



# SUMO Technology

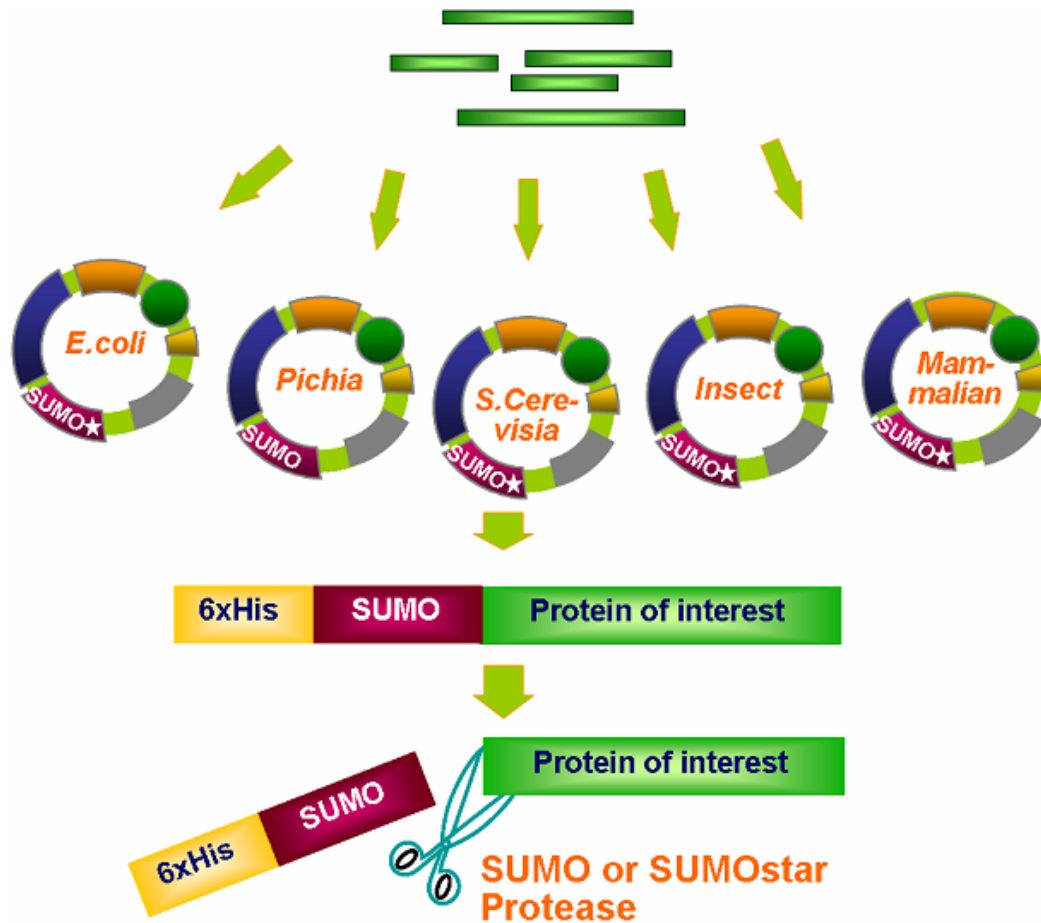


## Fusion Tag Protein Expression System

- Tag: SUMO (small ubiquitin-like modifier)
- **Increased expression**
  - SUMO protects proteins from degradation
- **Increased solubility**
  - SUMO helps proteins fold correctly
- **Easy Purification**
  - Both the tag and the protease have 6xHis tags
- **Native/Active Protein**
  - SUMO Protease leaves no unwanted residues on the N-terminus



# SUMO is a Universal Tag



PCR of a library

Directional cloning into vectors

Expression and purification by Ni-NTA

Cleavage to yield native/active protein



# SUMO Vectors



## SUMOpro

- Based on the yeast SUMO
- For expression in E.Coli
- Cleaved by SUMO Protease 1

## SUMOpro-3

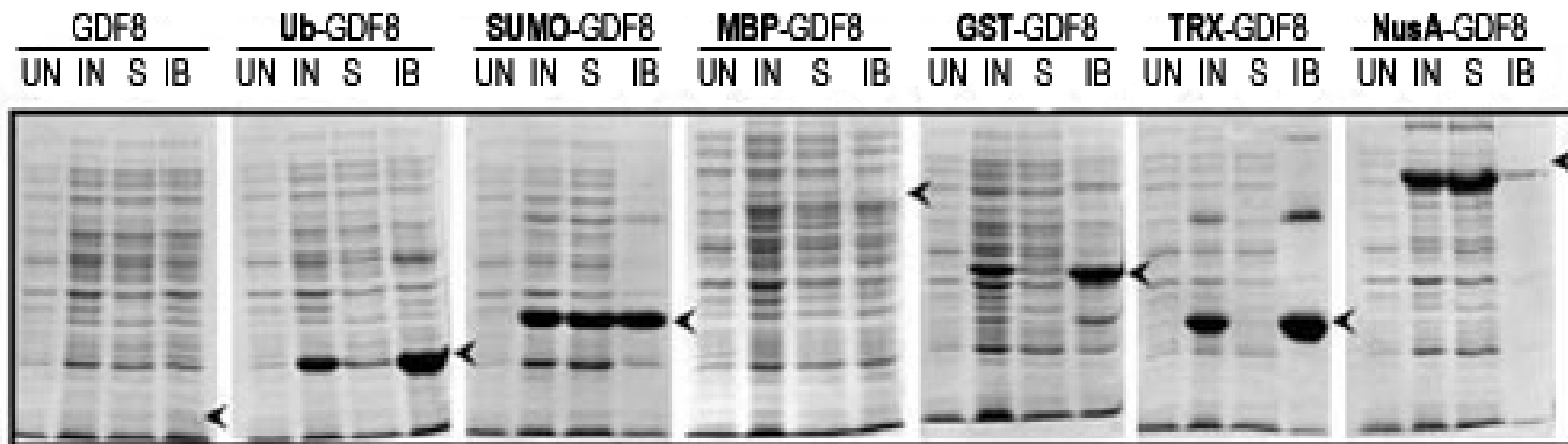
- Based on the human SUMO
- For expression in E.Coli or Pichia Pastoris
- Cleaved by SUMO Protease 2

## SUMOstar

- Mutant form of SUMO
- Uncleaveable by endogenous proteases
- For expression in E.Coli, S.cerevisiae, insect, or mammalian cells
- Only cleaved by SUMOstar Protease



# 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



# SUMO Vector Table



| Expression Host | Vector & Cat. Number  | Kit Cat. number        | Promoter | Selectable Marker in |          | Tags  |           | Secretary Signal | Map links           |                     | Tag cleaved by  |                 |                    |
|-----------------|---|------------------------|----------|----------------------|----------|-------|-----------|------------------|---------------------|---------------------|-----------------|-----------------|--------------------|
|                 |   |                        |          | E. coli              | Host     | 6xHis | SUMO      |                  | Seq.                | Tag + MCS           | SUMO Protease 1 | SUMO Protease 2 | SUMO star Protease |
| E. coli         | <a href="#">pE-SUMO (Amp) #1001A</a>                          | <a href="#">#1000A</a> | T7       | Amp                  |          | +     | SUMOpro   |                  | <a href="#">[A]</a> | <a href="#">[A]</a> | +               |                 |                    |
|                 | <a href="#">pE-SUMO (Kan) #1001K</a>                          | <a href="#">#1000K</a> | T7       | Kan                  |          | +     | SUMOpro   |                  | <a href="#">[A]</a> | <a href="#">[A]</a> | +               |                 |                    |
|                 | <a href="#">pE-SUMO3 (Amp) #1016</a>                          | <a href="#">#1010A</a> | T7       | Amp                  |          | +     | SUMOpro-3 |                  | <a href="#">[A]</a> | <a href="#">[A]</a> |                 | +               |                    |
|                 | <a href="#">pE-SUMO3(Kan) #1011</a>                           | <a href="#">#1010K</a> | T7       | Kan                  |          | +     | SUMOpro-3 |                  | <a href="#">[A]</a> | <a href="#">[A]</a> |                 | +               |                    |
|                 | <a href="#">pE-SUMOstar (Amp) #1106</a>                       | <a href="#">#1100A</a> | T7       | Amp                  |          | +     | SUMOstar  |                  | <a href="#">[A]</a> | <a href="#">[A]</a> |                 |                 | +                  |
|                 | <a href="#">pE-SUMOstar (Kan) #1101</a>                       | <a href="#">#1100K</a> | T7       | Kan                  |          | +     | SUMOstar  |                  | <a href="#">[A]</a> | <a href="#">[A]</a> |                 |                 | +                  |
| Yeast           | Pichia pastoris<br><a href="#">pP-secSUMO3 #2151</a>          | <a href="#">#2150</a>  | AOX1     | Zeocin               |          | +     | SUMOpro3  | +                | <a href="#">[A]</a> | <a href="#">[A]</a> |                 | +               |                    |
|                 | Saccharomyces cerevisiae<br><a href="#">pY-SUMOstar #2101</a> | <a href="#">#2100</a>  | CUP1     | Amp                  | Trp      | +     | SUMOstar  |                  | <a href="#">[A]</a> | <a href="#">[A]</a> |                 |                 | +                  |
| Insect cells    | <a href="#">pI-SUMOstar #3101</a>                             | <a href="#">#3100</a>  | Polh     | Amp                  | -        | +     | SUMOstar  |                  | <a href="#">[A]</a> | <a href="#">[A]</a> |                 |                 | +                  |
|                 | <a href="#">pI-secSUMOstar #3106</a>                          | <a href="#">#3105</a>  | Polh     | Amp                  | -        | +     | SUMOstar  | +                | <a href="#">[A]</a> | <a href="#">[A]</a> |                 |                 | +                  |
| Mammalian Cells | <a href="#">pM-SUMOstar #7111</a>                             | <a href="#">#7110</a>  | CMV      | Amp                  | Neomycin | +     | SUMOstar  |                  | <a href="#">[A]</a> | <a href="#">[A]</a> |                 |                 | +                  |
|                 | <a href="#">pM-secSUMOstar #7121</a>                          | <a href="#">#7120</a>  | CMV      | Amp                  | Neomycin | +     | SUMOstar  | +                | <a href="#">[A]</a> | <a href="#">[A]</a> |                 |                 | +                  |