

Figure S1: Normal AVN and AV bundle in *Nkx2-5^{ΔVCS}* mutant hearts.

(A-D) Immunofluorescence with Nkx2-5 and HCN4 or ETV1 and Contactin-2 on serial sagittal sections at the level of the atrioventricular node (AVN) (A-B) or atrioventricular bundle (AVB) (C-D) from control (Ctrl), *Nkx2-5^{ΔVCS}* hearts. High magnifications are presented in A'-D' and A''-D''. Scale bar= 100μm; 20μm in high mag images.

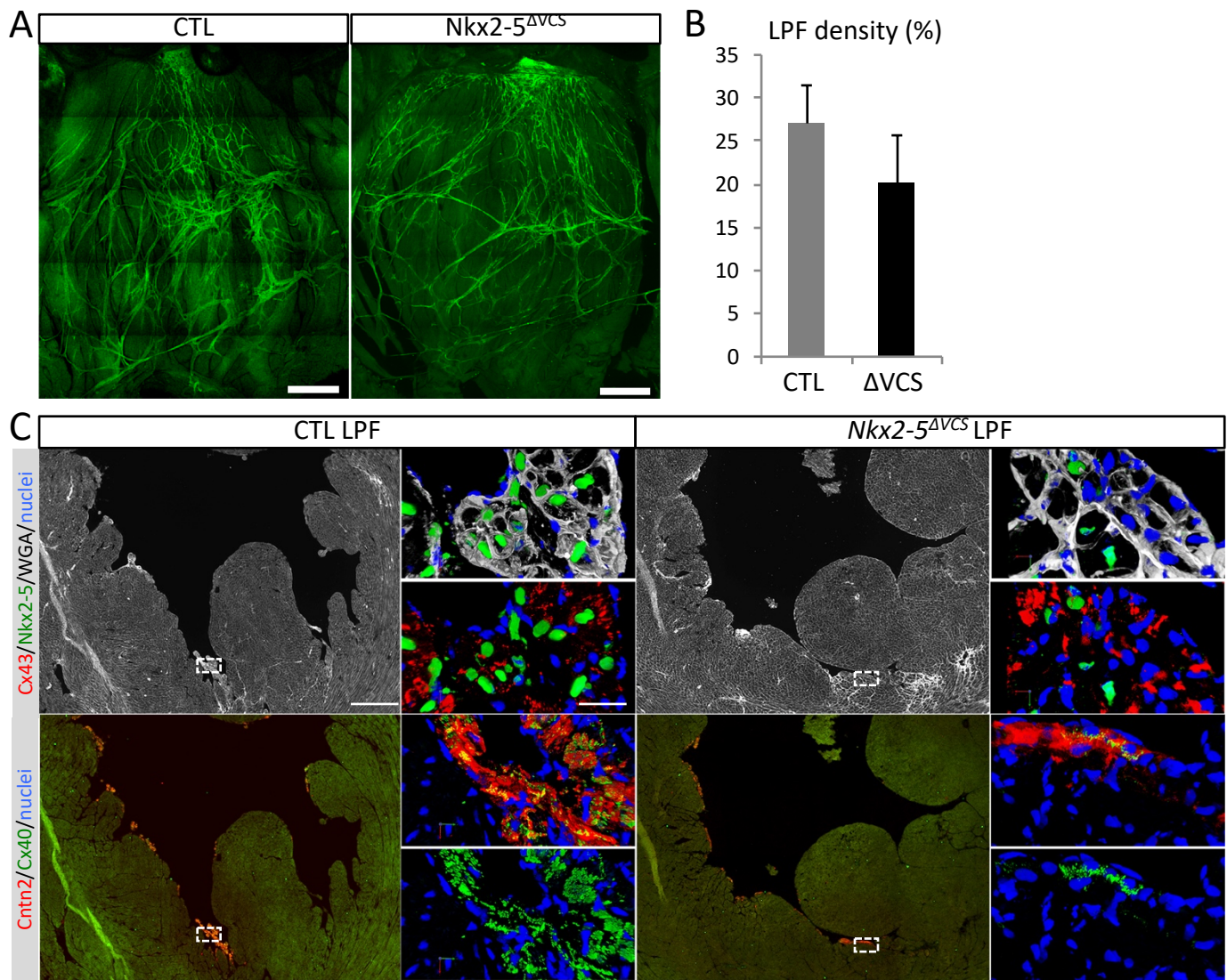


Figure S2: PF hypoplasia is aggravated in 10 month-old *Nkx2-5*^{ΔVCS} mice.

(A) Whole-mount immunofluorescence with Contactin-2 on opened LV from 10 month-old control and *Nkx2-5*^{ΔVCS} hearts. Scale bar = 1mm (B) Quantification of LPF density by Angiotool. (C) Immunofluorescence with *Nkx2-5*, *Cx43* and *WGA* or *Contactin-2* and *Cx40* on serial sagittal sections at the level of the left Purkinje fibers from 10 month-old control (CTL) and *Nkx2-5*^{ΔVCS} hearts. Scale bar= 200μm; 25μm in high mag images.

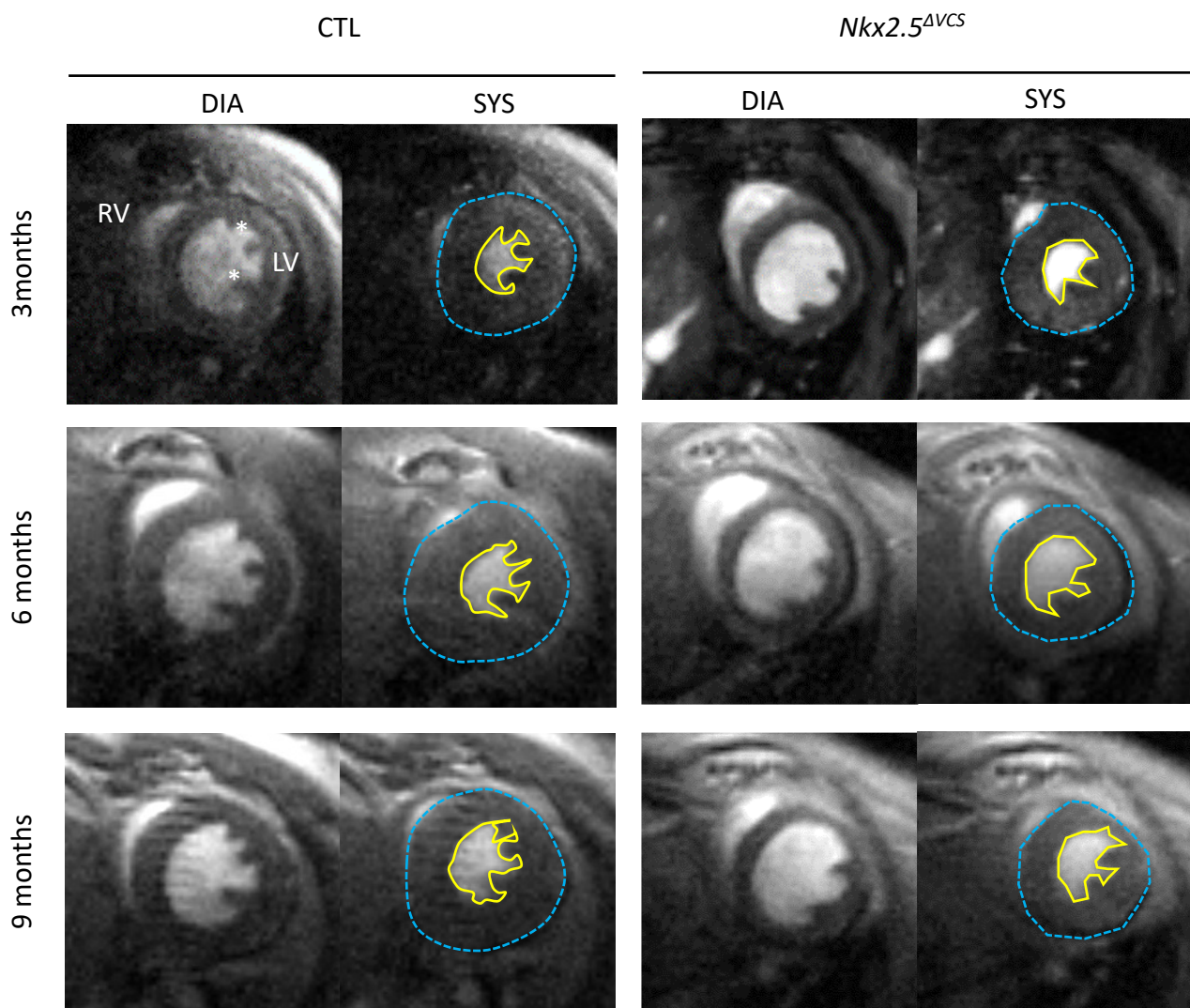


Figure S3 :Short-axis cine images recorded by MRI at end-diastole (DIA) and end-systole (SYS).

Images represent the follow-up of the same heart per mutant groups at 2-4, 6-8 and 9-10 month-old, with the yellow line indicating the endocardial outline and the blue line indicating the epicardial outline.