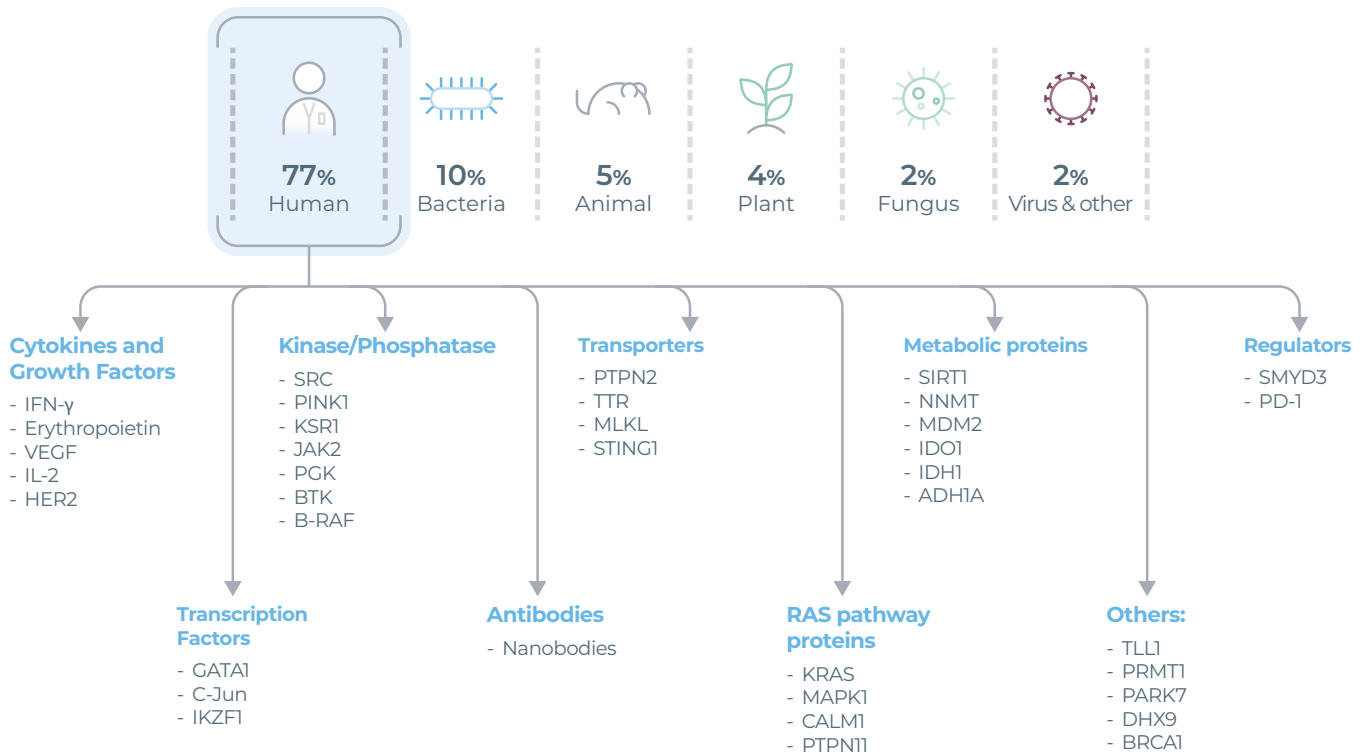
Illustration of a subset of pharma-relevant target proteins expressed using eProtein Discovery. An average yield of 35µg of protein obtained from 200µL of cell-free expression reagents (177µg per mL).

Evidence 3: High purity, assay-ready protein



Scale-up purity data. Guided by cartridge generated results, DNA construct and cell-free blend combinations with the highest yield were selected for scale-up expression and purification. (a) Purity data collected from 62 independent purifications, purity determined by SDS-PAGE and purity quantified on a GelAnalyzer. (b) Example of purified BRCA1 (2-620) showing purity >95%.

>1000 proteins generated on the system



A subset of trending drug targets successfully obtained on the eProtein Discovery System as going to press, March 2024.

Summary

A common significant problem for the protein science community are the long lead times and massive efforts to optimize protein constructs in order to generate enough protein for drug discovery and biomedical research. We offer a quick solution with the eProtein Discovery system which enables users to automate protein expression and purification on the benchtop. Screen through 24 different DNA constructs in parallel using customizable cell-free blends to gain knowledge on expressibility and purifiability. Scale-up the next day to get assay-ready protein in-hand!

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