SUPPLEMENT MATERIAL

Detailed Methods

Echocardiography. Mice were anesthetized with 5% isoflurane/O_2 and maintained on 2% mixture during the experiment. Non-invasive trans-thoracic echocardiography was performed using Vingmed Vivid Five (GE Technology) equipped with a 10-MHz linear transducer. The heart was imaged in 2-D mode in the parasternal short-axis view. The M-mode cursor was positioned perpendicular to the interventricular septum and posterior wall of the LV at the level of the papillary muscles and left ventricular parameters (chamber dimensions and wall thickness) were measured according to leading-edge convention adapted by the American Society of Echocardiography. The percentage of fractional shortening (FS%) and ejection fractions (EF%) were calculated according to following equations: FS = [(LVDd – LVDs) / LVDd] × 100; EF = [(EDVI – ESVI) / EDVI] × 100, where LVDd/s represent left ventricular diameters in diastole/systole, ESVI the end-systolic left ventricular volume index and EDVI the end-diastolic left ventricular volume index.

Gravimetric and histological analyses. Hearts were dissected, weighed and either snap-frozen in dry ice-cold isopentane or fixed in 4% formaldehyde. For collagen deposition analysis, 5 µm thick transverse cryo-sections were cut at intervals of 0.5 mm. Samples were fixed in ice-cold methanol for 10 min, rinsed with PBS and incubated for 2 min in Picrosirius Red solution (0.1% Sirius Red F3B in saturated aqueous solution of picric acid). Samples were subsequently washed in two changes of acidified water (0.5% glacial acetic acid/H_2O), dehydrated in ethanol (3 changes) and, after clearing in xylene, mounted with Enthelan® (*Merck*).
For immunofluorescence, cryosections were fixed in 3.7% formaldehyde/1% methanol (or ice-cold 100% methanol for LAP2β staining), washed in PBS and incubated for 30 min in blocking solution containing 20% normal goat serum/0.5% gelatine/0.5% TritonX-100/PBS. Primary antibodies [rabbit anti-LAP2α affinity purified serum[1], mouse anti-LAP2β mAb17[2], goat anti-lamin A/C N-18 (Santa Cruz Biotechnology) and mouse anti-desmin RD301 (Abcam)] were diluted in PBS and applied overnight at 4ºC. Sections were subsequently washed in PBS and incubated with respective fluorochrome-coupled secondary antibodies for 1 h at RT [anti-rabbit Texas Red and anti-mouse Cy5 (Jackson ImmunoResearch)]. After washing in PBS, nuclei were counterstained with Hoechst 33342 dye (1:5000 dilution in dH_2O) for 10 min at RT and washed in dH_2O. Samples were air-dried and mounted with Mowiol 4-88 (Roth).
Haematoxylin and eosin (H & E) staining was done according to the standard protocol. Fluorescence images were acquired at RT on Zeiss Axiovert 200M microscope, equipped with Zeiss LSM 510 META confocal laser-scanning unit, Plan-Neofluar 40×/1.3 Oil DIC and Plan-Apochromat 63×/1.4 oil DIC MC27 objectives, using Zeiss LSM imaging software. Data were processed with Zeiss LSM Image Browser and Adobe Photoshop CS2.
Brightfield images were acquired using Zeiss Axio Imager.M1 equipped with EC Plan-Neofluar M27 objectives (10×/0.30, 20×/0.50 and 40×/1.30 Oil), Zeiss AxioCam MRc5 camera and AxioVision Rel. 4.6 software. Data were processed in Adobe Photoshop CS2 and figures were created in Adobe Illustrator CS2.
The extent of cardiac fibrosis was assessed on Picrosirius Red-stained samples by measuring the size of collagen-positive areas within the left ventricle (expressed in %), using Adobe Photoshop CS2 (10 sections/mouse prepared as mentioned above), and presented as fibrotic index.

Western blot. Frozen samples were homogenized in modified RIPA buffer [150 mM NaCl, 50 mM Tris-HCl pH 7.4, 1 mM EDTA, 1 mM PMSF, 1 × Protease Inhibitor Cocktail Complete® EDTA free (Roche)] using Precellys 24 homogenizer (PeqLab Biotechnology) and incubated for 2 hr at 4ºC with 1% TritonX-100/0.1% SDS. Lysates were centrifuged at 15 000 *g* for 1 min, diluted in protein sample buffer and incubated for 5 min at 96ºC. For β_2-AR expression analysis, heart membranes were prepared by tissue homogenization in lysis buffer (0.25 M sucrose, 30 mM histidine, 1 mM EDTA pH 8.0, 1 mM PMSF, 1 × Protease Inhibitor Cocktail) and 2 × 10 min centrifugation at 100 000 *g*. The pellets were resuspended in buffer containing 50 mM Tris-HCl [pH 7.4]/1 mM EDTA/1 mM PMSF/1 × Protease Inhibitor Cocktail/10% glycerol. Protein concentration was determined using Coomassie Plus™ Protein Assay (Pierce) and samples (20 µg of protein) were loaded on 10% SDS-polyacrylamide gels without boiling. SDS-PAGE and immunoblotting were performed according to standard laboratory procedures. Samples were incubated overnight at 4ºC with primary antibodies diluted in 2%BSA/PBST/0.02%NaN_3 [rabbit anti-LAP2α serum 245-2, mouse anti-LAP2 mAb#12 recognizing the mouse LAP2 aa29-50 epitope (provided by C.A. Harris, R. W. Johnson Pharmaceutical Research Institute, Raritan, NJ), anti-lamin A/C N-18, anti-γ- tubulin (Sigma), rabbit anti-β_2-AR (M-20) SC-570 (Santa Cruz Biotechnology) and mouse anti-N-cadherin (BD Transduction Labs)]. Species-specific horseradish peroxidase-coupled secondary antibodies were applied for 1 hr at RT and SuperSignal® West Pico Chemiluminescent Substrate (Thermo Scientific) was used for signal detection on Clear Blue X-Ray films (Thermo Scientific). Films were scanned and processed by Adobe Photoshop CS2 and Adobe Illustrator CS2.

Semi-quantitative and real-time PCR. Total heart tissue RNA was isolated using TRIzol® reagent (Invitrogen) or RNeasy® Plus Micro Kit (Qiagen) and First Strand cDNA Synthesis Kit for RT-PCR (Roche) was used for cDNA synthesis according to manufacturer's instructions. cDNA was amplified using Go Taq Green Master Mix (Promega) in semiqPCR and MESA GREEN qPCR MasterMix Plus for SYBR® Assay I dTTP (Eurogentec), together with MasterCycler ep realplex (Eppendorf), in qPCR analyses. Images of ethidium bromide-stained agarose gels were documented using UVP Gel Doc-It TS Imaging System and processed with Adobe Photoshop CS2. qPCR data were normalized to endogenous HPRT levels and analyzed according to Pfaffl method[3]. The list of primers can be found in the Online Table V.

Isoproterenol-induced heart failure model. Acute cardiac stress was induced in mice by sustained infusion of β-adrenergic receptor agonist isoproterenol (Isoproterenol hydrochloride, Sigma Aldrich, I 6504) for 7 days. Mice were weighed and 15 mg/kg/day isoproterenol/0.5 mM ascorbic acid/PBS solution was prepared for each animal. Alzet® mini-osmotic pumps (model 1007D) were filled either with 100 µl of isoproterenol (ISO) or 0.5 mM ascorbic acid/PBS (sham) solutions according to the manufacturer's instructions and kept in PBS for 3 hours before implantation. Mice were anesthetized with 5% isofluorane/O_2 mixture and placed on heated pads. During the procedure, anesthesia was maintained by administration of 2% isofluorane/O_2 mixture. The inter-scapular region of the back was shaved and disinfected with 70% ethanol and Wundesin® (10 mg/ml polyvidone-iodide aqueous solution). A small incision (~5 mm) was made in the skin between the scapulae and, by using a haemostat, a pocket was formed by spreading the subcutaneous connective tissue apart. The filled osmotic pump was inserted into the pocket, with the flow moderator pointing away from the incision, and the skin was closed with 2-3 silk (6/0) sutures. During the whole deep sleep and waking period mice were kept on heated pads with their vital functions carefully monitored. Echocardiography was performed 2 h before and 7 days after the pump implantation as described above.

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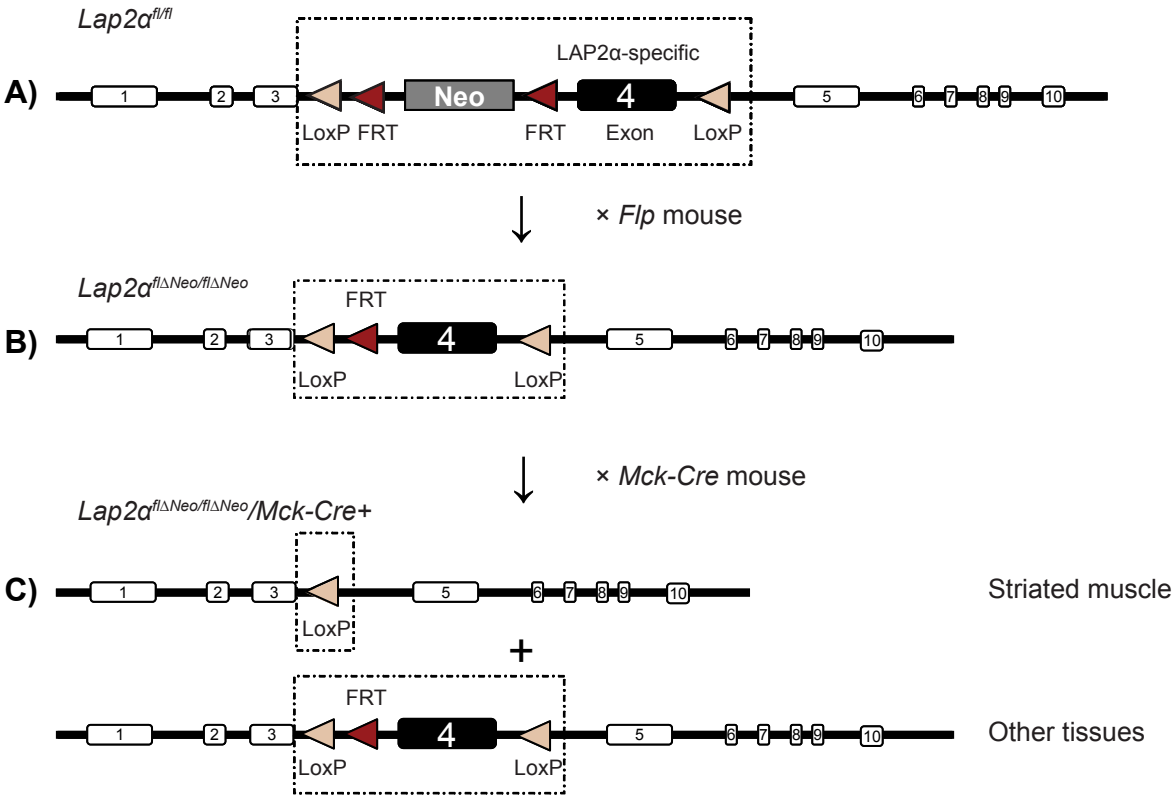
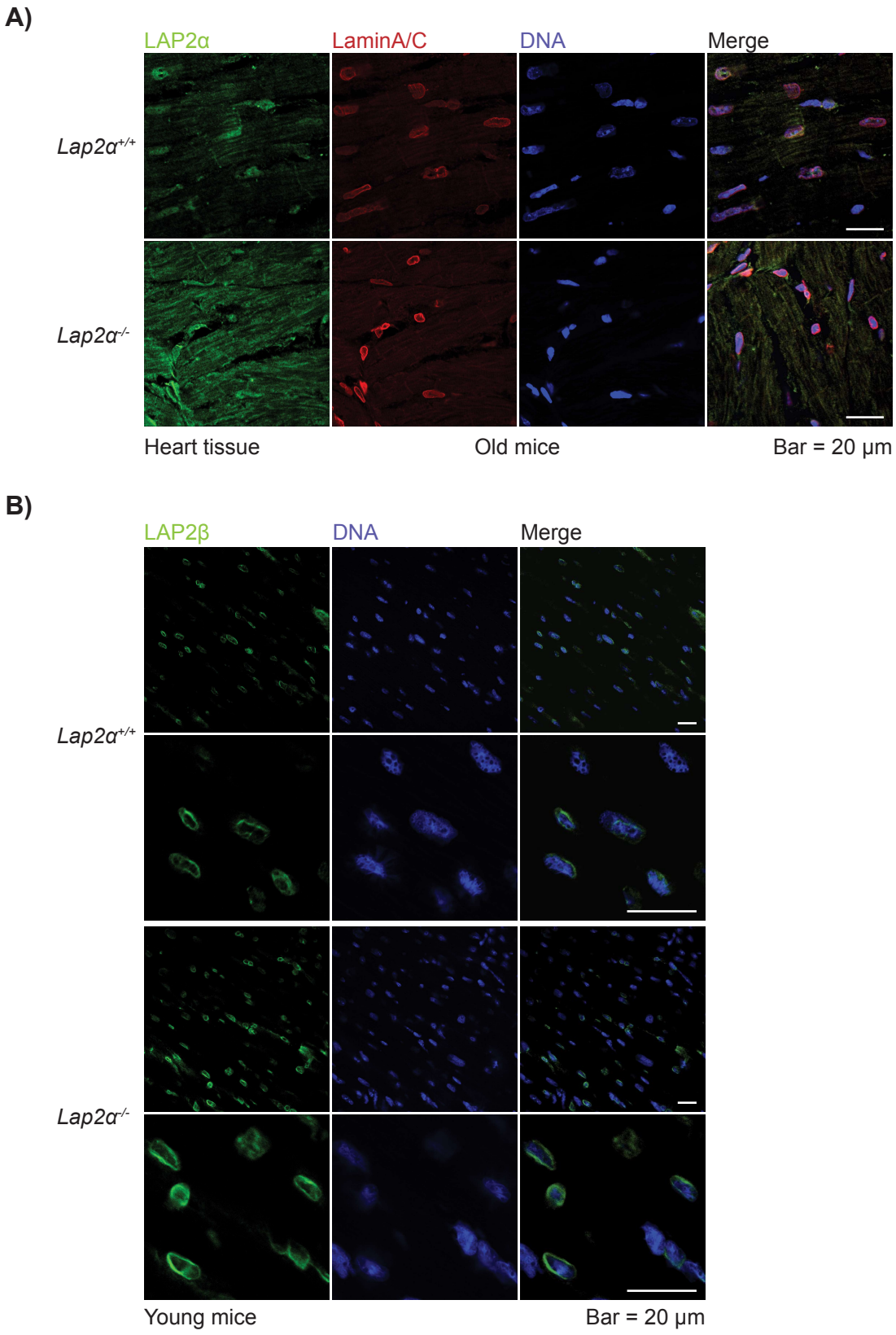
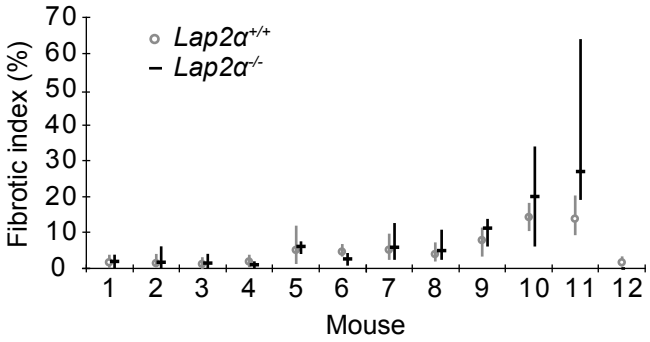


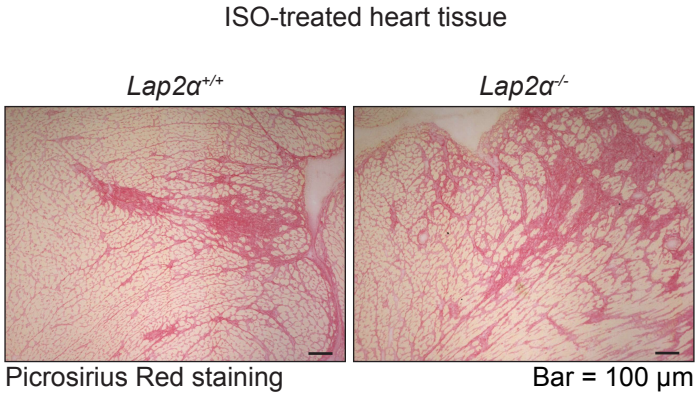
Online Figure I. Generation of *Lap2α*$^{fl\Delta Neo/fl\Delta Neo}$*/Mck-Cre*$^{+}$ mice. A) Crossing *Lap2α*$^{fl/fl}$ *mice*[4] to *Flp*-deleter mice[5] resulted in the removal of the Neomycine resistance cassette from the transgenic *Lap2* locus in all tissues. **B)** The newly generated *Lap2α*$^{fl\Delta Neo/fl\Delta Neo}$ strain was interbred to the *Mck-Cre* transgenic line[6] to create striated muscle-specific *Lap2α*$^{-/-}$ mice lacking the α-specific exon 4 of the *Lap2* gene only in tissues expressing MCK (*Lap2α*$^{fl\Delta Neo/fl\Delta Neo}$*/Mck-Cre*$^{+}$) **(C)**.



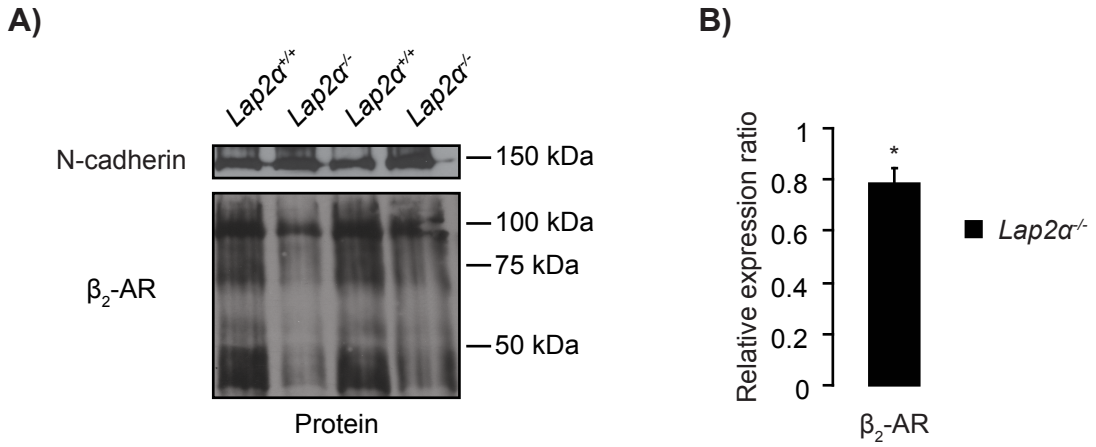
Online Figure II. Localization of lamin A/C (A) and LAP2β (B) in *Lap2α*$^{-/-}$ heart tissue appears normal. (Immunofluorescence analysis of heart tissue at 12 and 2 months of age respectively; n = 1 female + 3 male mice).



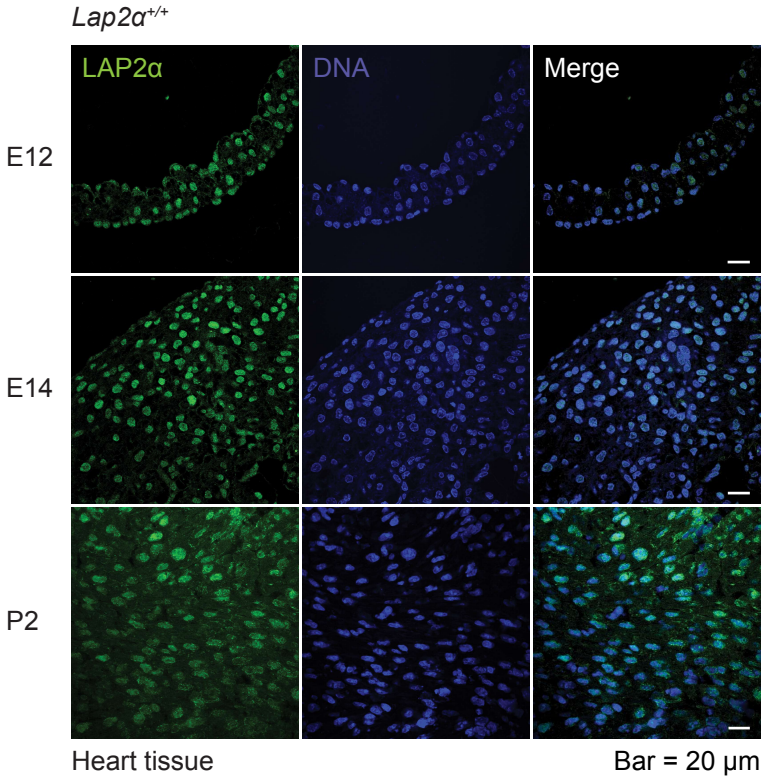
Online Figure III. Male *Lap2α*$^{-/-}$ mice show only sporadic cases of cardiac fibrosis. (Fibrotic index = % of right ventricular myocardium positive for collagen on Picrosirius Red-stained sections. Max, min and average values for each mouse are shown).



Online Figure IV. ISO-treatment causes subendocardial fibrosis in both *Lap2α*$^{-/-}$ and WT mice. (Picrosirius Red-stained heart sections).



Online Figure V. The expression of β_2-AR protein is reduced in *Lap2α*$^{-/-}$ hearts. A) Western blot analysis of heart membrane extracts. Representative image of 4 separate experiments is shown. Each lane was loaded with 20 µg of protein. Samples were normalized to endogenous N-cadherin content. High level of glycosylation and heterodimerization results in a variety of molecular weight species recognized by particular antibodies[7-10] (predicted molecular weight of mouse β_2-AR is 46 kDa (NP_031446.2)). **B)** Quantitative analysis of the relative β_2-AR expression in *Lap2α*$^{-/-}$ hearts. (The relative KO/WT β_2-AR expression ratio is shown. n = 4 old male littermate pairs, *$p<0.05$, ANOVA, mean ± SE).



Online Figure VI. LAP2α is highly expressed in developing cardiac tissue. Immunofluorescence analysis of heart tissue sections at embryonic day 12 and 14 (E12 and E14) and postnatal day 2 (P2).

Online Table I. Echocardiography reveals impaired heart function in male *Lap2α*$^{-/-}$ mice.

Young mice (10 weeks)

	***Lap2α*$^{+/+}$ M**	***Lap2α*$^{-/-}$ M**	***Lap2α*$^{+/+}$ F**	***Lap2α*$^{-/-}$ F**
n	8	8	4	4
Heart rate/ bpm	410.63 ± 15.76	410.25 ± 21.72	380.00 ± 17.80	387.50 ± 12.50
FS %	**36.72** ± 1.23	**27.97** ± 1.38*****	**37.22** ± 0.81	**36.49** ± 1.44
LVDd/cm	0.36 ± 0.01	0.35 ± 0.03	0.34 ± 0.02	0.33 ± 0.01
LVDs/cm	0.23 ± 0.01	0.25 ± 0.02	0.22 ± 0.01	0.21 ± 0.01
LVPWd/mm	0.85 ± 0.06	0.82 ± 0.10	0.74 ± 0.07	0.72 ± 0.03
LVPWs/mm	1.43 ± 0.08	1.23 ± 0.07	1.26 ± 0.09	1.16 ± 0.05
IVSd/mm	0.91 ± 0.04	0.81 ± 0.04	0.79 ± 0.06	0.73 ± 0.02
IVSs/mm	1.26 ± 0.07	1.17 ± 0.09	1.11 ± 0.11	0.96 ± 0.06
LA/mm	2.14 ± 0.15	2.82 ± 0.21*	2.70 ± 0.34	2.56 ± 0.07
ESVI ml/m2	0.04 ± 0.00	0.05 ± 0.01	0.03 ± 0.01	0.03 ± 0.01
EDVI ml/m2	0.14 ± 0.01	0.14 ± 0.03	0.14 ± 0.02	0.12 ± 0.01
EF %	73.18 ± 0.02	61.00 ± 0.02*****	74.01 ± 0.96	73.08 ± 1.72

Old mice (10-12 months)

	***Lap2α*$^{+/+}$ M**	***Lap2α*$^{-/-}$ M**	***Lap2α*$^{+/+}$ F**	***Lap2α*$^{-/-}$ F**
n	11	13	4	5
Heart rate/ bpm	418.91 ± 15.80	428.31 ± 10.31	430.00 ± 14.63	408.00 ± 35.28
FS %	**36.88** ± 0.86	**30.39** ± 1.67*****	**33.00** ± 3.41	**37.83** ± 3.94
LVDd/cm	0.36 ± 0.02	0.38 ± 0.01	0.36 ± 0.01	0.39 ± 0.03
LVDs/cm	0.23 ± 0.01	0.26 ± 0.01	0.23 ± 0.02	0.24 ± 0.03
LVPWd/mm	0.91 ± 0.05	0.92 ± 0.06	0.71 ± 0.03	0.77 ± 0.04
LVPWs/mm	1.48 ± 0.07	1.41 ± 0.07	1.33 ± 0.11	1.23 ± 0.17
IVSd/mm	0.91 ± 0.03	0.92 ± 0.04	0.84 ± 0.02	0.75 ± 0.07*****
IVSs/mm	1.30 ± 0.07	1.28 ± 0.07	1.16 ± 0.06	1.01 ± 0.07
LA/mm	2.37 ± 0.16	2.75 ± 0.23	2.40 ± 0.29	2.13 ± 0.22
ESVI ml/m2	0.04 ± 0.01	0.05 ± 0.01	0.03 ± 0.00	0.04 ± 0.01
EDVI ml/m2	0.13 ± 0.01	0.13 ± 0.02	0.13 ± 0.01	0.16 ± 0.00
EF %	73.43 ± 0.01	64.65 ± 0.03*****	73.66 ± 2.06	73.78 ± 4.45

†Raw data were tested for outliers according to Grubb's test and from the initial group of 12 old WT animals one mouse was excluded from further analyses.

*p<0.05 ANOVA, values are means ± SE. M – male; F – female; n – number of mice; bpm – beats per minute; FS% – fractional shortening; LVDd/s – left ventricular diameter in diastole/systole; LVPWd/s left ventricular posterior wall thickness in diastole/systole; IVSd/s – interventricular septum thickness in diastole/systole, LA – left atrium diameter; ESVI – end-systolic left ventricular volume index; EDVI – end-diastolic left ventricular volume index; EF% – ejection fraction.

Online Table II. *Lap2α*$^{-/-}$ mice show a blunted response to chronic isoproterenol infusion. Echocardiography parameters recorded before and 7 days after ISO-infusion.

Isoproterenol

	***Lap2α*$^{+/+}$ M**	***Lap2α*$^{-/-}$M**	***Lap2α*$^{+/+}$ M**	***Lap2α*$^{-/-}$M**
Old mice (10 months)	**Before**		**Isoproterenol**	
n	6	7	6	7
Heart rate/ bpm	489.50 ± 26.27	452.57 ± 10.16	507.17 ± 36.33	532.29 ± 14.55‡
FS %	**33.44** ± 2.37	**29.77** ± 1.61	**29.63** ± 3.70	**25.84** ± 2.94
LVDd/cm	0.30 ± 0.01	0.35 ± 0.02	0.41 ± 0.01‡	0.41 ± 0.02§
LVDs/cm	0.20 ± 0.01	0.24 ± 0.01	0.29 ± 0.02‡	0.31 ± 0.02
LVPWd/mm	1.14 ± 0.09	1.05 ± 0.06	1.00 ± 0.05	1.06 ± 0.10
LVPWs/mm	1.60 ± 0.08	1.51 ± 0.03	1.42 ± 0.10	1.41 ± 0.09
IVSd/mm	1.07 ± 0.04	0.96 ± 0.05	0.89 ± 0.07	1.02 ± 0.10
IVSs/mm	1.50 ± 0.07	1.40 ± 0.04	1.31 ± 0.08	1.45 ± 0.11
LA/mm	3.02 ± 0.31	3.05 ± 0.38	3.44 ± 0.31	3.81 ± 0.39
ESVI ml/m2	0.02 ± 0.00	0.04 ± 0.01	0.06 ± 0.01‡	0.07 ± 0.01
EDVI ml/m2	0.07 ± 0.01	0.10 ± 0.01	0.15 ± 0.01‡	0.16 ± 0.02
EF %	68.82 ± 3.28	63.69 ± 2.43	62.21 ± 6.00	56.52 ± 5.00

Sham (PBS)

	***Lap2α*$^{+/+}$ M**	***Lap2α*$^{-/-}$M**	***Lap2α*$^{+/+}$ M**	***Lap2α*$^{-/-}$M**
Old mice (10 months)	**Before**		**PBS**	
n	2	2	2	2
Heart rate/ bpm	465.00 ± 55.00	500.00 ± 40.00	445.00 ± 15.00	477.50 ± 37.50
FS %	**34.64** ± 4.49	**34.07** ± 0.29	**33.44** ± 3.01	**32.70** ± 1.93
LVDd/cm	0.31 ± 0.01	0.31 ± 0.02	0.30 ± 0.00	0.34 ± 0.00
LVDs/cm	0.20 ± 0.02	0.21 ± 0.01	0.20 ± 0.01	0.23 ± 0.01
LVPWd/mm	0.97 ± 0.00	1.07 ± 0.09	1.06 ± 0.09	1.14 ± 0.17
LVPWs/mm	1.17 ± 0.20	1.37 ± 0.04	1.38 ± 0.05	1.43 ± 0.13
IVSd/mm	1.01 ± 0.30	1.17 ± 0.01	1.05 ± 0.05	1.11 ± 0.07
IVSs/mm	1.33 ± 0.23	1.72 ± 0.03	1.42 ± 0.07	1.72 ± 0.16
LA/mm	2.40 ± 0.00	1.87 ± 0.40	2.35 ± 0.35	2.15 ± 0.20
ESVI ml/m2	0.02 ± 0.01	0.02 ± 0.00	0.02 ± 0.00	0.03 ± 0.00
EDVI ml/m2	0.06 ± 0.01	0.06 ± 0.01	0.06 ± 0.00	0.08 ± 0.00
EF %	70.54 ± 5.89	70.17 ± 0.33	69.21 ± 4.05	68.15 ± 2.65

Data were analysed using Student's paired t-test (comparisons within one genotype before and after the treatment) and ANOVA (comparisons between the two genotypes and multiple comparisons), followed by Boniferroni adjustment where applicable. §p=0.05; ‡p<0.05 Student's paired t-test; mean values ± SE are shown.

Online Table III. Echocardiography parameters – *Lap2α$^{-/-}$/Mdx* mice.

	Lap2α$^{+/+}$/Mdx	***Lap2α$^{-/-}$/Mdx***	***Lap2α$^{+/+}$/Mdx***	***Lap2α$^{-/-}$/Mdx***
	Young (10 weeks)		**Old (10-12 months)**	
n	3	3	4	5
Heart rate/ bpm	400.00 ± 0.00	413.33 ± 17.64	442.50 ± 63.03	404.00 ± 26.94
FS %	**39.51** ± 0.43*****	**39.58** ± 1.46*****	**31.22** ± 2.74†	**28.24** ± 2.21†
LVDd/cm	0.37 ± 0.03	0.38 ± 0.02	0.42 ± 0.01	0.41 ± 0.01
LVDs/cm	0.22 ± 0.01	0.23 ± 0.02	0.29 ± 0.02	0.30 ± 0.01
LVPWd/mm	0.58 ± 0.08	0.70 ± 0.11	0.73 ± 0.07	0.70 ± 0.04
LVPWs/mm	1.15 ± 0.09	1.28 ± 0.11	1.17 ± 0.07	1.03 ± 0.10
IVSd/mm	0.75 ± 0.04	0.71 ± 0.02	0.91 ± 0.10	0.87 ± 0.07
IVSs/mm	1.10 ± 0.13	1.10 ± 0.09	1.11 ± 0.11	1.08 ± 0.06
LA/mm	2.16 ± 0.16	2.50 ± 0.07	3.43 ± 0.14	3.27 ± 0.18
ESVI ml/m2	0.03 ± 0.01	0.03 ± 0.01	0.06 ± 0.01	0.06 ± 0.01
EDVI ml/m2	0.14 ± 0.03	0.15 ± 0.02	0.16 ± 0.01	0.15 ± 0.01
EF %	76.63 ± 0.43	76.62 ± 1.70	65.45 ± 3.97	61.05 ± 3.64

*p<0.05, ANOVA, *Lap2α$^{-/-}$* vs. *Lap2α$^{+/+}$/Mdx* and *Lap2α$^{-/-}$/Mdx* young mice.
†p<0.05, ANOVA, *Lap2α$^{+/+}$* vs. *Lap2α$^{+/+}$/Mdx* and *Lap2α$^{-/-}$/Mdx* old mice.

Online Table IV. Echocardiography parameters – *Lap2α*$^{fl\Delta Neo/fl\Delta Neo}$*/Mck-Cre*$^{+}$ mice.

	Lap2α$^{+/+}$*/Mck-Cre*$^{+}$	*Lap2α*$^{fl\Delta Neo/fl\Delta Neo}$*/Mck-Cre*$^{+}$
Young (10 weeks)		
n	5	5
Heart rate/ bpm	360.00 ± 7.07	378.00 ± 18.81
FS %	**32.54** ± 1.01	**33.88** ± 1.42
LVDd/cm	0.39 ± 0.01	0.38 ± 0.01
LVDs/cm	0.26 ± 0.01	0.25 ± 0.01
LVPWd/mm	0.72 ± 0.05	0.72 ± 0.02
LVPWs/mm	1.22 ± 0.08	1.28 ± 0.07
IVSd/mm	0.79 ± 0.02	0.84 ± 0.05
IVSs/mm	1.05 ± 0.09	1.06 ± 0.07
LA/mm	2.38 ± 0.13	2.35 ± 0.19
ESVI ml/m2	0.05 ± 0.00	0.04 ± 0.01
EDVI ml/m2	0.14 ± 0.01	0.13 ± 0.01
EF %	67.78 ± 1.38	69.55 ± 1.97

Online Table V. Primer sequences used for quantitative and semi-quantitative PCR.

Name/Target	Sequence	Tm ºC	Source
Adrb2_forward	TCTGTGCCTTCGCAGGTCTT	59.4	11
Adrb2_reverse	GTCCGTTCTGCCGTTGCTA	58.8	
ANF_forward	CGGTGTCCAACACAGATCTG	59.4	12
ANF_reverse	TCTCTCGAGGTGGGTTGAC	58.8	
mBNP_forward	CTGCTGGAGCTGATAAGAGA	57.3	13
mBNP_reverse	TGCCCAAAGCAGCTTGAGAT	57.3	
Cre2_forward	CGAACGCACTGATTTCGA	56.7	14
Cre2_reverse	GGCAACACCATTTTTTCTGAC	55.9	
Ctgf_forward	TGTGTGACGAGCCCAAGGA	58.8	15
Ctgf_reverse	TTGGGTCTGGGCCAAATGT	56.7	
GAPDH-hm1	CATCACCATCTTCCAGGAGCGA	62.1	16
GAPDH-hm2	CCTGCTTCACCACCTTCTTGAT	60.3	
GATA4b_forward	CACTATGGGCACAGCAGCTCC	63.7	17
GATA4b_reverse	TTGGAGCTGGCCTGCGATGTC	63.7	
Hprt_forward	TGATTAGCGATGATGAACCAGG	58.4	18
Hprt_reverse	CTTTCATGACATCTCGAGCAAG	60.3	
LAP2com_hm1	GTGGGAACAACCAGGAAGCTATATGA	63.2	19
LAP2ar_hm1	AGAGTGCTAAGTCCAACTGCTGAT	61.0	
LAP2br_hm1	CTCCCACTTCAGCTCTTGTCAATG	62.7	
mLamAC1091f	CATCAAGCTGGCCCTGGACATGGA	67.9	19
mLamAC1549r	TGCGCCTTCCACACCAAGTCAGTA	66.3	
MEF2C-RT2-1	GTATGTCTCCTGGTGTAACA	55.3	20
MEF2C-RT2-2	GGATATCCTCCCATTCCTTG	57.3	
MCK_forward	GAGATCTTCAAGAAGGCTGGTCA	60.6	21
MCK_reverse	GAGATGTCGAACACGGCG	58.2	
MyocardinA_forward	TCACTGTGTGGAGTCCTCAGGTC	64.2	22
MyocardinA_reverse	TGGCATCGGCTGGCATTT	58.8	
STARS_forward	GGCTCCTGCCAGGATCAAAC	61.4	NM_175456.4
STARS_reverse	TAGCCCTCGTCTCCCTTGTG	61.4	
TGFβ_forward	AGCGCTACATCGATAGCAAG	57.3	15
TGFβ_reverse	TCCTGTCTTTGTGGTGAAGC	57.3	