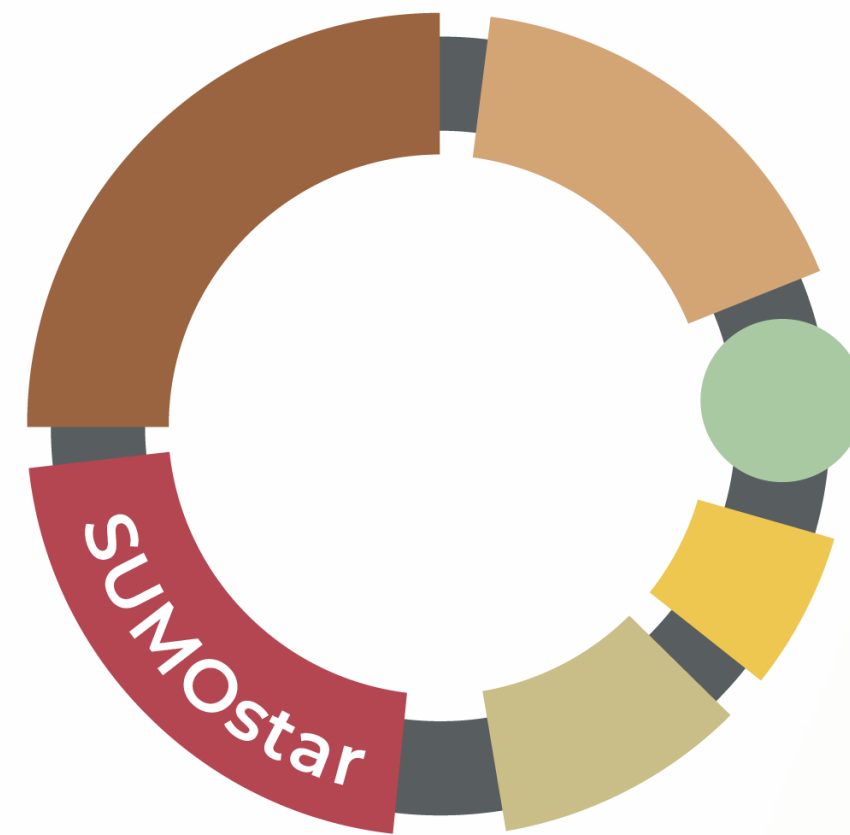


SUMO Protein Expression Platform



Noël Warren, Ph.D. and Abdul Haseeb, Ph.D.

LifeSensors Inc.
271 Great Valley Parkway
Malvern PA 19355

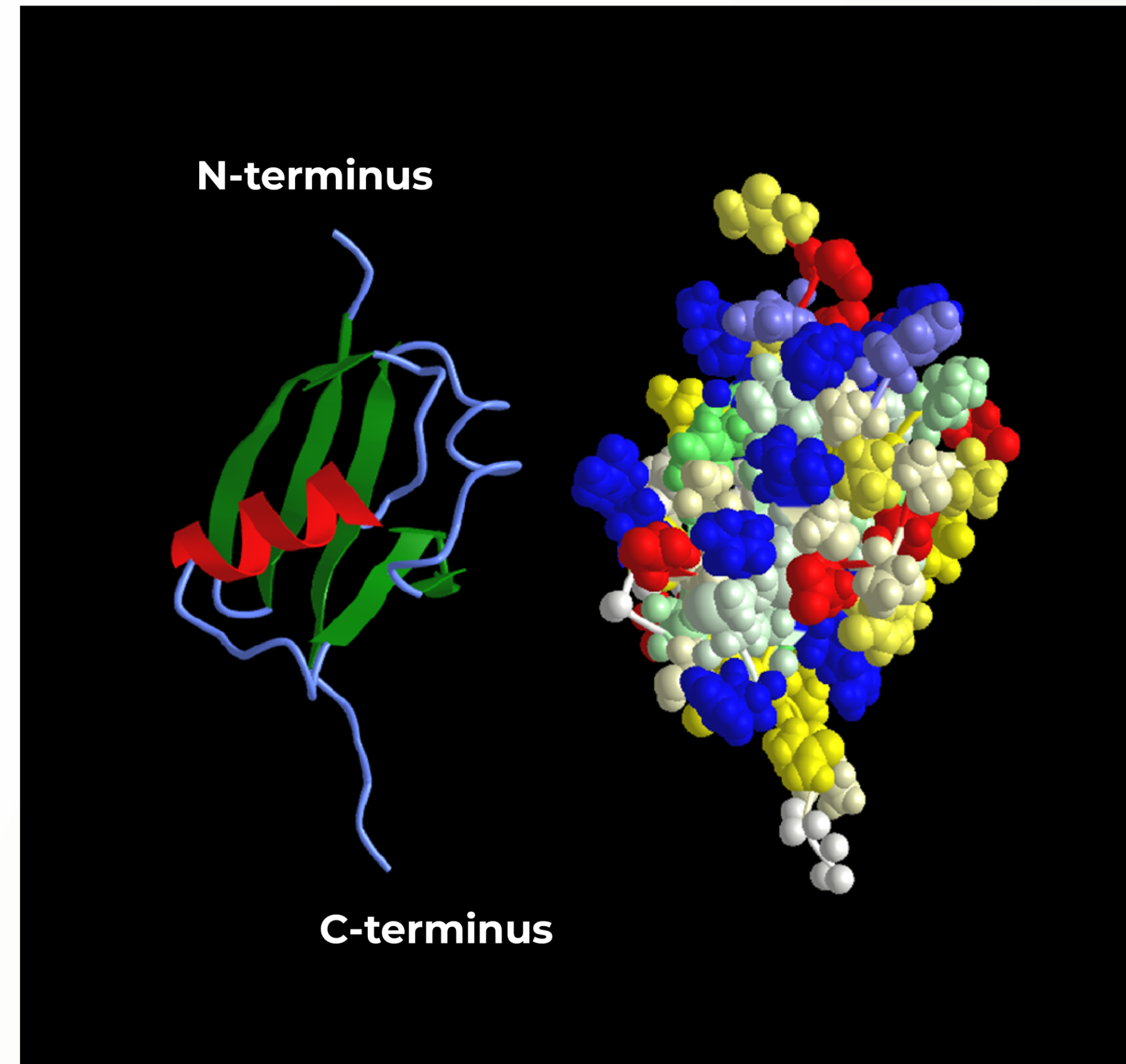
610-644-8845
bd@lifesensors.com
www.lifesensors.com

LifeSensors Inc.

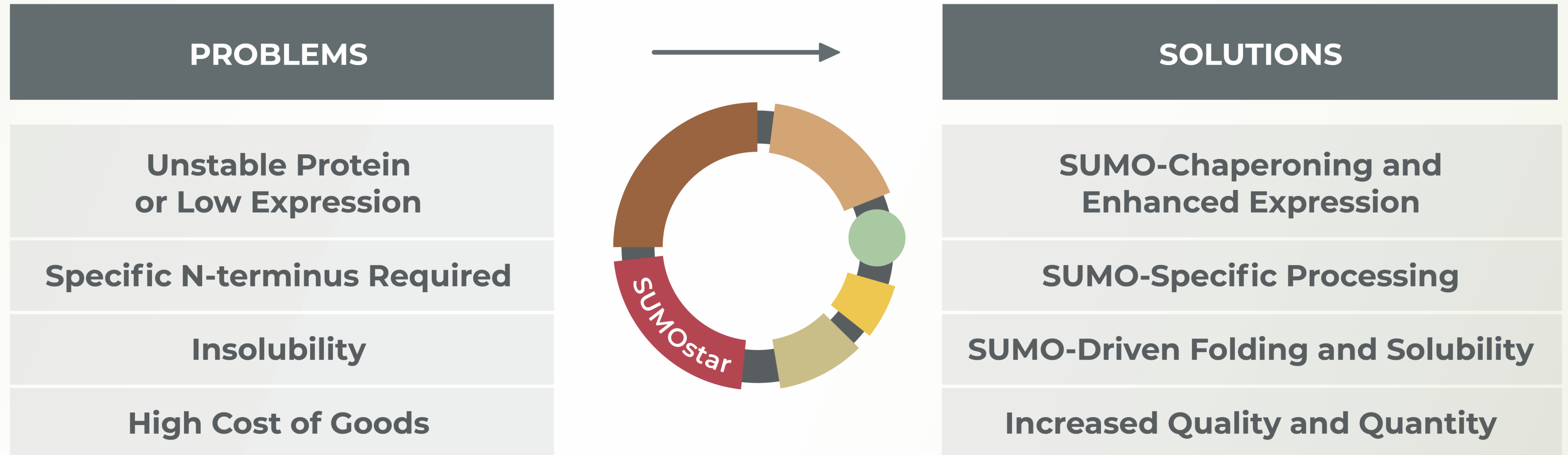
- Leading Biotech in PROTAC/UPS Drug Discovery and protein expression R&D
- ~500 Product lines, PROTAC plates, ligases, DUBs, TUBEs affinity tools & Kits
- **SUMO Protein Expression Systems**
- PROTAC/UPS drug discovery, cell-based and biochemical HTS
- Collaborative and Independent Research

What is SUMO?

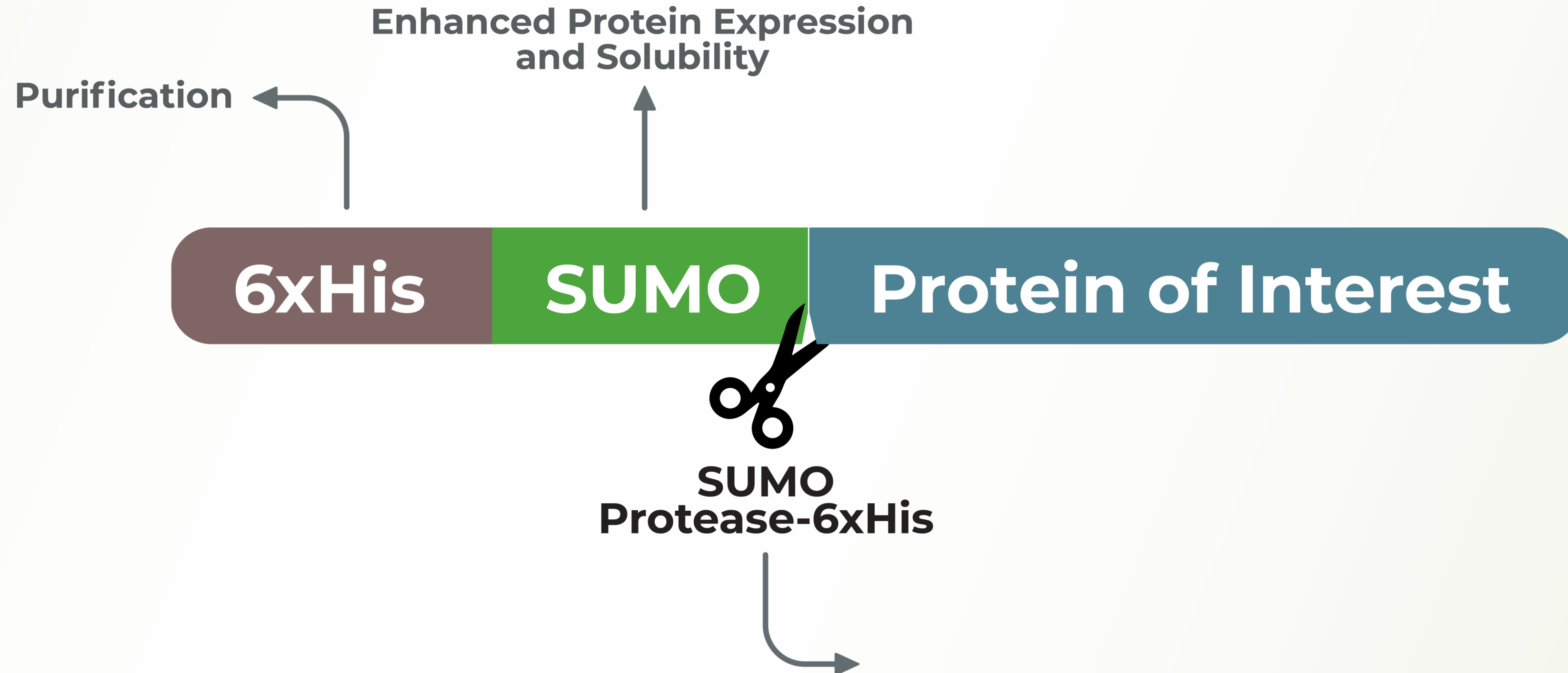
- SUMO, or Small Ubiqutin-like modifier, is a member of the ubiquitin family
- SUMO *is not involved* in targeting proteins for degradation
- Flexible N-terminal region followed by a compact ball-like Ubiquitin-like fold
- Nature designed SUMO to chaperone the proteins
- SUMO improves solubility due to hydrophilic shell and hydrophobic core



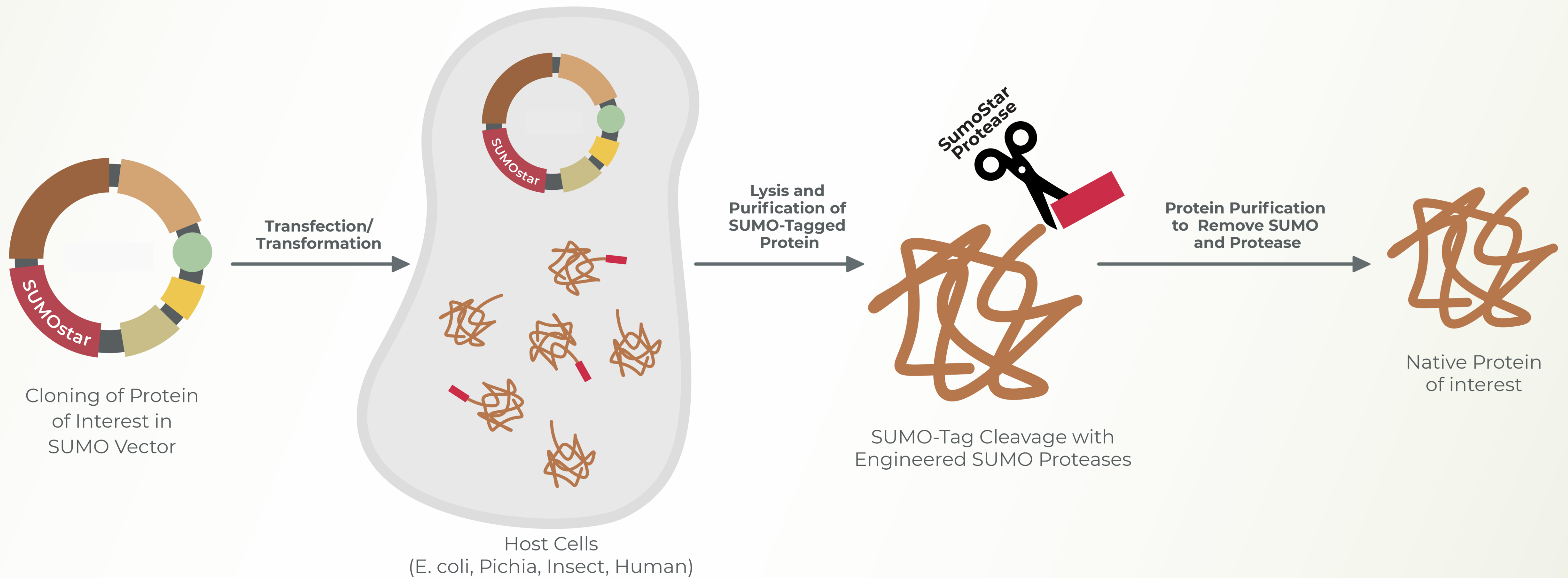
Benefits of the SUMO Platform



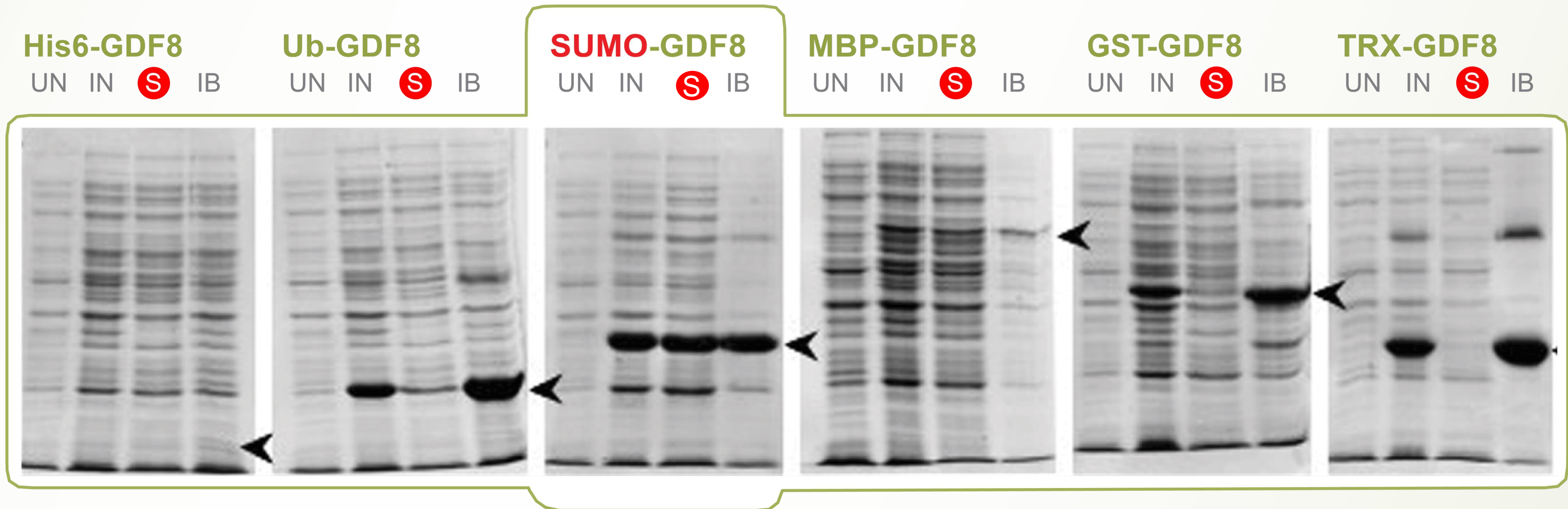
SUMO Fusion Tag Platform



Protein Expression and Purification Process Using SUMO-tag



SUMOpro[®] fusion enhances expression and solubility in *E. coli*



Conditions: UN – Uninduced, IN – Induced, S – Soluble Fraction, IB – Inclusion Bodies

Marblestone et. al, Protein Sci. 2006 Jan;15(1):182-9

SUMOSTAR | Generating Post-Translationally Modified Proteins

Producing proteins that require post-translational modifications requires production in eukaryotic cells

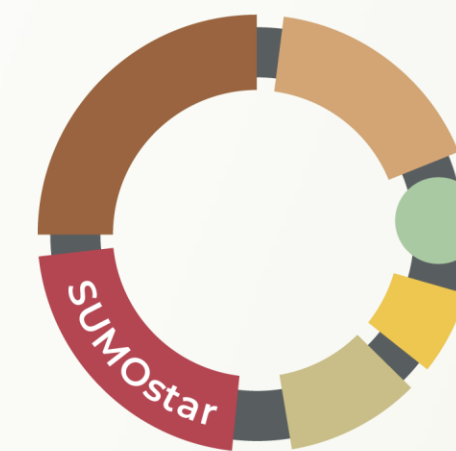
PROBLEM
Eukaryotic cells have endogenous SUMO protease

SOLUTION
SUMOStar Protease

Endogenous  Sumo

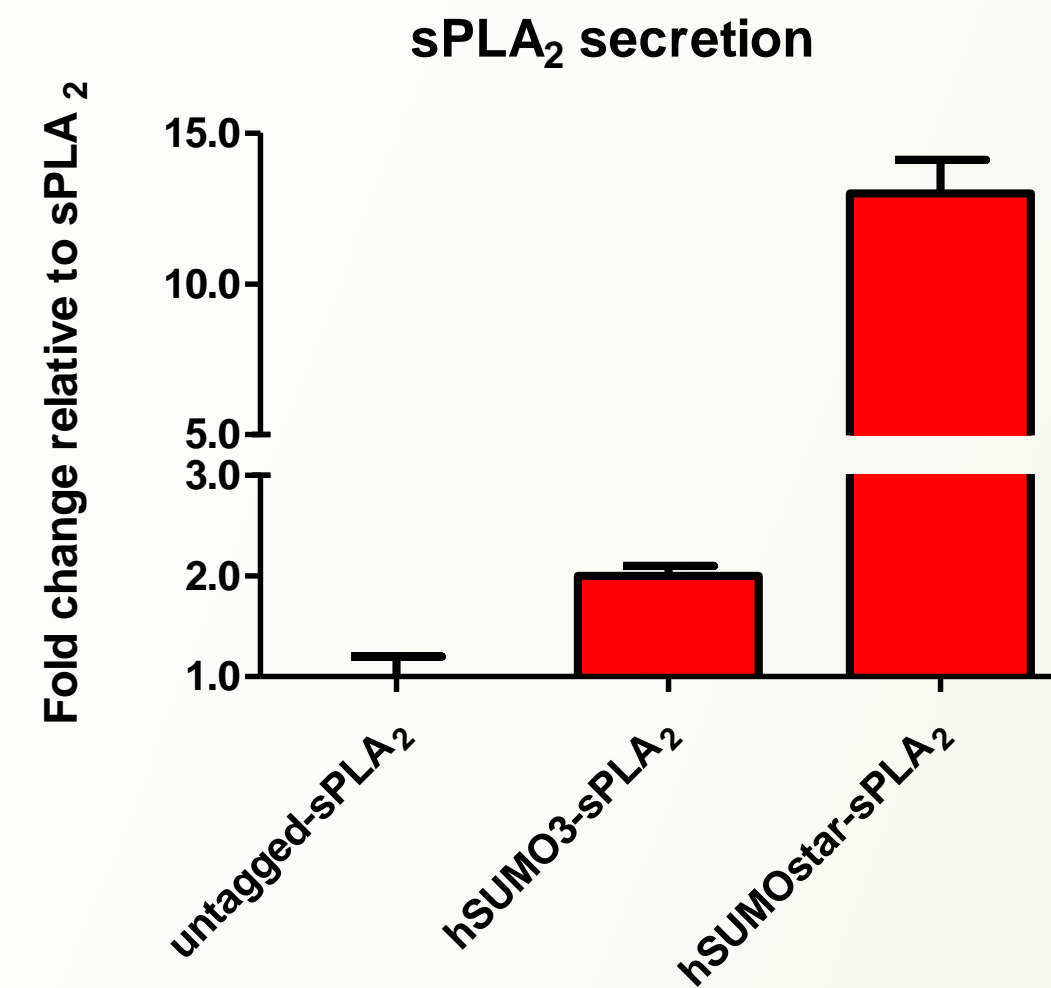
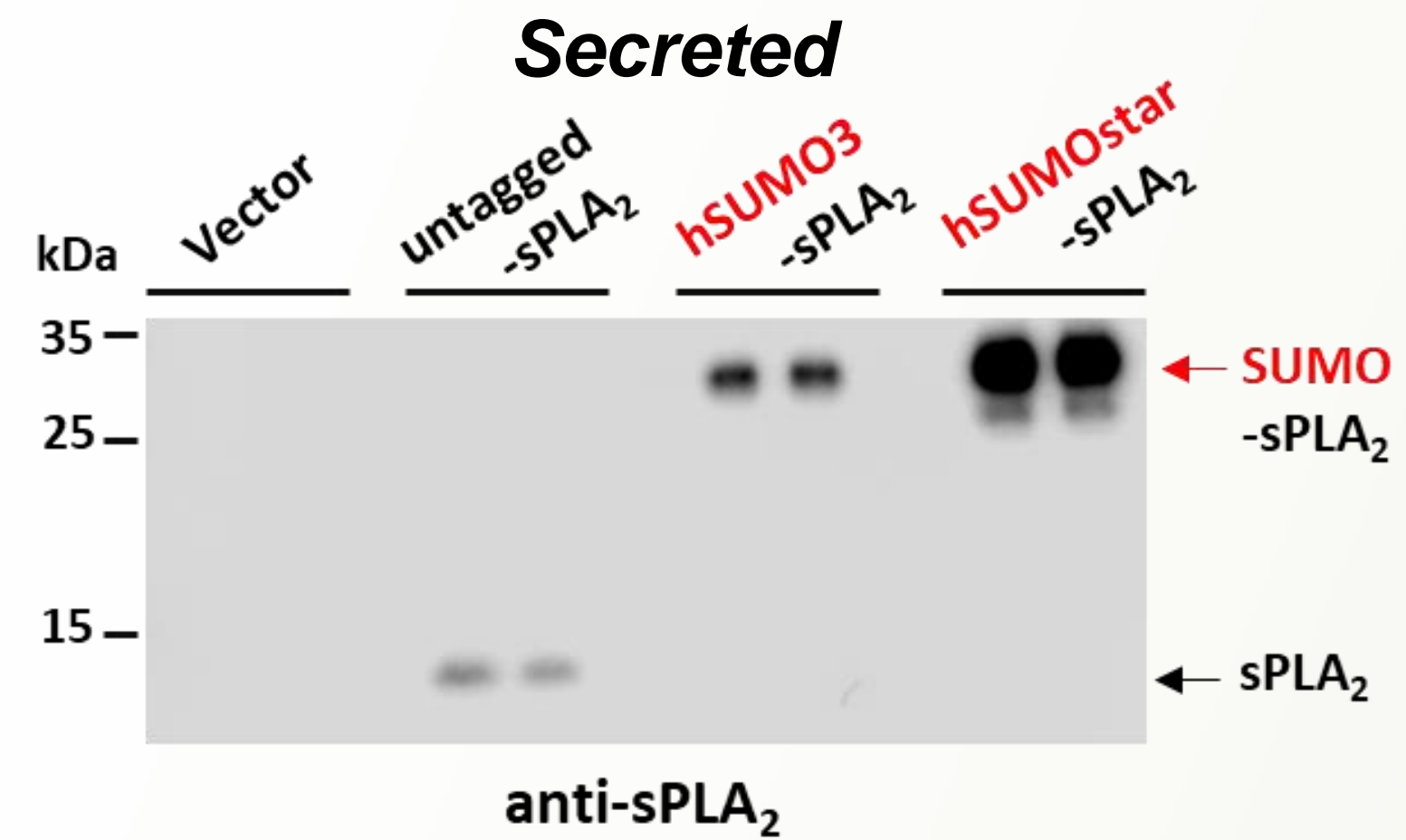
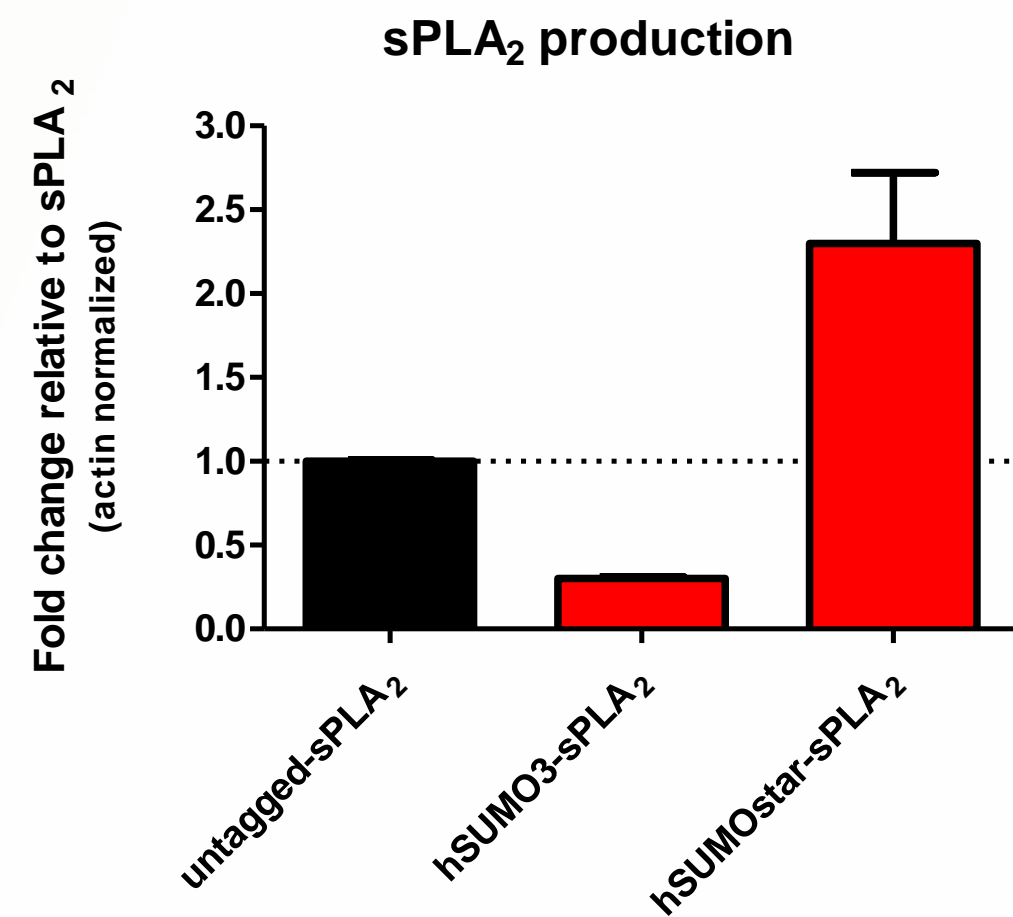
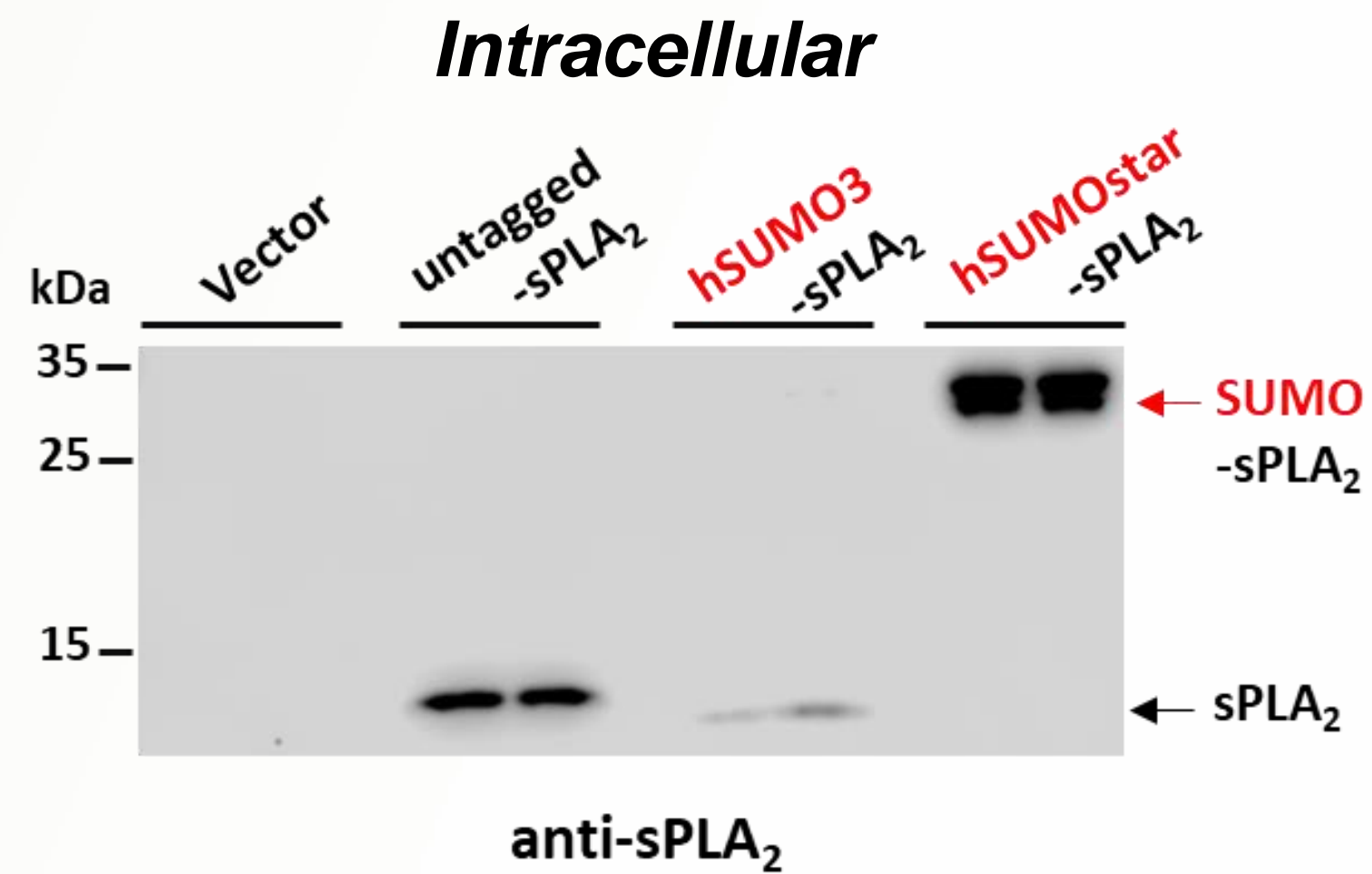
His-Tag Sumostar Tag Protein of Interest


Sumostar

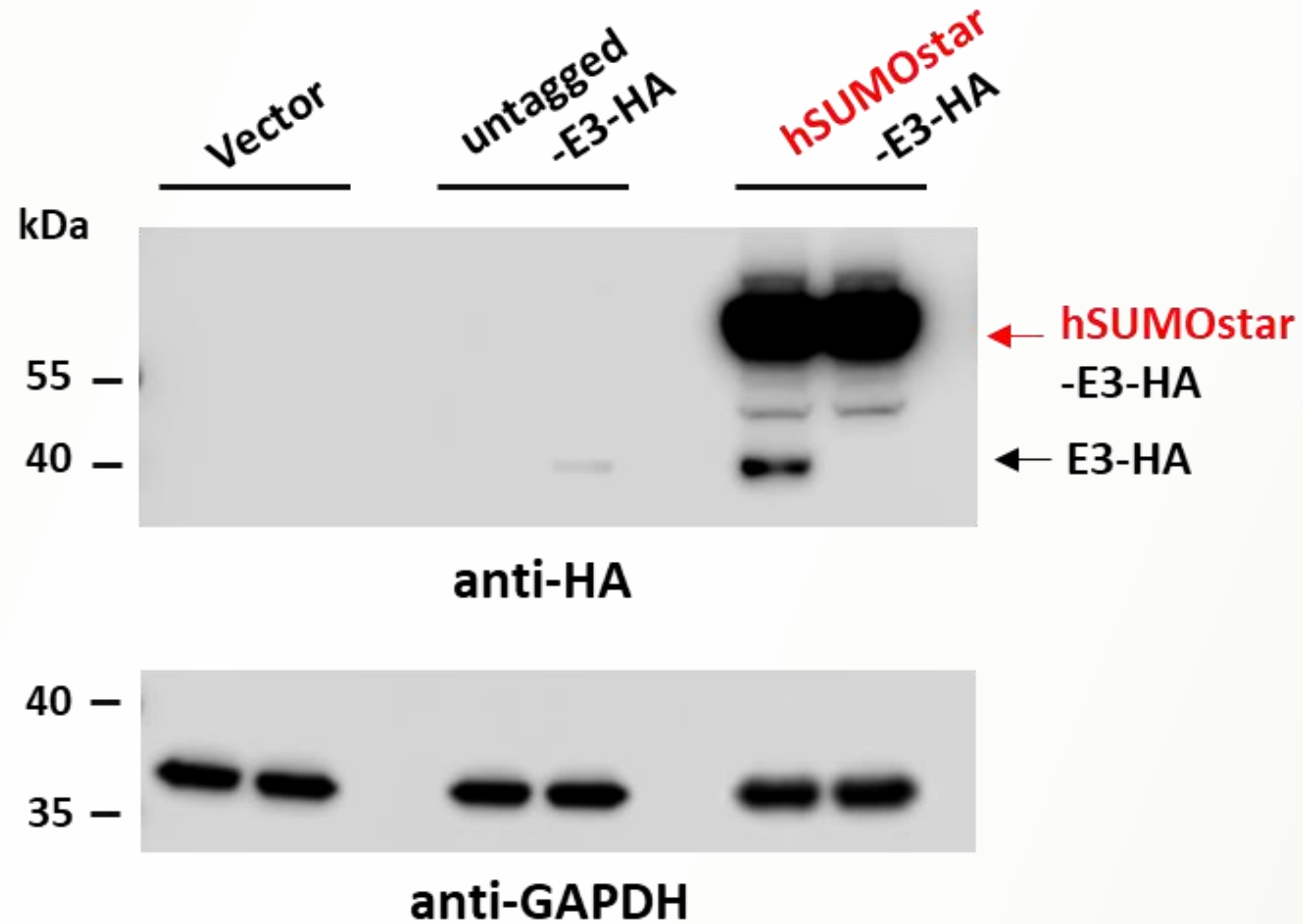


- *Pichia*
- *Insect*
- *Mammalian*

hSUMOstar Dramatically Enhances sPLA₂ Production & Secretion



hSUMOstar Dramatically Enhances Production of a Novel E3 ligase



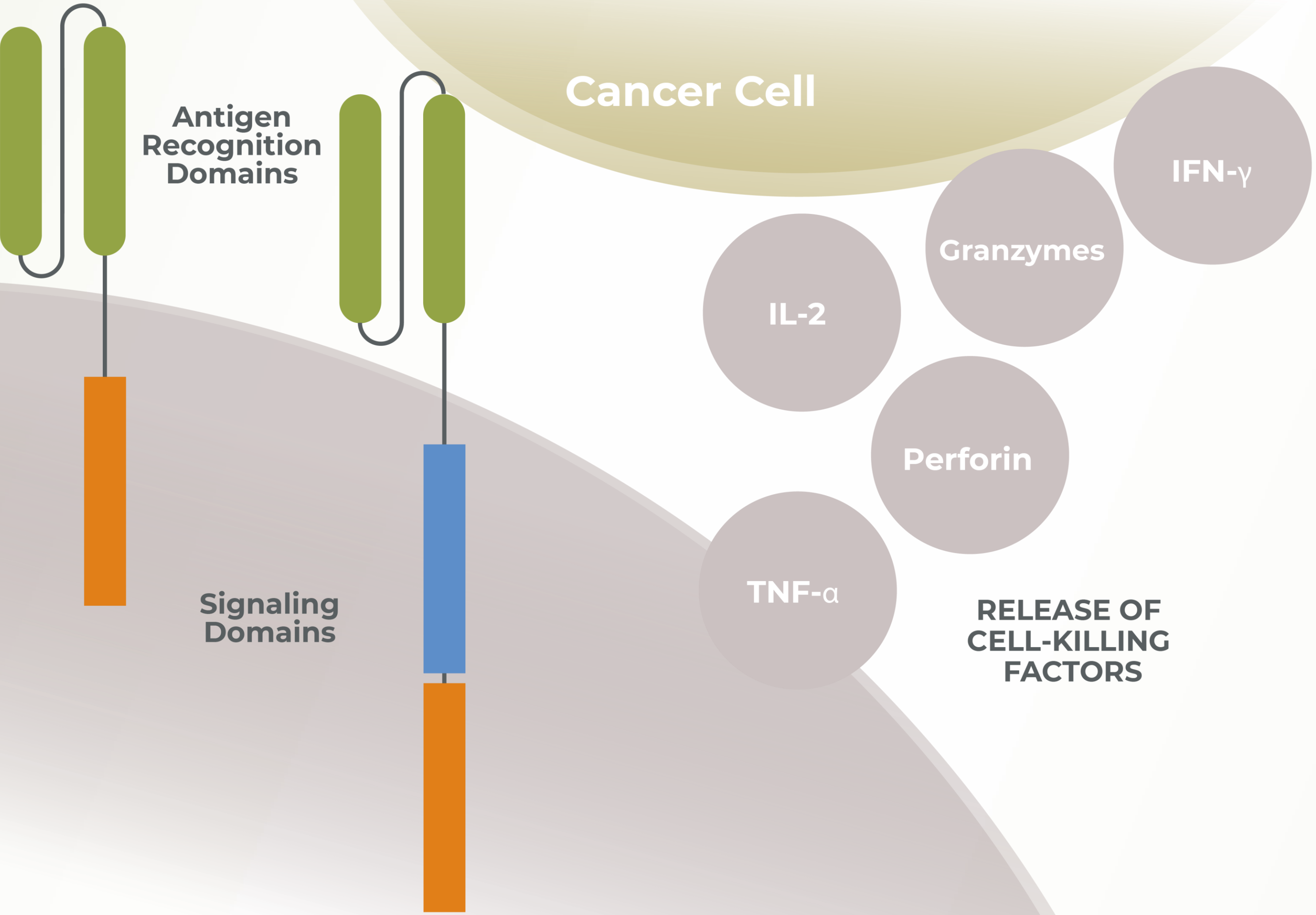
Challenges with CAR-T and Gene Therapy

- **Chimeric Antigen Receptors (CAR) are composed of scFV targeting tumor cells, membrane region and stimulatory domains**
- **RNA, Gene or vaccine therapies are similarly engineered proteins/receptors**
- **Lack of CAR expression, off-tumor effects, checkpoint blockade**
- **Augment CAR efficacy by enhancing quality and quantity of CARs**

Role of SUMO in Enhancing CAR-T Efficacy

- **Enhancing expression of under or non-expressed CARs**
- **Regulate level of expression by N-terminal rule**
- **On and off Switch for CARs**
- **Co-expression of tumor induced chemokines receptors**
- **CAS 9 expression**

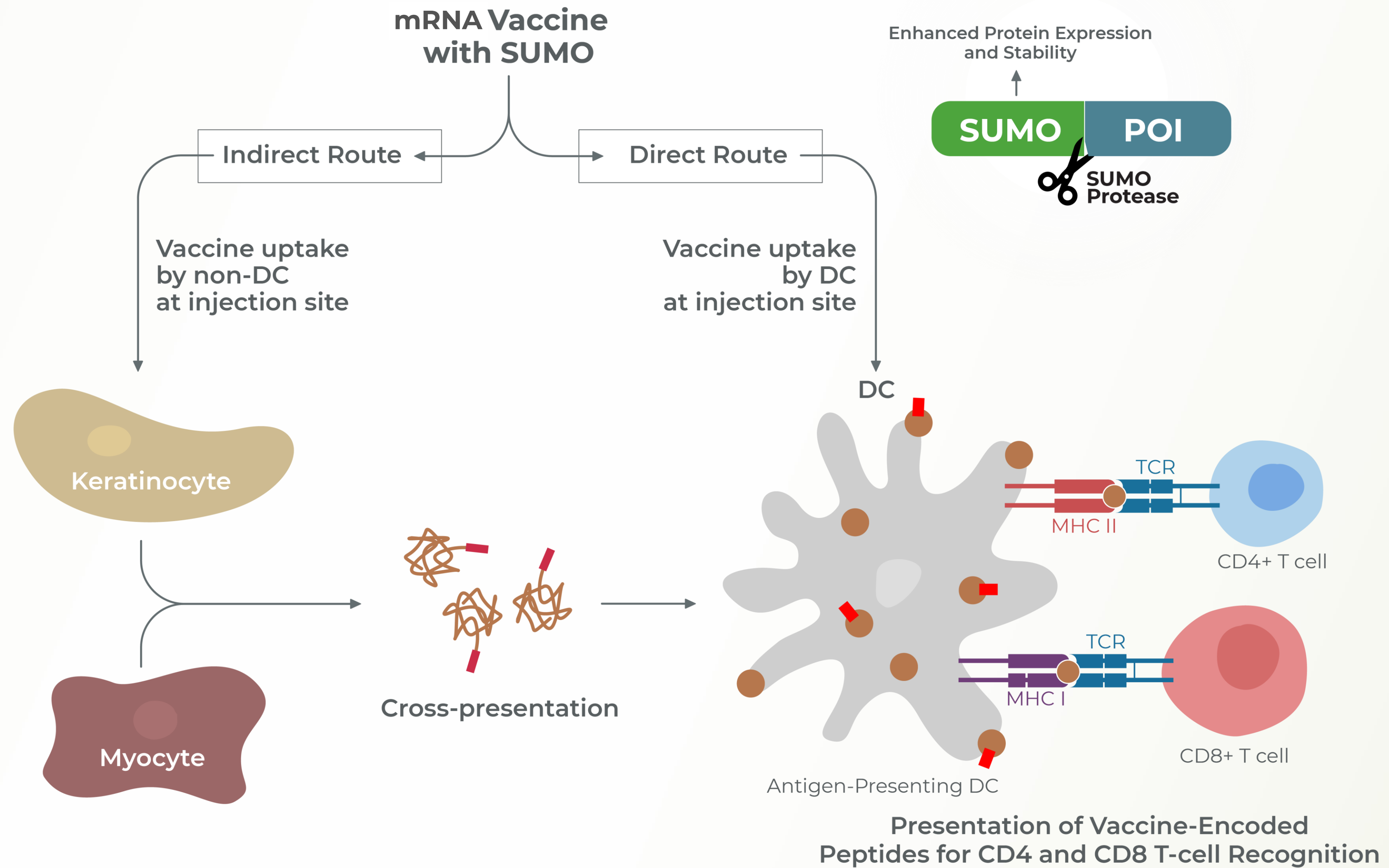
SUMO Expression in CAR-T / Gene Therapy Solution



BENEFITS

- Enhanced Expression
- Compartmentalization
- Improved Folding
- Improved Efficacy

mRNA Vaccines with SUMO-tag



Thank You

We are your partner in Protein Expression, CAR-T/Gene therapy and vaccine development

Contact Us!

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Custom Service & Assays	BD	bd@lifesensors.com	610-644-8845 (ext 310)