Supplementary Methods S3. Induce expression and purification of target protein.

Transfer 100 μL of cultures containing BL21(DE3) expression strain carrying expression vector into 8 mL LB (with 50 μg/mL Kanamycin) for overnight at 37℃ 180 rpm. The overnight suspension cultures were transferred into 100 mL LB (with 50 μg/mL Kanamycin) and grown to OD600 ≈ 0.6 at 37°C, then induced with 0.5 mM IPTG at 15°C for 20 h with shaking (140 rpm).

Since the recombinant plasmid contains a His tag, the *N*-terminus of the fusion protein heterologously expressed in *E. coli* contains 6 histidine His residues. Protein purification can be performed through affinity with immobilized metal ions Ni^{2+}. The specific operation steps are as follows:

(1) Lyse the bacteria. All operations should be placed on ice. Use 40 mL of lysis buffer (50 mM NaH_2PO_4; 300 mM NaCl; 10 mM Imidazole) to dissolve the deposit of bacteria for 100 mL cultures.

(2) After complete dissolution, ultrasonicate with an ultrasonic interval of 5 s;

(3) Centrifuge the ultrasonicated solution at 4℃, 8000 g for 5 min, and take 20 μL of the supernatant and divide it into 1.5 mL centrifuge tubes;

(4) Equilibrate the Ni column with 50 mL of lysis buffer, leaving 1 mL in the column, and then add the supernatant from the previous step to the column in turn, which can reduce the flow rate to allow the protein and resin to fully bind;

(5) Remove impurities (i.e. impurities that are not bound to the resin): 50 mL wash buffer1 (50 mM NaH_2PO_4; 300 mM NaCl; 20 mM Imidazole); 50 mL wash buffer2 (50 mM NaH_2PO_4; 300 mM NaCl; 40 mM Imidazole); 50 mL wash buffer3 (50 mM NaH_2PO_4; 300 mM NaCl; 80 mM Imidazole);

(6) Elute the target protein: 50 mL elution buffer (50 mM NaH_2PO_4; 300 mM NaCl; 250 mM Imidazole), and collect in a new 50 mL EP tube;

(7) Concentrate to 500ul with ultrafiltration tube;

(8) Clean the protein purification column: 50 mL elution buffer, 30 mL lysis buffer, 50 mL pure water, 50 mL of 20% ethanol, and keep 1-2 mL of 20% ethanol to preserve the column to prevent contamination.