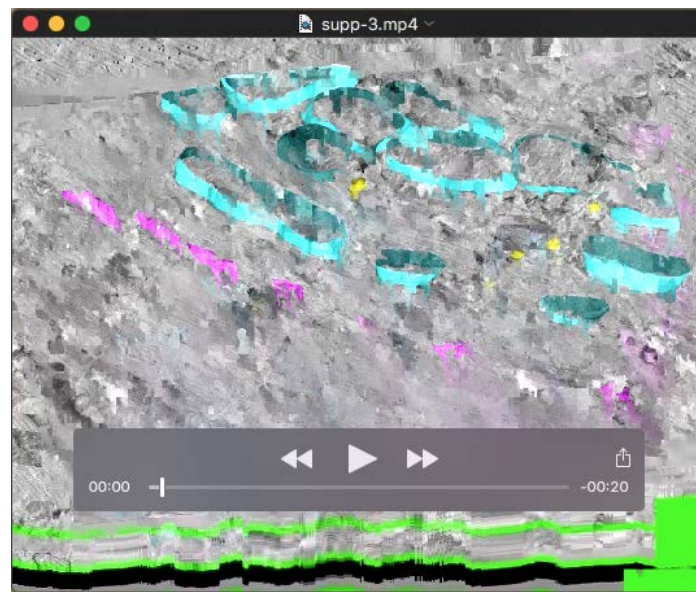
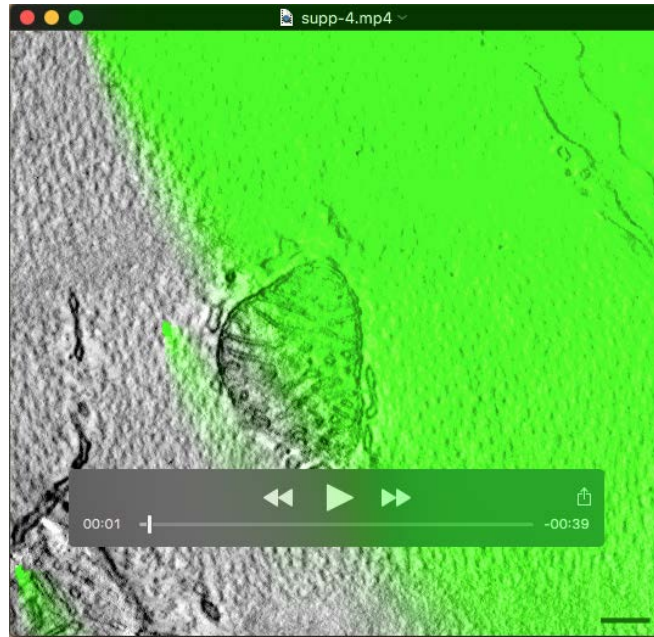


**Movie 1.** Tomogram in the avian left atrium, as in Figure 1A. The tomogram was segmented for cSR (yellow), mitochondria (cyan), and the SR network (purple) adjacent to the sarcolemma (green line), in order to obtain the 3D model shown in Figure 1C and Supplementary Video 2. Scale bar = 500 nm.



**Movie 2.** Segmented 3D model of avian left atrium, as in Figure 1C. Segmented are the cSR (yellow), mitochondria (cyan), and the SR network (purple) adjacent to the sarcolemma (green line). Scale bar = 1000 nm.



**Movie 3.** CSR in the avian right ventricle. Scale bar = 200 nm.

**Table S1.** Modelling parameters used in the equations (see methods) to simulate results obtained in Figures 5 and 6.

Parameter symbol and description	Mammalian value	Avian value	Units
<b>Morphology<sup>1</sup></b>			
D, Diameter of cell	8	8.7	$\mu\text{m}$
L, Length of cell	104	136	$\mu\text{m}$
d <sub>1</sub> , Distance between PCs,		0.25, 0.5, 0.75	
d <sub>2</sub> , Distance between consecutive Z disks	1.8	1.5, 1.7, 1.9, 2.1	$\mu\text{m}$
d <sub>3</sub> , Distance between cSR within a Z disk	0.4	0.1, 0.2, 0.4, 0.6	$\mu\text{m}$
<b>Reactions<sup>2</sup></b>			
D <sub>c</sub> , diffusion constant of cytosolic Ca <sup>2+</sup>	0.25	0.25	$\mu\text{m}^2/\text{ms}$
[B <sub>n</sub> ] total, maximum immobile buffer CMDN	123	123	$\mu\text{M}$
K <sub>n</sub> <sup>+</sup>	0.1	0.1	$\mu\text{M}/\text{ms}$
K <sub>n</sub> <sup>-</sup>	0.1	0.1	/ms
V <sub>max,pump</sub>	0.208	0.208	$\mu\text{M}/\text{ms}$
M	3.98	3.98	No units
K <sub>pump</sub>	0.184	0.184	$\mu\text{M}$
c <sub>∞</sub>	0.1	0.1	$\mu\text{M}$
K, Ca <sup>2+</sup> release threshold	15	15	$\mu\text{M}$
Ta, time duration when RyR releases Ca <sup>2+</sup> from SR to cytosol	10	10	ms

<b>A, max. amplitude of local Ca<sup>2+</sup> release</b>	15	15	μM
<b>Finite difference scheme parameters</b>			
<b>dx, space step</b>	0.05	0.05	μm
<b>dt, time step</b>	0.02	0.02 (adaptive time step)	ms

<sup>1</sup> Morphology was based on (Kim *et al.*, 2000). <sup>2</sup> Reactions were based on (Cheng *et al.*, 1993; Izu *et al.*, 2001).

**Table S2.** Summary of individual cSR geometric and volumetric data for the four chambers of avian myocardium.

	<b>Left Atrium</b>	<b>Left Ventricle</b>	<b>Right Atrium</b>	<b>Right Ventricle</b>
<b>cSR diameter (nm)</b>	119±3	129±5	130±3	119±5
<b>cSR surface area (nm<sup>2</sup>)</b>	22262±1315*	26972±1510	27370±1470	28401±1530*
<b>cSR volume (nm<sup>3</sup>)</b>	446249±32357*	593937±45955*	593673±45450	600288±49132

Data are presented as mean±SEM. Measurements of corbular SR (cSR) were performed in all 4 chambers from a single bird heart; n measurements = LA (50), RA (40), LV (28), RV (26). Paired \* indicates significant differences (one-way ANOVA, P<0.05) within a measurement.

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