

## Supplementary Figure legends

Supplementary Figure 1. UBAP2L is localized to SGs in response to various stress conditions. Related to Figure 1. **a** HeLa cells were treated with heat shocked (44°C) for 30 min or 1 mM hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) for 1.5 h. The cells were immunostained for UBAP2L and G3BP1. **b** HeLa cells were transfected with plasmids encoding GFP or GFP-UBAP2L, and 24 h later, the cells were immunostained for GFP and eIF4E with or without 0.5 mM arsenite (AS) treatment for 30 min. **c** Cells were transfected with plasmids encoding indicated cDNA and 24 h later, the cells were lysed and immunoblotted.

Supplementary Figure 2. UBAP2L depletion suppressed SG assembly by heat and sorbitol treatments. **a,b** HeLa cells were transfected with control or UBAP2L siRNAs. After 72h, the cells were treated with heat shocked (44°C) for 30min (**a**) or 0.3 M sorbitol for 30min (**b**) and immunostained with anti-UBAP2L and anti-G3BP1 antibodies.

Supplementary Figure 3. UBAP2L interacted with multiple SG localizing proteins. **a** 293T cells were transfected with FLAG-UBAP2L together GFP-G3BP2, GFP-FXR1, GFP-FMRP or GFP-Caprin1, and 24 h later, the cells were lysed and immunoprecipitated with an anti-FLAG antibody. The immunoprecipitates were immunoblotted by anti-GFP and anti-FLAG antibodies. **b** HeLa cells were lysed and immunoprecipitated with control or anti-UBAP2L antibodies. The immunoprecipitates were subjected to immunoblot analysis. **c** 293T cells were transfected with GFP-G3BP1 together with FLAG-UBAP2L deletion mutants. After 24 h, cells were lysed and immunoprecipitated with an anti-FLAG antibody and subjected to immunoblotting to probe for GFP or FLAG. **d** 293T cells were transfected with GFP-FXR2 together with GFP-UBAP2L deletion mutants. After 24 h, cells were lysed and immunoprecipitated with an anti-FLAG antibody and subjected to immunoblotting to probe for GFP and FLAG.

Supplementary Figure 4. Adox and phosphatase treatments did not affect the interaction between UBAP2L and G3BP1. **a** HeLa cells were cultured in the presence or absence of 25uM of Adox for 24 h, and lysed, and immunoprecipitated with an anti-UBAP2L antibody. The immunoprecipitates were immunoblotted with indicated antibodies. **b** Cells were cultured with or without Adox for 24 h, and then treated with 0.5 mM arsenite for 30 min. The cells were immunostained for G3BP1 and FXR2. **c** HeLa cells were immunoprecipitated with an anti-UBAP2L antibody, the immunoprecipitates

were treated with lambda phosphatase and immunoblotted.

Supplementary Figure 5. The results of small RNA sequencing of G3BP1 RIP. **a** The RNAs with the top 10 G3BP1 RPM scores are presented. **b** The percentages of each type of gene of the RNAs with top 100 G3BP1 RPM scores are shown in the circle graph. **c** HeLa cells were treated with or without 0.5 mM arsenite for 30 min. **c** Cells were fixed and hybridized SNORD 44-DIG probe for overnight, and then cells were immunostained for DIG and UBAP2L.