

Transcriptional regulation plays an important role in the control of gene expression during aging. However, translation efficiency likely plays an equally important role in determining protein abundance, but has been relatively under studied in this context. Here we used RNA-seq and ribosome profiling to investigate the role of translational regulation in lifespan extension by CAN1 gene deletion in yeast. Through comparison of the transcriptional and translational changes in cells lacking CAN1 with other long-lived mutants, we were able to identify critical regulatory factors, including transcription factors and mRNA-binding proteins, that coordinate transcriptional and translational responses. Together, our data support a model in which deletion of CAN1 extends replicative lifespan through increased translation of proteins that facilitate cellular response to stress. This study extends our understanding of the importance of translational control in regulating stress resistance and longevity.