

## **Inventory of Additional Supplementary Files**

### **File name: Supplementary Data 1.**

Description: Echocardiographic profiles for the heart of *Rpl3l*<sup>+/+</sup> and *Rpl3l*<sup>-/-</sup> mice.

### **File name: Supplementary Data 2.**

Description: TE values for the heart of *Rpl3l*<sup>+/+</sup> and *Rpl3l*<sup>-/-</sup> mice.

### **File name: Supplementary Data 3.**

Description: TE values for RPL3 OE, RPL3L OE, and empty control C2C12 cells.

### **File name: Supplementary Data 4.**

Description: Fold change in ribosome occupancy for Pro or Ala codons in the heart of *Rpl3l*<sup>-/-</sup> mice compared with that of control mice.

### **File name: Supplementary Data 5.**

Description: MaxLFQ label-free quantification values for proteins in the heart of *Rpl3l*<sup>+/+</sup> and *Rpl3l*<sup>-/-</sup> mice.

### **File name: Supplementary Data 6.**

Description: RPM values for Charged-DM-tRNA-seq analysis of the heart of *Rpl3l*<sup>+/+</sup> and *Rpl3l*<sup>-/-</sup> mice.

### **File name: Supplementary Data 7.**

Description: TPM values for m6A-seq analysis of the heart of *Rpl3l*<sup>+/+</sup> and *Rpl3l*<sup>-/-</sup> mice.

### **File name: Supplementary Data 8.**

Description: RPM values for Disome-seq analysis of the heart of *Rpl3l*<sup>+/+</sup> and *Rpl3l*<sup>-/-</sup> mice.

### **File name: Supplementary Data 9.**

Description: Oligonucleotides used in this study.

### **File name: Supplementary Data 10.**

Description: Concatemer sequences used in MRM analysis.

**File name: Supplementary Data 11.**

Description: Artificial protein sequences and corresponding MRM assay information.

**File name: Supplementary Movie 1.**

Description: Two-dimensional targeted M-mode images of the heart of *Rpl3l*<sup>+/+</sup> and *Rpl3l*<sup>-/-</sup> mice.