

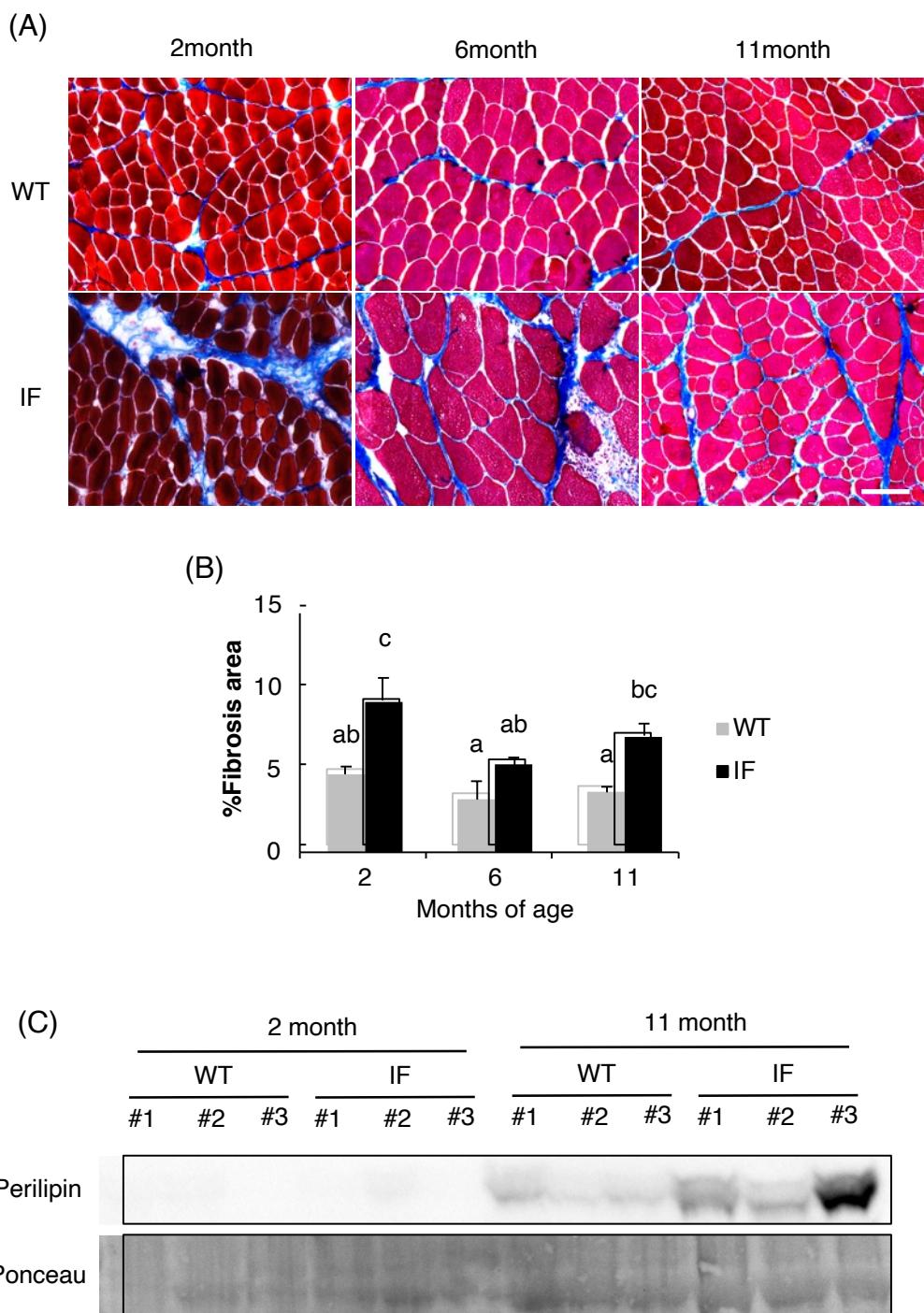
**Figure. S1 Continuous degeneration and age-related change of regeneration capacity in skeletal muscles of IF rats.**

(A) Representative images of H&E staining on TA muscle sections of 1, 2, 6, 11-month-old WT and IF rats. Scale bar = 50  $\mu$ m.

(B) Representative images of immuno-staining for eMHC on TA muscle sections of 1, 6, 11-month-old WT and IF rats. Scale bar = 50  $\mu$ m.

(C) The number of eMHC-positive fibers per TA section of 1, 6, 11-month-old WT and IF rats. Data are presented as means $\pm$ SD (n=3-4, in each group). NP= not present.

(D) The number of Pax7(+) satellite cells per well on day 2 in primary culture from 6, 11-month-old WT and IF rats. Bars represent the mean value of each group. \*P < 0.05, by t-test.

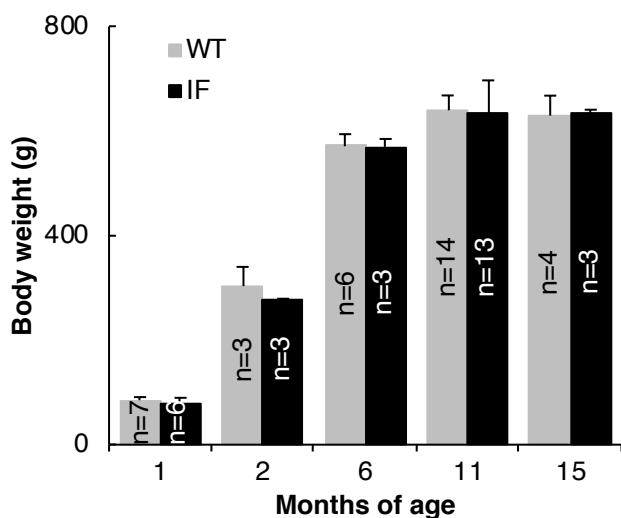


**Figure. S2 Promoted fibrosis and accumulation of adipose tissues in skeletal muscles of IF rats.**

(A) Representative images of Masson trichrome staining on TA muscle sections of 2, 6, 11-month-old WT and IF rats. Scale bar = 50  $\mu$ m.

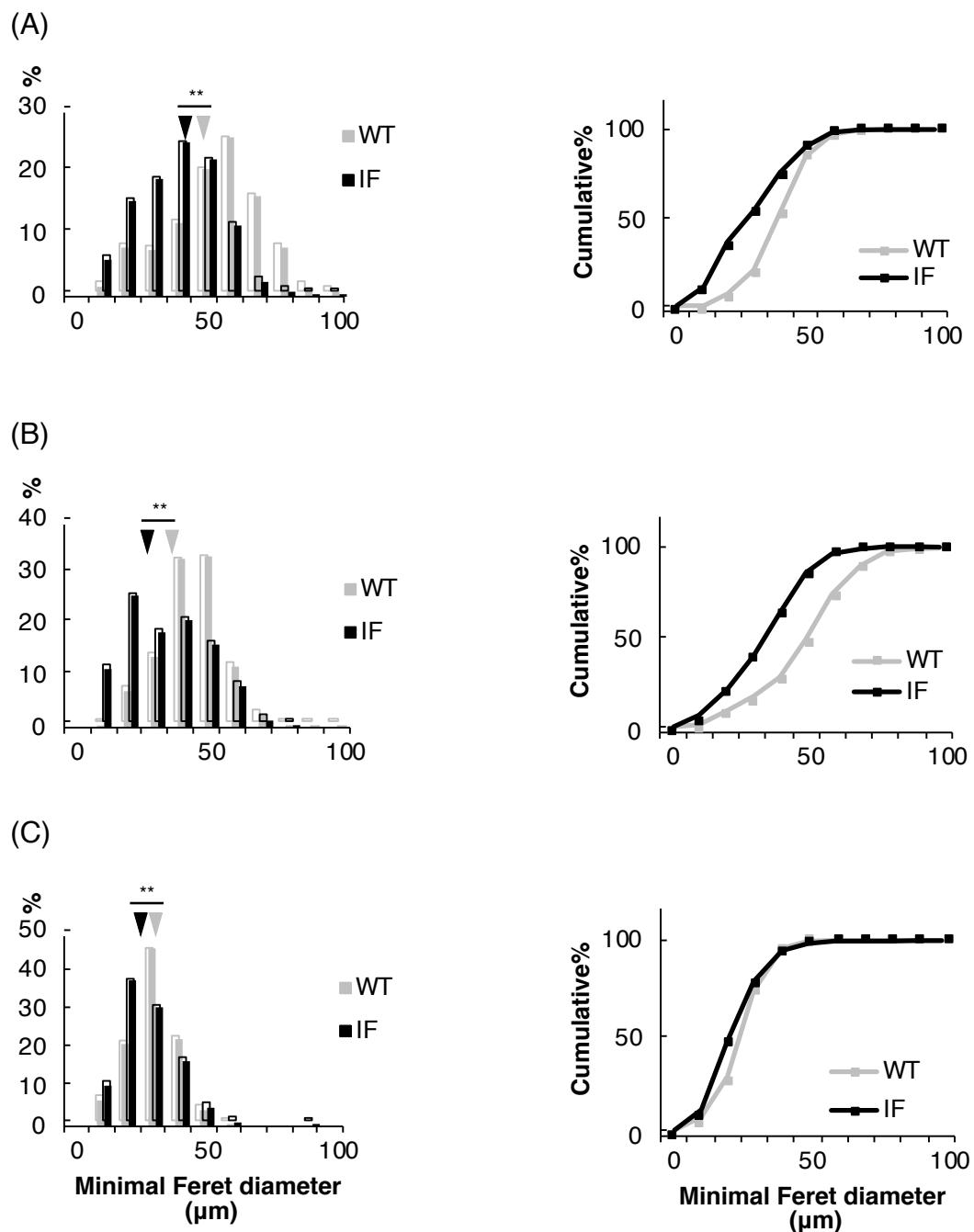
(B) Percentage of fibrosis area in total area observed in TA muscle sections of 2, 6, 11-month-old WT and IF rats. Different letters indicate significant differences between groups ( $P<0.05$ , by Tukey's test). Data are presented as means+SD (n=3, in each group).

(C) Immunoblot analysis of perilipin protein expression in TA of 2, 11-month-old WT and IF rats. Ponceau S staining was used as a loading control.

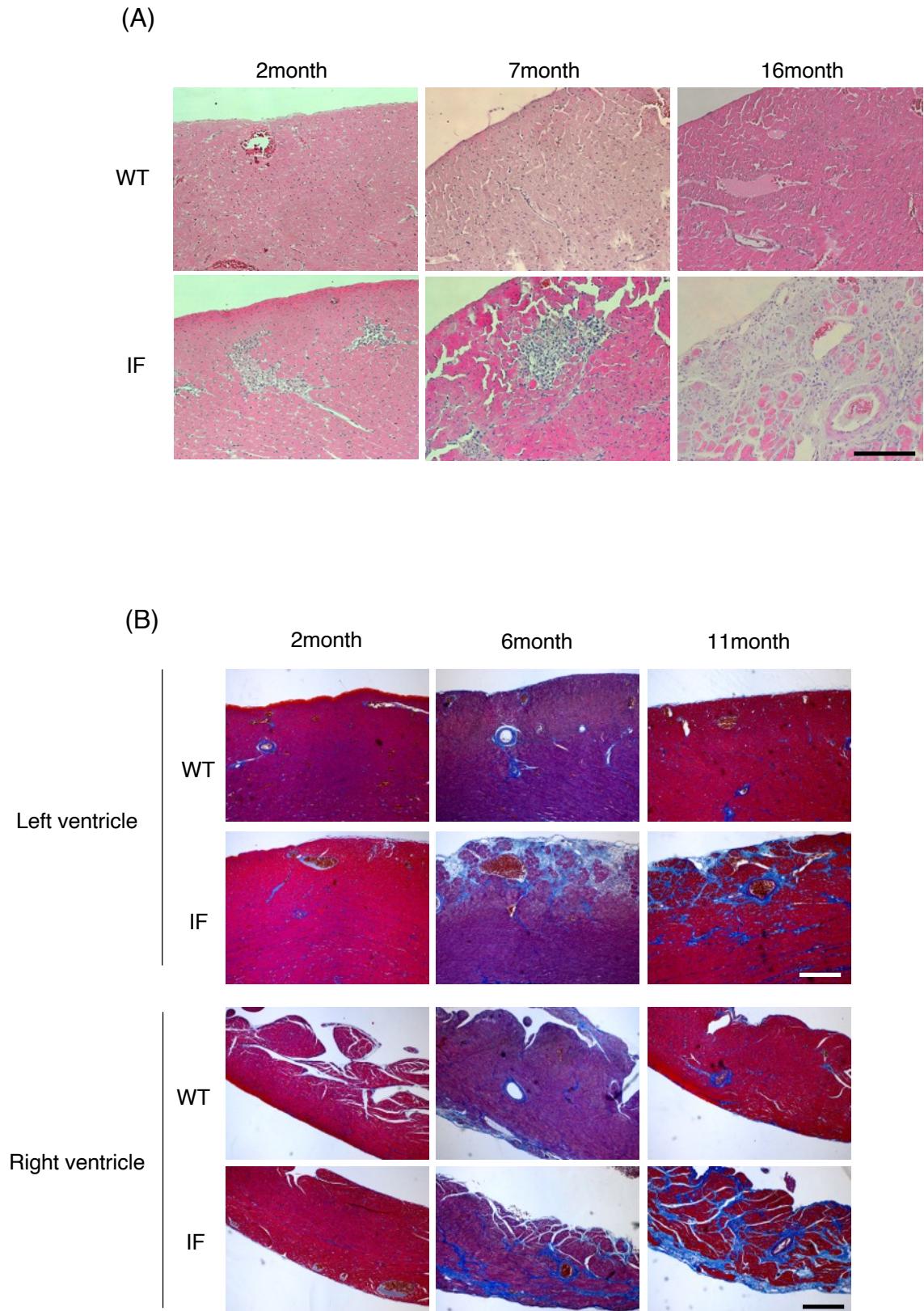


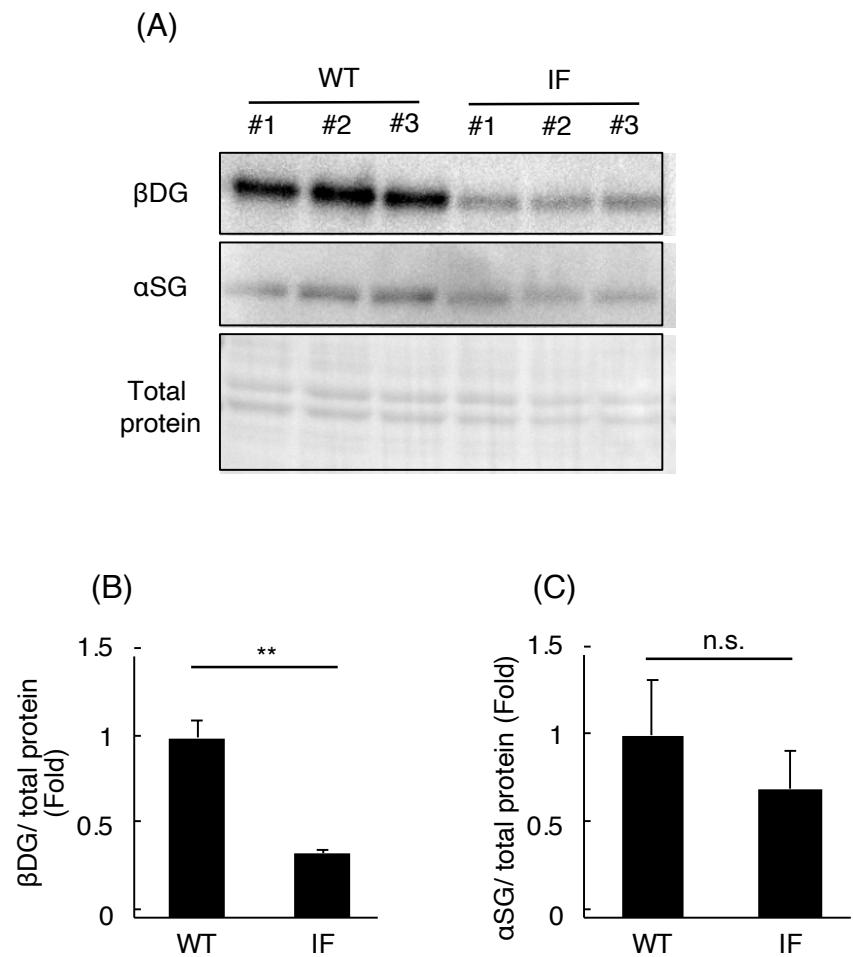
**Figure. S3 Body weight of WT and IF rats**

Body weight of 1, 2, 6, 11, 15-month old WT and IF rats. Data are presented as means+SD (n=3-14, in each group).

**Figure. S4 IF soleus muscles have reduced myofiber size compared with WT.**

Relative distributions and cumulative plots of myofiber size in SOL at 2- (A), 6- (B), and 11-month-old (C) WT and IF rats. Each arrowhead indicates a median value of each group. The data in each group contains the total number of detected myofibers from 3 subjects per group. \*\* $P < 0.01$ , analysis using Wilcoxon rank sum test.

**Figure. S5 Continuous degeneration and progression of fibrosis in cardiac muscles of IF rats.**(A) Representative images of H&E staining on left-ventricular-wall sections of 2, 7, 16-month-old WT and IF rats. Scale bar = 100  $\mu$ m.(B) Representative images of Masson trichrome staining on left- and right-ventricular-wall sections of 2, 6, 11-month-old WT and IF rats. Scale bar = 100  $\mu$ m.



**Figure. S6 Reduction of DGC components expression in skeletal muscle of IF rats.**

(A) Immunoblot analysis of  $\beta$ -dystroglycan and  $\alpha$ -sarcoglycan protein expression in TA of 1-month-old WT and IF rats. Ponceau S staining was used as loading control.  
 (B, C)  $\beta$ -dystroglycan (B) and  $\alpha$ -sarcoglycan (C) expression levels quantified by the immunoblot analysis shown in figure S5A. Data are presented as means $\pm$ SD (n=3). \*\*P < 0.01, n.s.=not significant, by t-test.

**Table S1. Other Echocardiographic Variables**

Variables	7 month			16 month		
	WT (4)	IF (4)	P (t-test)	WT (5)	IF (5)	P (t-test)
Heart rate (bpm)	327±18	354±29	0.221	335±19	332±29	0.869
<b>Left Heart Variables</b>						
Septal wall thickness (mm)	1.7±0.3	1.6±0.4	0.769	1.7±0.1	1.5±0.3	0.315
Posterior wall thickness (mm)	1.9±0.1	1.8±0.1	0.363	1.8±0.3	1.8±0.2	0.774
LV end-diastolic diameter (mm)	9.5±0.6	8.7±0.4	0.12	10.1±0.6	9.8±0.4	0.492
LV end-systolic diameter (mm)	6.2±0.7	5.1±0.1	0.037	6.1±1.3	5.8±1.0	0.727
LV fractional shortening (%)	35.4±3.8	42.0±3.5	0.069	39.5±11.7	40.7±10.2	0.888
Transmitral E velocity (cm/s)	110±23	126±7	0.281	118±19	104±18	0.344
Transmitral E deceleration time (ms)	53±16	42±4	0.302	39±8	49±11	0.164
LV myocardial performance index	0.33±0.05	0.26±0.06	0.194	0.27±0.04	0.33±0.13	0.351
Sm septum (cm/s)	3.8±0.7	4.2±1.1	0.685	3.4±0.3	4.0±0.5	0.085
Sm lateral (cm/s)	6.1±0.9	5.2±1.0	0.296	5.9±0.7	4.5±0.7	0.021
Ea septum (cm/s)	6.9±2.8	5.9±2.0	0.640	6.4±0.5	5.0±1.5	0.149
Ea lateral (cm/s)	6.3±1.7	6.1±2.3	0.912	5.7±1.5	4.7±0.9	0.305
Transmitral E/Ea septum	18.8±8.2	23.5±6.5	0.465	18.6±4.6	22.2±5.5	0.383
Transmitral E/Ea lateral	18.4±4.5	22.7±5.7	0.342	22.2±6.3	23.1±5.9	0.833
<b>Right Heart Variables</b>						
RV fractional area change (%)	41.5±3.7	44.0±3.8	0.457	41.3±6.1	39.5±6.5	0.683
TAPSE (mm)	1.8±0.5	2.3±0.3	0.189	2.3±0.3	1.5±0.6	0.061
Transtricuspid E velocity (cm/s)	67.2±19.8	77.1±12.3	0.191	84.7±5.4	72.2±18	0.666
Sm RV free-wall (cm/s)	5.6±0.4	5.1±0.3	0.096	4.6±0.7	3.9±0.9	0.279
Ea RV free-wall (cm/s)	7.9±2.2	5.5±1.5	0.425	9.1±0.7	6.1±3.4	0.357
Transtricuspid E/Ea RV free-wall	9.0±2.8	15±4.9	0.842	9.4±1.1	12.3±6.4	0.525
Maximum IVC diameter (mm)	3.6±1.0	2.6±0.4	0.161	3.1±0.8	3.0±0.3	0.849

**Table S1 Values from echocardiography**

\*P<0.05, WT vs age-matched IF, by t-test. Numbers in parentheses represent the number of subject in each group.

Table S2 List of primers

		Forward	Reverse
Fig. 1C	genome #1	5'-AAAAGGAGAACAGGAGTTTGAAAT-3'	5'-TACAGTAGCTGAGTCATGAGGTTG-3'
	genome #2	5'-GAATACCTTGGGTGTGACTGTATC-3'	5'-TACAGTTTCCATTCTGAAGAAC-3'
Fig. 1D	mRNA #1	5'-AAAGCAACACATAGACAACCTCTTC-3'	5'-CCTCTTGGCATGTTTACCA-3'
	mRNA #2	5'-GAACTCAGCTCTGAAGGCAAT-3'	5'-CTTCAAAGTTGCATTTCC-3'
Fig. 4D	Dmd	5'-GGAAGATCTGAATACCAGATGGA-3'	5'-CTGCCTGACACGGTCCTC-3'
	Hprt	5'-GACCGGTTCTGTCATGTCG-3'	5'-ACCTGGTTCATCATCACTAATCAC-3'