A novel system for mapping regional electrical properties and characterizing arrhythmia in isolated intact rat atria.

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Supplemental Data

S1 Conduction velocity measurements: Local conduction velocities were computed using the algorithm described by Bayly and co-workers (1). Briefly, a 3rd degree polynomial was fitted to a window within each pixel of the activation map. Local velocity vectors were then computed using the gradient of the fitted AT values within the window. Mean conduction velocity for each pacing interval was then computed (Figure A1).

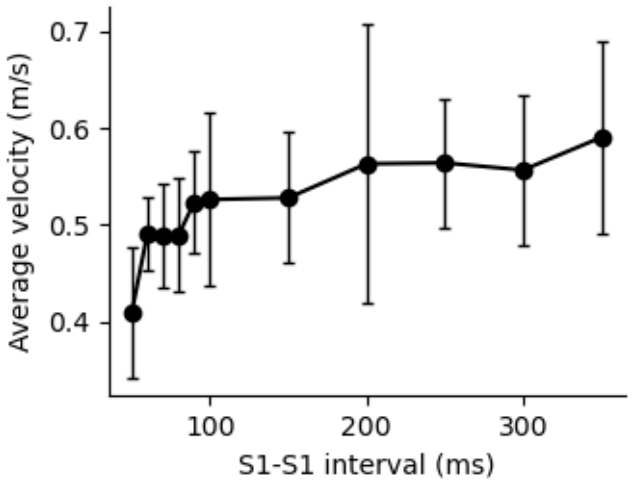

Figure S1: Restitution of mean conduction velocity with S1-S1 pacing for whole group (N=5). Pacing was performed from the RAA.

S2 Ensemble averaging: Validation steps relating to Figure 5.

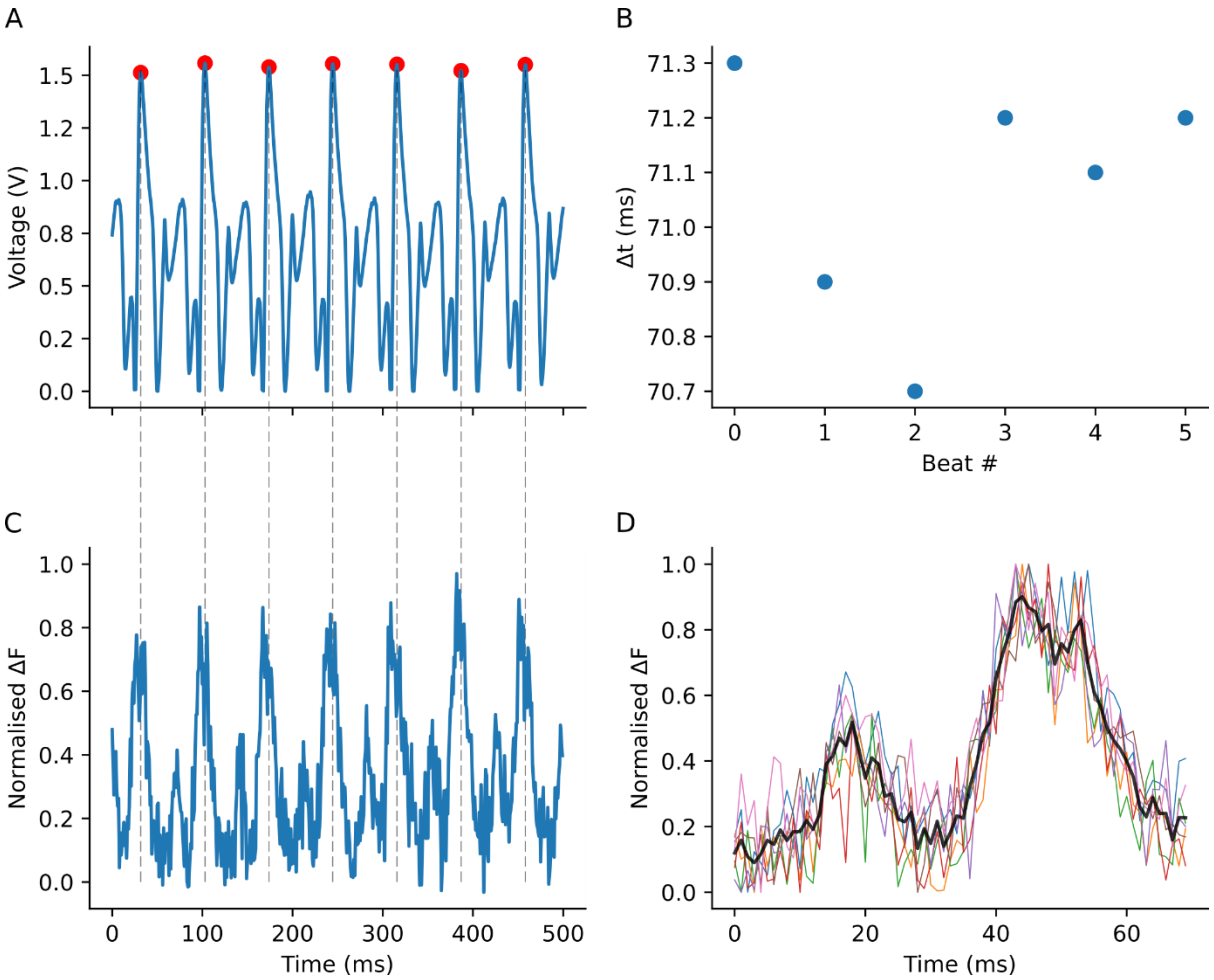

Figure S2: Ensemble-averaging validation steps. ***A****: Bi-atrial electrogram recording during stable arrhythmia. Red dots indicate detected activation cycles.* ***B****: Time difference between successive cycles detected in A.* ***C****: Raw optical recording aligned with electrogram in A.* ***D****: Overlay of aligned optical cycles (colored lines) with ensemble average (black).*

S3 Ensemble averaging: Validation steps relating to Figure 6

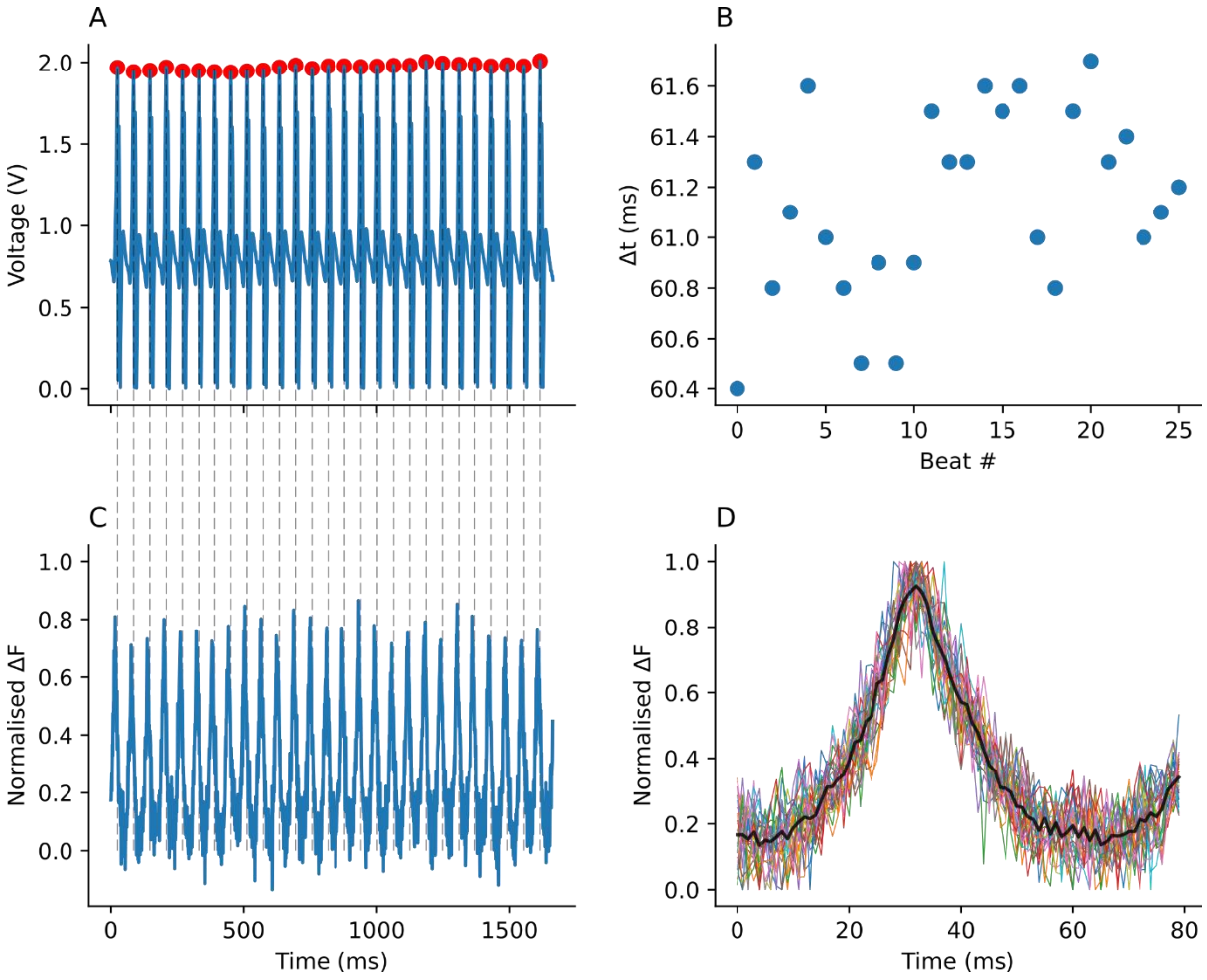

Figure S3: Ensemble-averaging validation steps. ***A****: Bi-atrial electrogram recording during stable arrhythmia. Red dots indicate detected activation cycles.* ***B****: Time difference between successive cycles detected in A.* ***C****: Raw optical recording aligned with electrogram in A.* ***D****: Overlay of aligned optical cycles (colored lines) with ensemble average (black).*

S4 Summary of statistics: Comparison between regions in Figure 4C.

Pacing Interval (ms)	Kruskal-Wallis Test	Dunn's post-hoc									
		RAA-PP	RAA-CT	RAA-LARm	RAA-LAA	LAA-PP	LAA-LARm	LAA-CT	CT-PP	CT-LARm	LARm-PP
350	***	***	***	***	***	NS	**	***	**	NS	NS
300	***	***	***	***	***	***	***	***	NS	NS	**
250	***	***	***	***	***	***	***	***	NS	NS	***
200	***	***	***	***	***	***	***	***	NS	NS	NS
150	***	***	***	***	***	***	***	***	NS	NS	NS
100	***	***	***	***	***	***	***	***	NS	NS	NS

Key: ** 10e-4<p<0.05, *** p<10e-4

Table S4. Summary of statistical analyses comparing APD_{80} for representative atrial regions at pacing intervals from 100-350 ms. Abbreviations: RAA - right atrial appendage; LAA - left atrial appendage; PP - primary pacemaker; CT - crista terminalis; and LARm - mid left atrial roof.

References

1. **Bayly PV**, **KenKnight BH**, **Rogers JM**, **Hillsley RE**, **Ideker RE**, **Smith WM**. Estimation of conduction velocity vector fields from epicardial mapping data. *IEEE Trans Biomed Eng* 45: 563–571, 1998.