**eIF3 mediates translational heat shock response through the RNA-binding g subunit**

**Summary**

While heat shock response is crucial for protein folding homeostasis and the rapid growth of cells including cancer, its translational control remains a mystery. Here, we performed genome-wide translational profiling of yeast temperature-sensitive mutant mapping in the i subunit of translation factor eIF3 [1] and found that, along with its RNA-binding partner, eIF3g, it promotes translation of a subset of mRNA in response to heat. The eIF3i/g-regulated genes include SSA1/2 encoding Hsp70. Its translational control is mediated by direct eIF3g-binding to the GUCG motif located 12-bases downstream of the start codon. SELEX analysis indicates that eIF3g binds a consensus GUCG-GC through its RRM. We propose that eIF3g binding to the leading edge of mRNA within the scanning pre-initiation complex promotes translation initiation from a subset of mRNAs in response to heat.