Several types of acute toxic and abiotic stresses can induce SG formation.

**STEP 1** Initiation of Cellular Stress

- Heat stress
- Oxidative stress
- Viral infection
- UV irradiation
- Phosphorylation of eIF2α by PKR, PERK, GCN2, or HRI
- mTOR regulates eIF4F; inactivation of mTOR drives eIF4F interference

**STEP 2** Stress Granule (SG) Seed Formation

- Recruitment of canonical nucleating RNA-binding proteins (RBPs)
- Translating ribosomes run off, inhibiting translation and exposing the mRNA and 40S subunit interface.
- Stress granule formation drives liquid-liquid phase separation (LLPS).

**STEP 3** Stress Granule Formation

- G3BP1/2, TIA1, and Caprin1 proteins complex and relocate to SG, regulating SG formation.
- Disease-linked RBPs translocate from the nucleus and are recruited to SGs through secondary nucleation.
- TIA1/R strongly interacts with G3BP1/R.
- Increased local seed concentration and weak low-affinity interactions between seeds results in the coalescence of stress granules.

**STEP 4** Stress Granule Disassembly

- YTHDF2 binds m6A-modified mRNA and accumulates around G3BP1 clusters to facilitate SG coalescence.
- Disease-linked RBPs translocate from the nucleus and are recruited to SGs through secondary nucleation.

**STEP 5** Resumption of Translation

- Translation and protein production resumes.
- Preinitiation complexes re-form, recruiting eIF-proteins and preparing for translation.
- Disease-linked RBPs translocate from the nucleus and are recruited to SGs through secondary nucleation.

**CYTOPLASM**

- UBAP2L is required for SG assembly and controls the recruitment of SG component mRNP, RBPs, and ribosomal subunits.

**STRESS GRANULE SEED**

- Increased local seed concentration and weak low-affinity interactions between seeds results in the coalescence of stress granules.

**STRESS GRANULE**

- hnRNP A1 is hyperphosphorylated and accumulates in the cytoplasm, incorporating into SGs.

**NUCLEUS**

- m7-G cap
- hnRNP A1
- PABP1
- Start codon
- TIA1/TIAR
- 40S ribosome
- Ataxin-2
- UBA2P2L
- Caprin1
- YTHDF1/3
- FUS

**Key**

- mRNA
- m7-G cap
- hnRNP A1
- PolyA tail
- PABP1
- Start codon
- TIA1/TIAR
- 40S ribosome
- Ataxin-2
- UBA2P2L
- Caprin1
- YTHDF1/3
- FUS

For more information visit: www.cellsignal.com
<table>
<thead>
<tr>
<th>STRESS GRANULE MARKERS</th>
<th>ANTIBODIES</th>
<th>APPLICATIONS</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3BP1 (E9G1M) XP®</td>
<td>Rabbit mAb #1559</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R, Ma</td>
</tr>
<tr>
<td>TIA1 (D1Q3K)</td>
<td>Rabbit mAb #2740</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R</td>
</tr>
<tr>
<td>UBAP2L (E5X4E)</td>
<td>Rabbit mAb #40199</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R, Ma</td>
</tr>
<tr>
<td>FUS/TLS (E3O8I)</td>
<td>Rabbit mAb #5704</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R</td>
</tr>
<tr>
<td>TIAR (D32D3)</td>
<td>XP® Rabbit mAb</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R</td>
</tr>
</tbody>
</table>

**APPLICATIONS**
- WB, IP, IHC-P, IF-IC
- WB, IP, IHC-P, IF-IC
- WB, IP, IHC-P, IF-IC
- WB, IP, IHC-P, IF-IC
- WB, IP, IHC-P, IF-IC

**REACTIVITY**
- H, M, R, Ma
- H, M, R
- H, M, R, Ma
- H, M, R, Ma
- H, M, R, Ma

---

<table>
<thead>
<tr>
<th>STRESS GRANULE ASSOCIATED PROTEINS</th>
<th>ANTIBODIES</th>
<th>APPLICATIONS</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIAR (D1Q3K) XP®</td>
<td>Rabbit mAb #5809</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R</td>
</tr>
<tr>
<td>FMRE Antibody #4317</td>
<td>Confluent fibroblasts or C172 cells, untreated (left) or treated (right) with MG-132 (50 µM for 3 hours) using #4317 (green). Actin filaments were labeled with Dylight® 554 phalloidin (red). Blue pseudocolor = DRAQ5® #4084 (fluorescent DNA dye).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**APPLICATIONS**
- WB, IHC-P, IF-IC
- WB, IHC-P, IF-IC

**REACTIVITY**
- H, M, R, Ma
- H, M, R, Ma

---

<table>
<thead>
<tr>
<th>STRESS GRANULE DISASSEMBLY</th>
<th>ANTIBODIES</th>
<th>APPLICATIONS</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQSTM1/p62 (D6M5X)</td>
<td>Rabbit mAb</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R, Ma</td>
</tr>
<tr>
<td>PERK (D11A8)</td>
<td>Rabbit mAb</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R, Ma</td>
</tr>
<tr>
<td>UBAP2L (E5X4E) Rabbit mAb</td>
<td>WB, IHC-P, IF-IC</td>
<td>M, R, Ma</td>
<td></td>
</tr>
</tbody>
</table>

**APPLICATIONS**
- WB, IP, IHC-P, IF-IC
- WB, IP, IHC-P, IF-IC
- WB, IP, IHC-P, IF-IC

**REACTIVITY**
- H, M, R, Ma
- H, M, R, Ma
- H, M, R, Ma