

**Entry Clone Source:** IMAGE

**Entry Clone Accession:** IMAGE:3504538

**SGC Construct ID:** GYG1A-c003

**GenBank GI number:** gi|20127457

**Vector:** pNIC28-Bsa4. Details [[PDF](#)] ; Sequence [[FASTA](#)] or [[GenBank](#)]

**Amplified construct sequence:**

```
CATATGCACCACATCATCATCATCATCATTC  
TTCTGGTAGATCTGGGTACCGAGA  
ACCTGTACTTCAATCCATGACAGAT  
CAGGCCTTGTGACACTAACCAACAAA  
CGATGCCTACGCCAAAGGTGCCCTGG  
TCCTGGGATCATCTCTGAAACAGCAC  
AGGACCACCAGGAGGCTGGTCGTGCT  
CGCCACCCCTCAGGTCTCAGACTCCA  
TGAGAAAAGTTTAGAGACAGTCTT  
GATGAAGTCATCATGGTAGATGTCTT  
GGACAGTGGCGATTCTGCTCATCTAA  
CCTTAATGAAGAGGCCAGAGTTGGGT  
GTCACGCTGACAAAGCTCCACTGCTG  
GTCGCTTACACAGTATTCAAAATGTG  
TATTGATGGATGCAGATACTCTGGTC  
CTAGCAAATATTGATGATCTTTGA  
CAGAGAAGAATTGTCAGCAGCACCAG  
ACCCAGGGTGGCCTGACTGCTTCAAT  
TCCGGAGTCTCGTTATCAGCCTTC  
AGTTGAAACATACAATCAGCTGTTGC  
ATCTTGCTCTGAGCAAGGTAGTTT  
GATGGTGGGGACCAAGGCATACTGAA  
CACATTTTTAGCAGCTGGCAACAA  
CAGATATCAGAAACACCTGCCGTT  
ATTTATAAACCTAACGAGCATCTCTAT  
ATTCTCCTACCTCCGGCATTTAAAG  
TGTTGGTGCAAGTGCAAAGTTGTG  
CATTTCTGGGACGAGTCAAACCATG  
GAATTATACTTATGATCCAAAACAA  
AAAGTGTCAAAAGTGAGGCCATGAT  
CCCAACATGACTCATCCAGAGTTCT  
CATCCTGTGGTGGAACATCTTACCA  
CCAACGTTTACCTCTGCTTCAATGA  
CAGTAAAGGTGGATACGGATCCGAA
```

**Final protein sequence (Tag sequence in lowercase):**

```
mhhhhhhssgvdlgtenlyfq^smTD  
QAFVTLTTNDAYAKGALVLGSSLKQH  
RTTRRLVVLATPQVSDSMRKVLETVF  
DEVIMVDVLDGDSAHLTLMKRPELG  
VTLTKLHCWSLTQYSKCVFMDADTLV  
LANIDDLFDREELSAAPDPGWPDCFN  
SGVFVYQPSVETYNQLLHLASEQGSF
```

DGGDQGILNTFFSSWATTDIRKHLPF  
IYNLSSISIYSYLPAFKVGASAKVV  
HFLGRVKPWNYTYDPKTKSVKSEAH  
PNMTHPEFLILWWNIFTTNVLPLLQ

^ TEV cleavage site

**Tags and additions:** Cleavable N-terminal His6 tag.

**Host:** Rosetta-gami 2(DE3)pLysS (from EMD Biosciences).

**Growth medium, induction protocol:** One colony from the transformation was used to inoculate 1ml of TB media containing 50 $\mu$ g/ml kanamycin and 34 $\mu$ g/ml chloramphenicol, which was placed in a 37°C shaker overnight. The next day glycerol stocks were prepared from this overnight culture. A glycerol stock was used to inoculate 50ml of TB media containing 50 $\mu$ g/ml kanamycin and 34 $\mu$ g/ml chloramphenicol, which was placed in a 37°C shaker overnight. The next day this starter culture was used to inoculate 3L of TB media (7.5ml starter culture used per 1L) containing 50 $\mu$ g/ml kanamycin. When the OD<sub>600</sub> reached approximately 0.8 the temperature was reduced to 18°C and after a further 30 minutes the cells were induced by the addition of 0.1 mM IPTG. The expression was continued overnight. Cells were harvested by centrifugation at 6000g after which the supernatant was poured out and the cell pellet either placed in a -20°C freezer or used directly for purification.

**Lysis buffer:** 50 mM HEPES, pH 7.5; 500 mM NaCl; 5% Glycerol; 10 mM Imidazole; 0.5 mM TCEP; 1 tablet per 50 ml protease inhibitor cocktail EDTA-free (Roche)

**Extraction buffer, extraction method:** Cell pellets were dissolved in approximately 100ml lysis buffer and broken by passing through a high pressure homogenizer at 15,000psi for 4 cycles. The cell debris was pelleted at 35,000g and the supernatant used for further purification.

**Column 1:** Ni-NTA (3.5 ml volume in a gravity-flow column).

**Column 1 Buffers:**

**Binding buffer:** 50 mM HEPES, pH 7.5; 500 mM NaCl; 5% glycerol; 10 mM Imidazole; 0.5 mM TCEP.

**Wash buffer:** 50 mM HEPES, pH 7.5; 500 mM NaCl; 5% glycerol; 40 mM Imidazole; 0.5 mM TCEP.

**Elution buffer:** 50 mM HEPES, pH 7.5; 500 mM NaCl; 5% glycerol; 250 mM Imidazole; 0.5 mM TCEP.

**Column 1 Procedure:** The clarified cell extract was incubated with 2ml of Ni-NTA pre-equilibrated with lysis buffer for 1 hour at 4°C with rotation after which it was passed through a glass column. The column was then washed with 50ml of binding buffer and 50ml of wash buffer. The protein was eluted with 30ml of elution buffer in 5-10 ml fractions.

**Column 2:** Superdex S75 16/60 Gel Filtration.

**GF Buffers:** 10 mM HEPES, pH 7.5; 500 mM NaCl; 5% glycerol; 0.5 mM TCEP.

**Column 2 Procedure:** The elution buffer fractions from column 1 were pooled and concentrated to 2ml with a 10kDa mwco spin concentrator and injected onto an S75 16/60 column (pre-equilibrated in GF Buffer) at 1.0 ml/min. 1 ml fractions were collected.

**Enzymatic treatment:** Protein fractions eluted at 50-55ml from S75 gel filtration were pooled and incubated with 1:20 mol:mol TEV protease overnight at 4°C. The protein plus TEV was passed through a column containing 0.5ml Ni-NTA pre-equilibrated with GF buffer. column was washed with 1ml of GF buffer. Flow-through and wash fractions were pooled.

**Mass spectrometry characterization:** After TEV protease digestion:

Measured mass: 29583.8Da

Expected mass: 29582.8Da

**Protein concentration:** Protein was concentrated to 12mg/ml using an Millipore 10k mwco concentrator.

**Crystallisation:** Prior to crystallization, protein was pre-incubated with 1 mM MnCl<sub>2</sub> and 1 mM uridine diphosphate UDP. Crystals were grown by vapour diffusion in sitting drop at 20°C. A sitting drop consisting of 75nl protein and 75nl well solution was equilibrated against well solution containing 25% (v/v) PEG3350, 0.1 M Tris pH 8.5 and 0.2 M ammonium sulphate. Crystals were mounted in the presence of 25% (v/v) ethylene glycol and flash-cooled in liquid nitrogen.

**Data collection:**

**Resolution:** 2.26Å

**X-ray source:** FRE superbright, single wavelength.