

Histology-validated quantitative MRI characterization of collagen-rich Purkinje fiber-associated pathways in the ex vivo porcine heart

ELECTRONIC SUPPLEMENTARY MATERIAL

Fig. S1

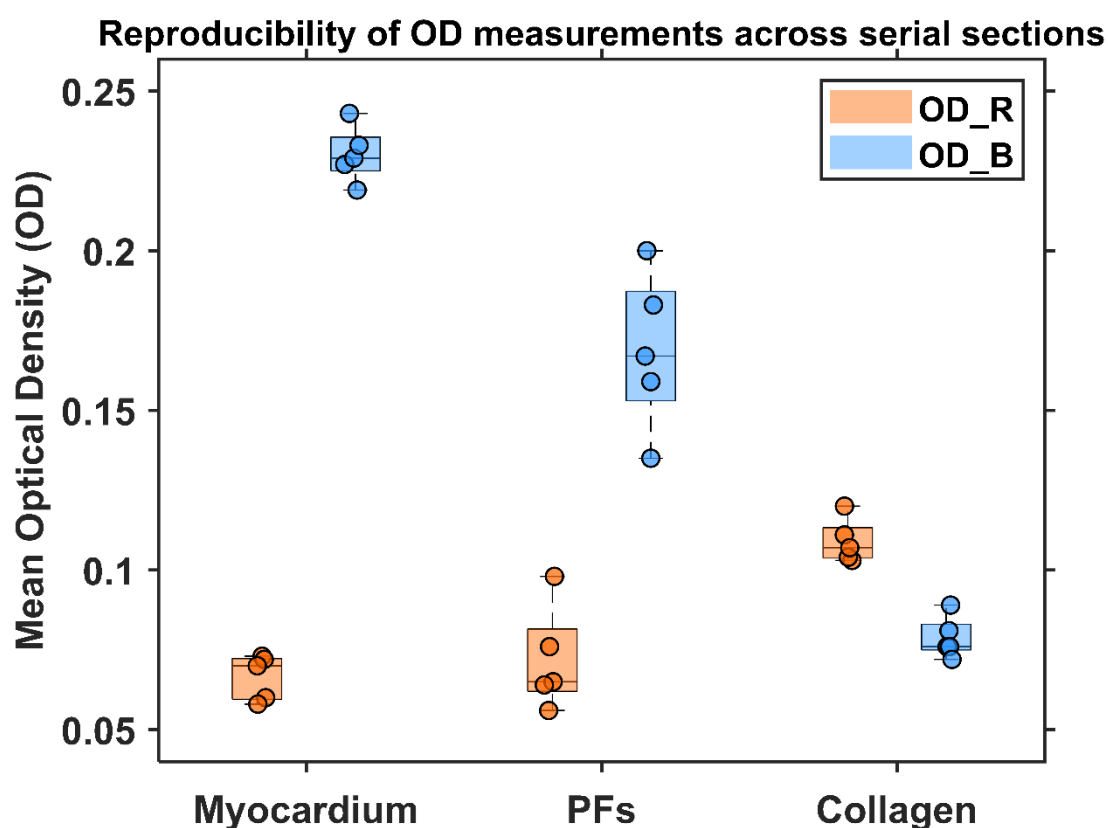


Fig. S1 Boxplots showing the distribution of mean optical density (OD_R and OD_B) in myocardium, Purkinje fibers (PFs), and collagen across five consecutive sections from one representative cardiac sample. Each point represents one section. The results show minimal section-to-section variation, confirming the reproducibility of manual staining and image quantification procedures. No statistical comparisons were made, as the purpose was to verify measurement consistency.

Table S1. Statistical comparisons of histological optical density measurements among myocardium, PF-associated regions, and collagen.

Comparison	Tissue 1 (mean $\pm$ SD)	Tissue 2 (mean $\pm$ SD)	Mean difference (Tissue 2 – Tissue 1)	95 % CI	P value	Cohen's d_z
Myocardium vs PF (OD_R)	0.07 $\pm$ 0.01	0.07 $\pm$ 0.003	-0.0001	-0.0156 to 0.0154	0.98	-0.008
Myocardium vs PF (OD_R)	0.24 $\pm$ 0.04	0.17 $\pm$ 0.03	-0.07	-0.1016 to -0.0417	0.003	-2.97
Myocardium vs Collagen (OD_R)	0.69 $\pm$ 0.01	0.11 $\pm$ 0.01	0.04	0.0331 to 0.0476	0.0001	6.93
Myocardium vs Collagen (OD_B)	0.24 $\pm$ 0.04	0.07 $\pm$ 0.005	-0.17	-0.2238 to -0.1179	0.0008	-4
PF vs Collagen (OD_R)	0.07 $\pm$ 0.003	0.11 $\pm$ 0.011	0.04	0.0238 to 0.0570	0.0025	3.02
PF vs Collagen (OD_B)	0.17 $\pm$ 0.03	0.07 $\pm$ 0.005	-0.0992	-0.1330 to -0.0654	0.0012	-3.64

PF, Purkinje fiber-associated region; OD, optical density; CI, confidence interval. Mean differences were calculated as Tissue 2 – Tissue 1.

Table S2. Statistical comparisons of qMRI parameters between MC and HC regions.

Comparison	MC region (mean $\pm$ SD)	HC region (mean $\pm$ SD)	Mean difference (HC – MC)	95 % CI	P value	Cohen's d_z
T_{RAFF2}	119 $\pm$ 2 ms	214 $\pm$ 18 ms	95 ms	74 to 116 ms	0.00024	5.55
$T_{1\rho}$	72 $\pm$ 3 ms	115 $\pm$ 24 ms	44 ms	12 to 76 ms	0.019	1.69
T_2	52 $\pm$ 3 ms	71 $\pm$ 10 ms	20 ms	6 to 33 ms	0.016	1.80
T_1	979 $\pm$ 43 ms	1028 $\pm$ 36 ms	49 ms	11 to 87 ms	0.023	1.60

MC, remote myocardium region; HC, collagen-rich region; CI, confidence interval. Mean differences were calculated as HC – MC.