nuclera

Making proteins accessible™

Is obtaining soluble, stable and active protein a bottleneck in your research and your next breakthrough?

Explore eProtein Discovery™

Nuclera empowers scientists to make progress on protein projects through a rapid protein prototyping system to automate construct screening, expression and purification characterization of proteins.

> **Rapid protein prototyping** enables progress by allowing scientists to gain awareness quickly about which proteins – and which variations of a protein – will work

> **Simultaneously screen multiple constructs** and protein synthesis reagents for soluble expression, and then scale up to micrograms of recombinant protein off-cartridge to test in your applications

> Explore multiple DNA constructs, including **solubility tags, truncations, polymorphisms and isoforms** on the same smart cartridge to expand your range of accessible proteins

eProtein Discovery™ Workflow

Step 1: Design & Prep

Design, order and prepare linear DNA expression constructs

Design

Input protein sequences into software and customize construct (eGene) design with pre-set fusion tags to optimize expression

eGene prep

Prepare expression constructs with the included eGene Prep Kit

Step 2: Load & Screen

Pipette and forget! Automated screens to determine your path to soluble, purifiable proteins

Expression screen

Rapidly screen 192 expression conditions assessing soluble yield

24 eGenes × 8 Customizable Cell-Free Blends = 192 Expression datapoints

Purification screen

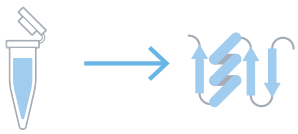
Data driven selection of 30 expression conditions for a strep purifiability assessment to determine purifiable yield

30 Purifiability data points

Step 3: Scale up & Go!

Scale up proteins at µg- and mg-scale

Scale up



Choose winning eGene/Cell-Free Blend combinations based on screen datapoints for scale up and purification

µl-scale included
ml-scale available

µg to mg purified protein (strep)

Total time: < 48 hours to µg of protein

(Hands on time < 2 hours)

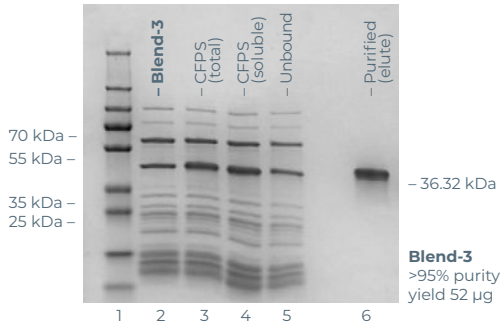
Robust screening data: Soluble expression and purification

Robust solubility screening and purifiable yield assessment provided, allowing for the selection of the best construct and Cell-Free Blend to obtain desired protein.

> Nuclera's technology represents fresh approaches, which will improve cost and quality significantly.
>
> **Prof. George Church**
> Professor of Genetics at Harvard Medical School and Professor of Health Sciences and Technology at Harvard and the Massachusetts Institute of Technology (MIT)

Figure 1. Expression and purification characterization. The instrument reports on expression and purified yield (mg/mL or µM) to inform on the most favorable construct and cell-free blend.

Purified active protein



Lane	Description
1	Molecular weight ladder
2	Cell-free Blend-3 negative control
3	Total protein after cell-free protein synthesis (CFPS)
4	CPFS (soluble) obtained following centrifugation and supernatant retained
5	Unbound; flow through sample not bound to beads
6	Purified (elute); sample eluted off of the beads

Figure 2. Scale-up expression and purification. SDS-PAGE showing expressed and purified proteins from a scaled-up reaction.

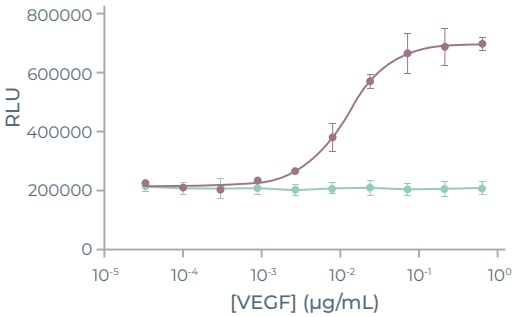


Figure 3. Activity testing of VEGF protein produced with eProtein Discovery.
The cell-based PathHunter® dimerization assay was used to observe a change in substrate presence, which was reported in relative light units (RLU) indicating the presence of active protein. Two biological replicates, shown here as a mean, were carried out on two separate occasions. The VEGF protein displayed an EC_{50} of 12.49 ng/mL. PathHunter® is a registered trademark of Eurofins DiscoverX as used in US and/or in other countries.

Key: SUMO_VEGF_STREP_DET — Negative Control

Which proteins have been produced so far?

Human 77% | Bacteria 10% | Animal 5% | Plant 4% | Fungus 2% | Virus & other 2%

Figure 4. Proteins produced. Chaperones, Hydrolases, Ligase, Oxidoreductase, Signaling protein, Structural protein and Transferases with the molecular weight range: Min: 18 kDa to Max: 300kDa (Avg: 46kDa).

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