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Purification of FUNDC1-GST

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We use this protocol and it's working

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Abstract

This protocol details the purification of FUNDC1-GST.



Materials

Lysis buffer:

	Tris-HCl	50 mM
	pH	7.4
	NaCl	300 mM
	Triton X-100	1%
	glycerol	5%
	MgCl ₂	2 mM
	DTT	1 mM
	β-mercaptoethanol	2mM
	cOmplete EDTA-free protease inhibitors (Roche)	
	CIP protease inhibitor (Sigma)	
	DNase (Sigma)	

Wash buffer:

	Tris-HCl	50 mM
	pH	7.4
	NaCl	300 mM
	DTT	1 mM

High salt buffer:

	Tris-HCl	50 mM
	pH	7.4



	NaCl	700 mM
	DTT	1 mM

SEC buffer:

	Tris-HCl	25 mM
	pH	7.4
	NaCl	300 mM
	DTT	1 mM

- pET-DUET1 vector (available on Addgene)  pETDuet-1 TIM9,10 addgene Catalog #170280
- FUNDC1 Y18A/L21A (Δ LIR)(available on Addgene)
- Rosetta pLysS cells (Novagen Cat# 70956-4)

 Rosetta™(DE3)pLysS Competent Cells - Novagen Merck Catalog #70956-4

- SORVAL RC6+ centrifuge with an F21S-8×50Y rotor (Thermo Scientific)
- 10 kDa cut-off Amicon filter (Merck Millipore)

 Amicon® Ultra Centrifugal Filter, 10 kDa MWCO Merck MilliporeSigma (Sigma-Aldrich) Catalog #UFC801008



Purification - FUNDC1-GST

16h

- 1 To purify FUNDC1-GST, fuse the cytosol-exposed domain of FUNDC1 (1-50aa) to a C-terminal GST-tag through cloning into a pET-DUET1 vector (available on Addgene).
- 2 Introduce the point mutants by in vitro mutagenesis to generate FUNDC1 Y18A/L21A (Δ LIR)(available on Addgene). After the transformation of the pET-DUET1 vector encoding FUNDC1-GST wild-type or mutants in *E. coli* Rosetta pLysS cells (Novagen Cat# 70956-4), grow the cells in 2x Tryptone Yeast extract (TY) medium at  37 °C until an OD₆₀₀ of 0.4 and then continue at  18 °C .
- 3 Once the cells reaches an OD₆₀₀ of 0.8, induce protein expression with  100 micromolar (μ M) isopropyl β -D-1-thiogalactopyranoside (IPTG) for  16:00:00 at  18 °C .
- 4 Collect the cells by centrifugation and resuspend in lysis buffer.

Lysis buffer:

A	B
Tris-HCl pH 7.4	50 mM
NaCl	300 mM
Triton X-100	1%
Glycerol	5%
MgCl ₂	2 mM
DTT	1 mM
β -mercaptoethanol	2mM
cOmplete EDTA-free protease inhibitors (Roche)	
CIP protease inhibitor (Sigma)	
DNase (Sigma)	

- 5 Sonicate the cell lysates twice for 30 s and clear by centrifugation at  18000 rpm, 4°C, 00:45:00 in a SORVAL RC6+ centrifuge with an F21S-8×50Y rotor

45m

(Thermo Scientific).



5.1 Sonicate the cell lysates for 00:00:30 (1/2).

30s

5.2 Sonicate the cell lysates for 00:00:30 (2/2).

30s

6 Collect the supernatant and incubate with pre-equilibrated Glutathione Sepharose 4B beads (GE Healthcare) for 02:00:00 at 4 °C with gentle shaking to bind FUNDC1-GST.

2h



7 Centrifuge the samples to pellet the beads and remove the unbound lysate.



8 Wash the beads twice with wash buffer, once with high salt wash buffer, and two more times with wash buffer.



Wash buffer:

	A	B
	Tris-HCl pH 7.4	50 mM
	NaCl	300 mM
	DTT	1 mM

High salt buffer:

	A	B
	Tris-HCl pH 7.4	50 mM
	NaCl	700 mM
	DTT	1 mM

9 Incubate the beads Overnight with 4 mL of 50 millimolar (mM) reduced glutathione dissolves in wash buffer at 4 °C , to elute FUNDC1-GST from the beads.

2h



10 To collect the supernatant, collect the beads by centrifugation.





11 Wash the beads twice with  4 mL of wash buffer, and collect the supernatant. 

12 Pool the supernatant fractions, filtered through a 0.45 µm syringe filter, concentrated with 10 kDa cut-off Amicon filter (Merck Millipore), and load onto a pre-equilibrated Superdex 200 Increase 10/300 GL column (Cytiva).

13 Elute the proteins with SEC buffer.

SEC buffer:

	A	B
	Tris-HCl pH 7.4	25 mM
	NaCl	300 mM
	DTT	1 mM

14 Analyze fractions by SDS-PAGE and Coomassie staining. Pool the fractions containing purified FUNDC1-GST.

15 After concentrating the purified protein, aliquote the protein and snap-frozen in liquid nitrogen. 

Note

Store the proteins at  -80 °C .