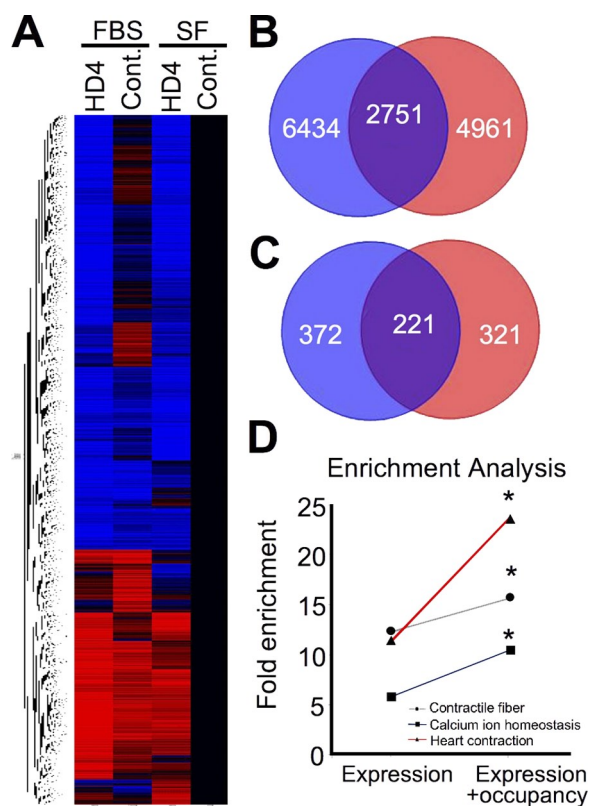Figure S1. **Analysis of HDAC4 target genes.** (A) Heat map of the genome-wide expression analysis using Affymetrix arrays from neonatal cardiomyocytes infected with an adenovirus expressing β-galactosidase (cont.) or HDAC4 (HD4) in either serum-free (SF) or 10% fetal bovine serum (FBS)–containing media. (B) Vin diagram of the DamID screen showing HDAC4 genomic targets identified under quiescent conditions (blue), targets identified under hypertrophic conditions (light red), and targets present under both conditions (purple). (C) Vin diagram of the cross between the expression analysis and occupancy DamID screens for HDAC4 target genes with FBS (light red), under quiescence (blue), or under both conditions (purple). (D) Enrichment analysis, consisting of only direct HDAC4 targets, showing that the heart contraction and Ca^{2+} ion homeostasis gene groups were significantly enriched in the HDAC4 expression target analysis (*, $P < 0.05$).

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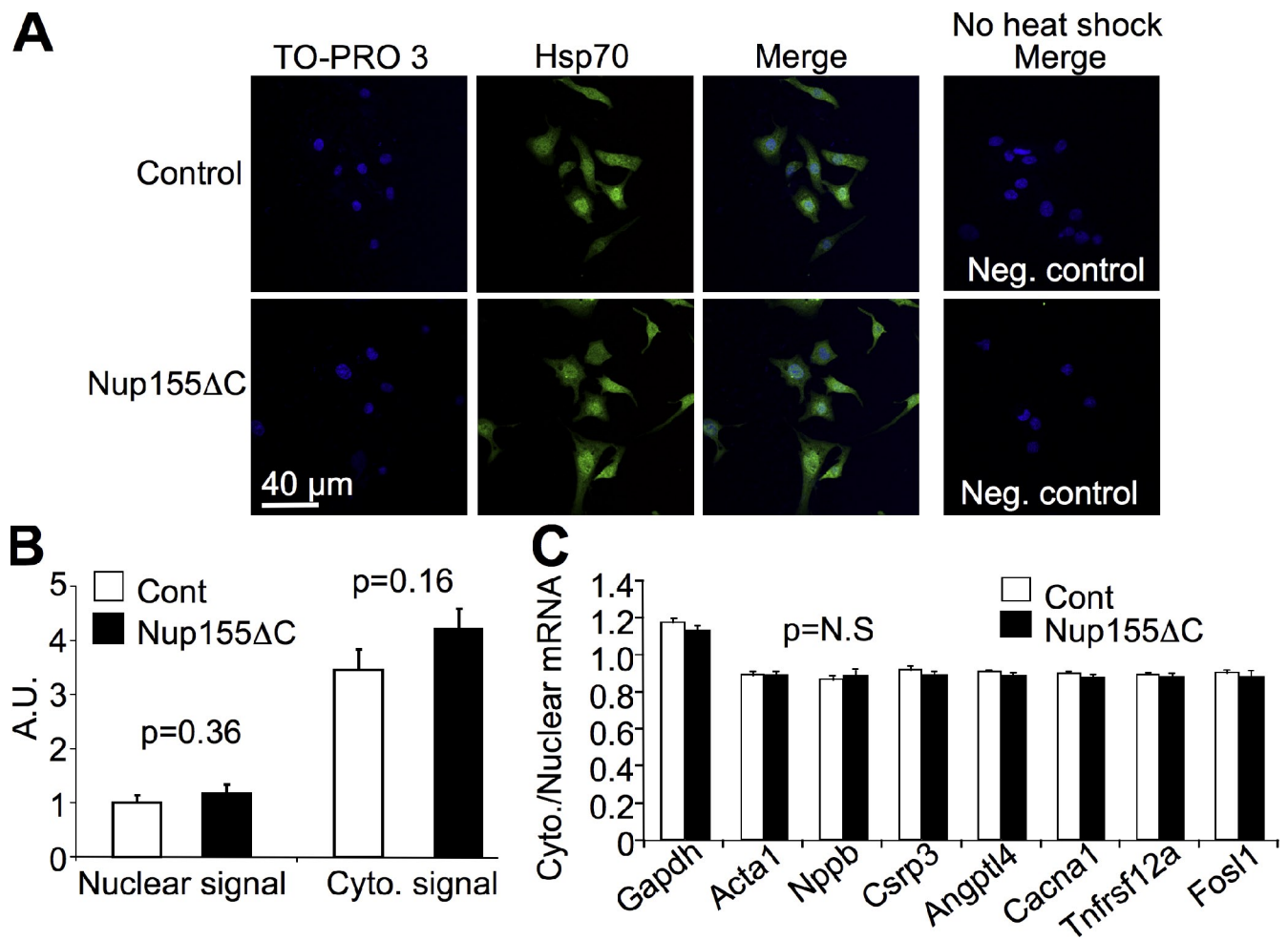
Figure S2. **Infection with AdNup155ΔC does not disrupt the nuclear pore.** (A) Immunofluorescent staining of heat-shocked NRVMs for Hsp70 (green) infected with Adβgal (control) or AdNup155ΔC showing similar nuclear content of Hsp70. The "no heat shock" controls show no Hsp70 expression. (B) Quantification showing similar nuclear and cytoplasmic immunosignal with Adβgal or AdNup155ΔC. (C) Quantification of cytoplasmic/nuclear mRNA content of the indicated genes in NRVMs infected with Adβgal (control) or AdNup155ΔC by qRT-PCR demonstrating that Nup155ΔC does not cause an impairment in mRNA export.
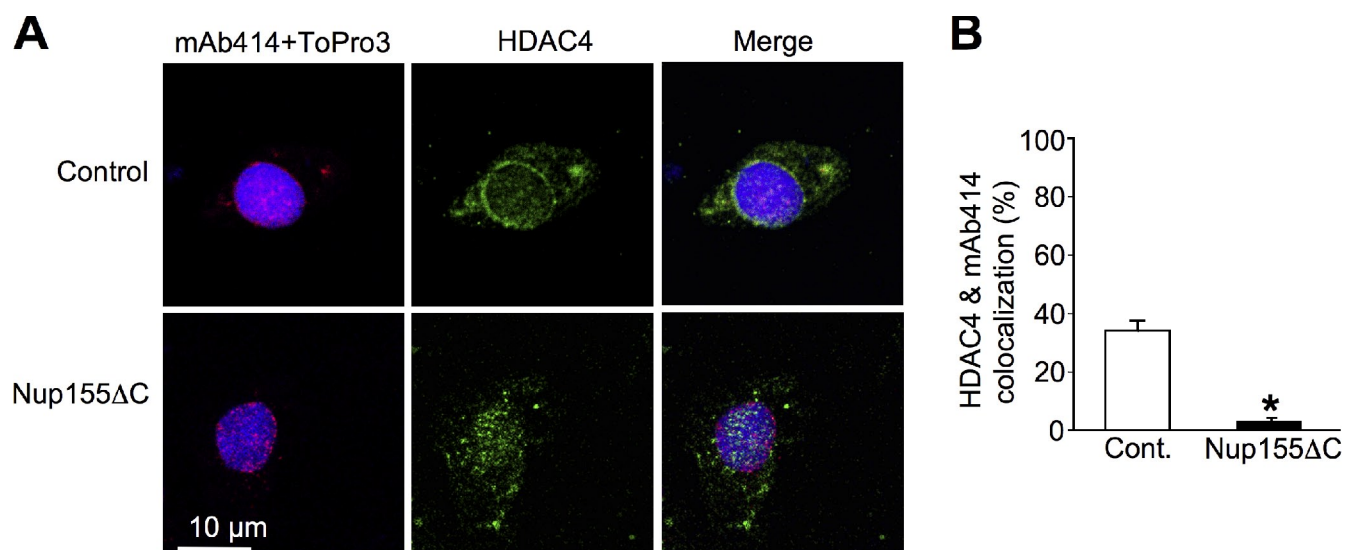
Figure S3. **Colocalization of HDAC4 and nucleoporins.** (A) Immunofluorescent staining of NRVMs for HDAC4 (green) and mAb414 (red) infected with Adβgal (control) or AdNup155ΔC. The data show displacement of HDAC4 from the NPC by Nup155ΔC. (B) Quantification of the data showing significantly decreased colocalization of HDAC4 and mAb414 signal after infection with AdNup155ΔC (*, P < 0.001).