Supplementary Figure Legends

Supplementary Figure 1

AAGCTTGCGGCCGCATATAGGATCCGCCACCATGAGACTGACCAGATGCTGGGCCGCTCT
GGCCGCTGCCATCATCCTGAACCTGCTGGTGTTCTTCTACGTGTCCTGGCTGCAGCACCA
GCCCAGAAACAGCAGAGCCAGAGGCCCCAGAAGAACCAGCGCCATCGGCCCCAGAGTGAC
CGTGCTGATCAGAGAGTTCGAGGCCTTCGACAACGCCGTGCCCGAGCTGGTGGACAGCTT
TCTGCAGCAGGACCCTGCTCAGCCTGTGGTGGTGGCCGCCGATACCCTGCCTTACCCTCC
ACTGGCCCTGCCCAGAATCCCCAACGTGCGGCTGGCTCTGCTGCAGCCTGCCCTGGATAG
ACCTGCCGCCGCTAGCAGACCCGAGACATACGTGGCCACCGAGTTCGTGGCCCTGGTGCC
TGATGGCGCCAGAGCTGAGAGCCCTGGCCACCTGGAAAGAATGGTGGAAGCCCTGAGAGG
CAGCAGCGCCAGACTGGTGGCTGCTCCTGTGGCTACAGCCAACCCTGCCAGATGCCTGGC
CCTGAACGTGTCCCTGAGAGAGTGGACCGCCAGATACGACCCTGCCCCCAGCGCCCCTAG
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GAGCGTGCCACTGGCGCGCCCGCTGGCTACAAGCCTGTTCCTGCAGACCGCCCTGAGGGG
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CGCCCACGCCAGATGGAAGGCCGAGAGAGAGGGCAGAAGCCGCAGAGCCGCCCTGCTGAG
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GGGCAGATGGACCCCCCCATGCTGCCTGAGGGCCCTGCGCGAGACAGCCAGATACGTGGT
CCCTCACGACCTTCGGCGACCGCACGCCATGACCGACCTTCCGCCGAGAGACGACCCTCG
CGCCAGACACGGCGACATCATCCCTTGGGACTACGACGTGGACCTGGGCATCTACCTGGA
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AGATGTGGGCAACTGCGAGCAGCTGAGAGGCGCCCGAGGCCGGCTCTGTGGTGGATGAGAG
GGGCTTCGTGTGGGAGAAGGCCGTGGAAGGCGACTTCTTCAGAGTGCAGTACAGCGAGAA
CAACCATCTGCATGTGGACCTGTGGCCCTTCTACCCCAGAAACGGCGTGATGACCAAGGA
CACCTGGCTGGACCACAGACAGGACGTGGAATTCCCCGAGCACTTTCTGCAGCCCCTGGT
GCCACTGCCCTTCGCCGGCTTCATGGCCCAGGCCCCCAACAACTACAGAAGATTCCTGGA
ACTGAAGTTCGGCCCTGGCGTGATCGAGAACCCCGAGTACCCTAACCCTGCCCTGCTGTC
CCTGACCGGCGGAGAGCAAAAGCTCATTTCTGAAGAGGACTTGTGATAAGTCGACAGAG
GCGGCCGCTTAATTAA

Figure S1. Codon-optimized FKRP sequences for mammalian expression. Green colored letters are the start codon; yellow colored letters are the sequences coding for the Myc-tag.

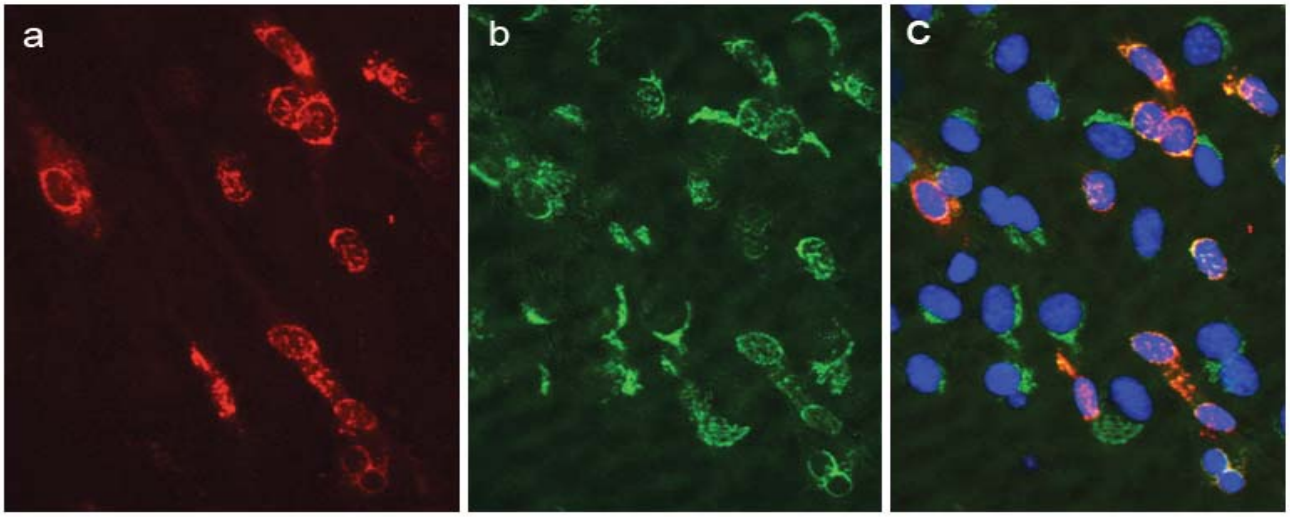

Figure S2. Co-localization of Myc-tag signal with GM130 in AAV9-FKRP treated C2C12 myoblasts. (a) Detection of Myc-tag in a proportion of the myoblasts. (b) Detection of Golgi apparatus with GM130. (c) The merge of the (a) and (b) shows the co-localization of the two signals.

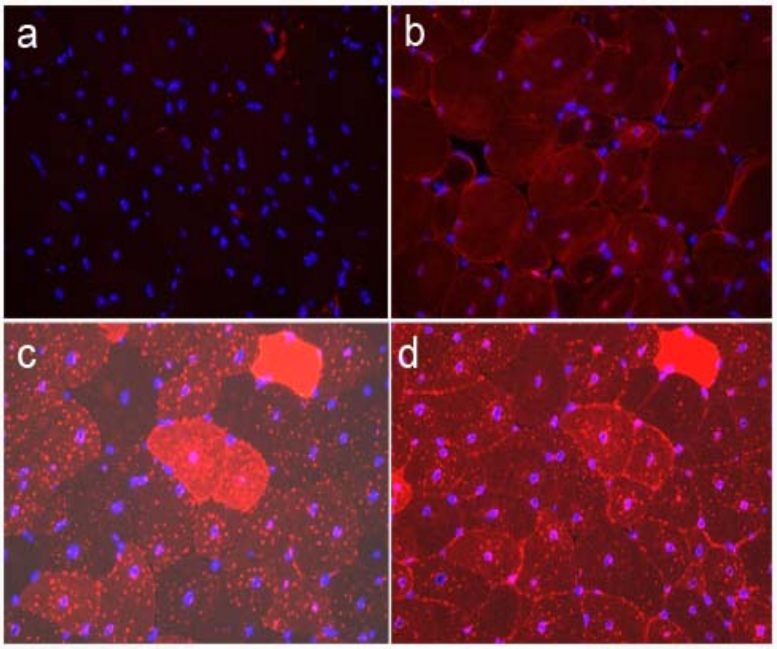

Figure S3. Detection of AAV9-mediated FKRP expression in TA muscles. (a and b) Untreated control muscle. (c and d) AAV9-FKRP treated muscle. (a and c) Sections were stained with FKRPSTEM rabbit antibody to FKRP protein. (b and d) Sections were stained with rabbit anti-Myc-tag antibody. The same 2 fibers with strong FKRP expression covering the entire sarcoplasm in (c) showed significant weaker and punctate staining in (d), indicating segmental expression of the transgene within a single fiber.

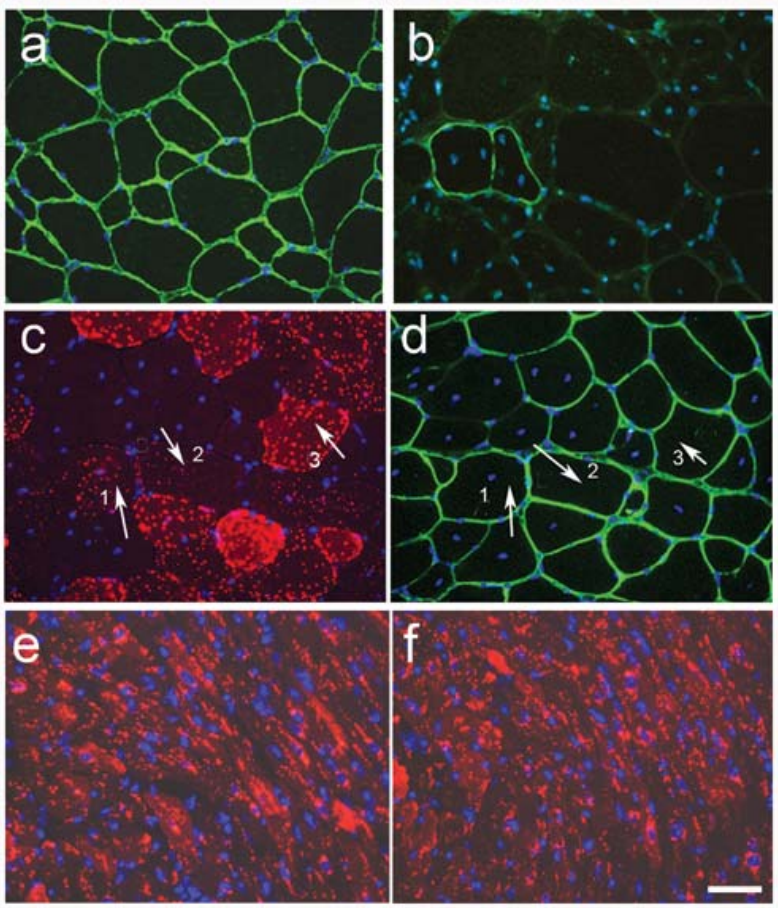

Figure S4. Co-localization of FKRP expression (a, b and d detected with FKRPSTEM antibody) and functionally glycosylated α-DG (c, e and f detected with IIH6 antibody). (a) TA muscle of normal C57 mouse. (b) TA muscle of untreated P448L mutant mouse. Two revertant fibers are clearly visible. (c) Sections of the TA muscle from AAV-FKRP treated P448L mutant mouse. Arrows and the numbers show different expression level of FKRP in relation to the expression level of functionally glycosylated α-DG (d). (e and f) Detection of FKRP expression in cardiac muscles of the AAV9-FKRP treated mouse with antibodies to FKRP protein and the Myc-tag. Scale bar, 50 μm.

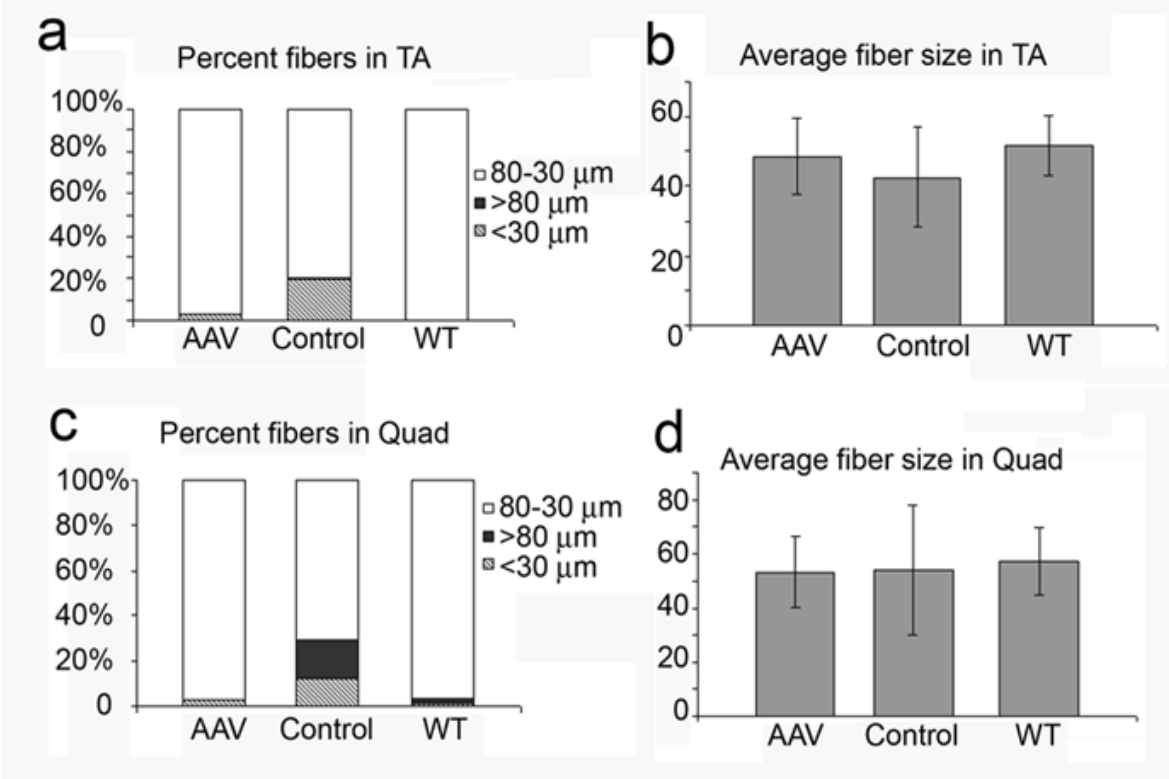

Figure S5. Fiber size measurement. The percentage of fibers with diameter of more than 80 µm, smaller than 30 µm and between 30-80 µm for Tibialis Anterior (TA) and quadriceps(quad) are presented in (a) and (c) respectively. The average fiber size in diameter for TA and quadriceps are represented in (b) and (d) respectively. Number of fiber, ≥500. No significant difference in average fiber size was obtained in both muscles, due to the presence of both small regenerating and larger hypertrophic fibers in the muscles of untreated P448L mutant mice.

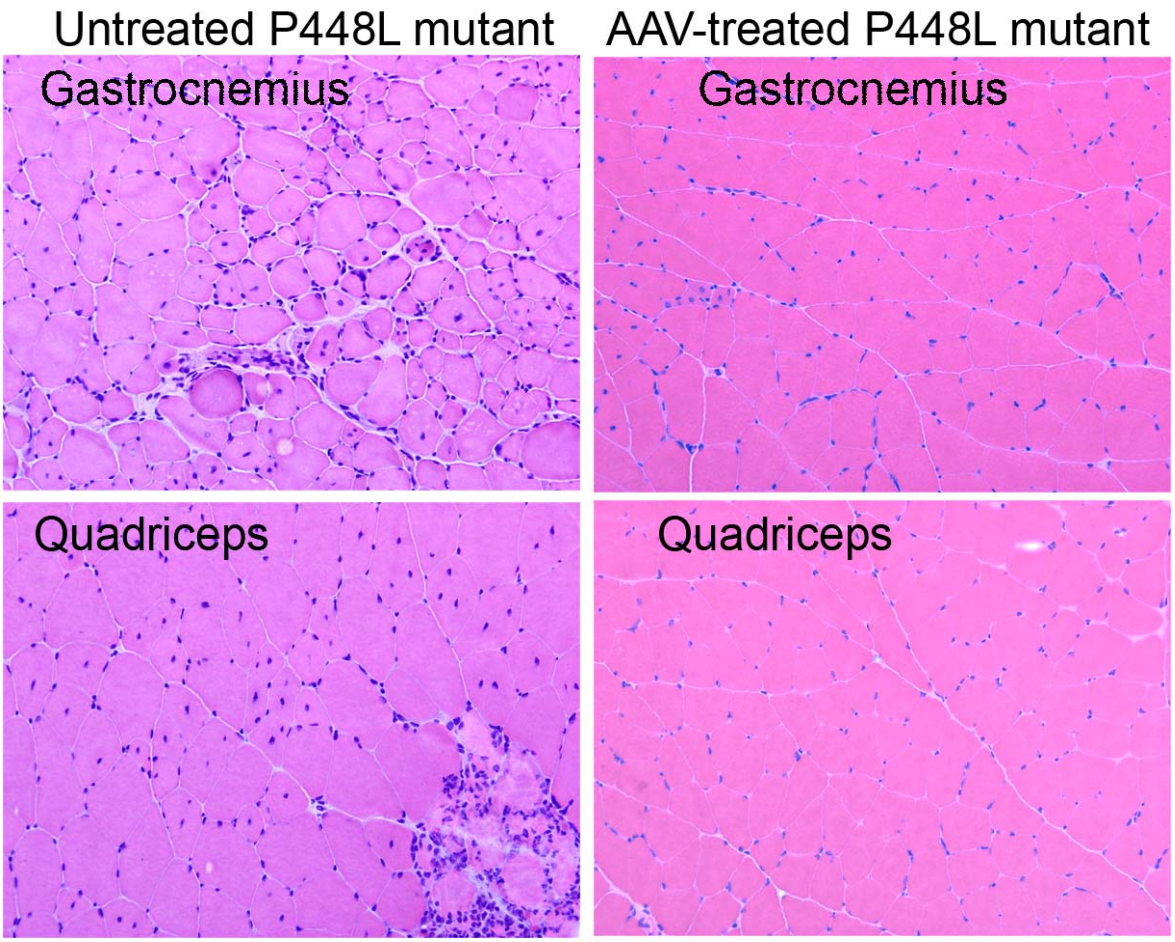

Figure S6. Histological analysis of muscle tissues from control P448L mutant mice (left column) and AAV-FKRP treated P448L mutant mice (Right column). H&E staining.

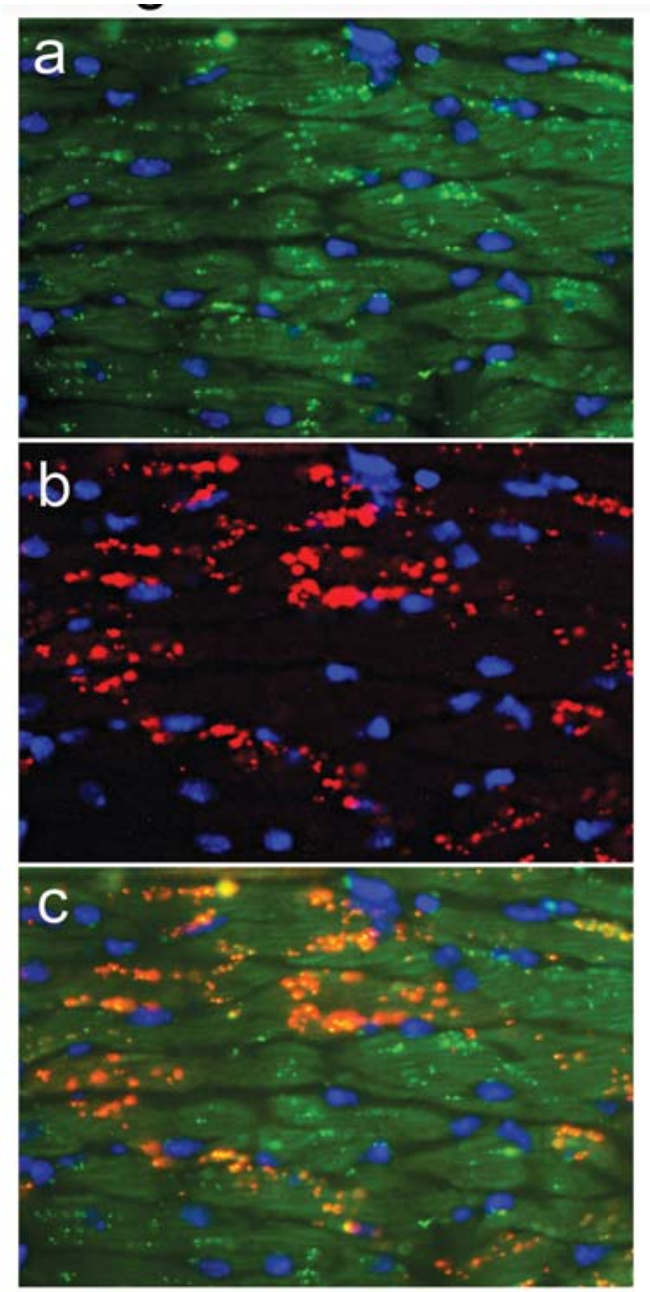

Figure S7. (a and b) Co-localization of GM130 and FKRP in cardiac muscle. (c) Merge of the (a) and (b). Blue DAPI nuclear staining. Scale bar, 50 μm. The area is selected to show the negative fibers as well as positive fibers for FKRP expression.

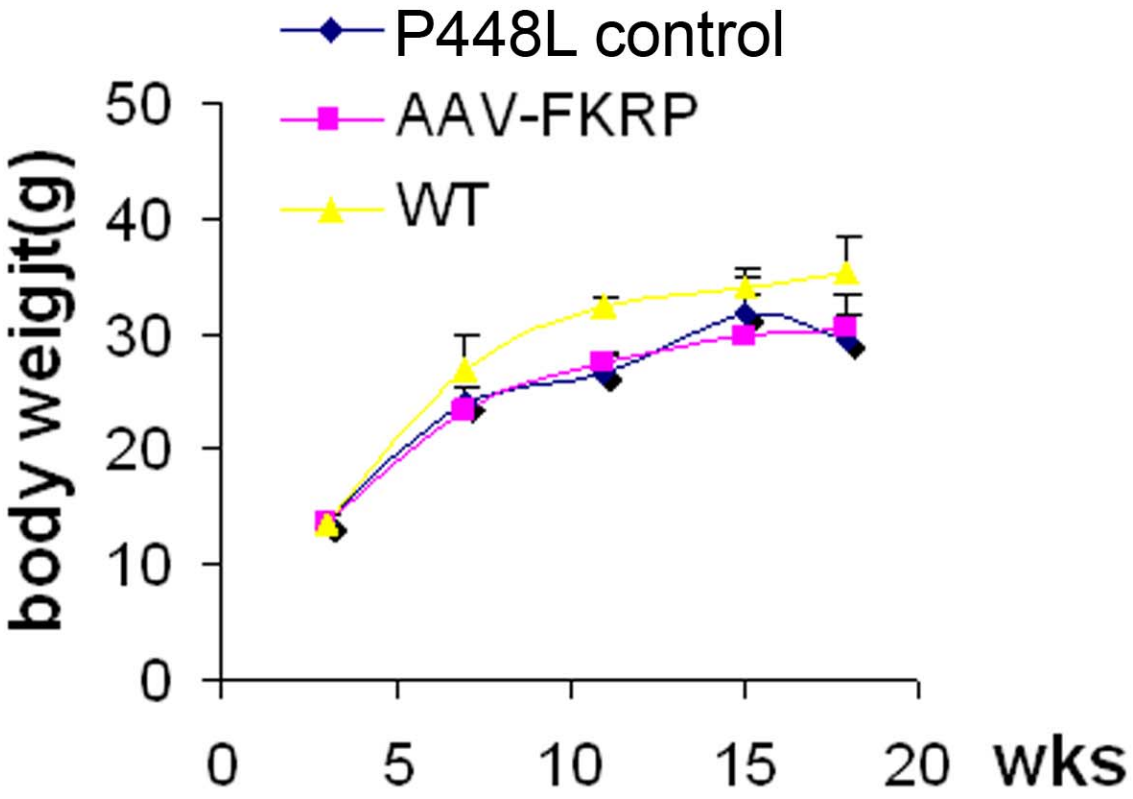

Figure S8. Body weight measurement. n=5.