

Supplementary information

Anatomically porous-media heat transfer modeling for multi-organ supercooling perfusion cryopreservation

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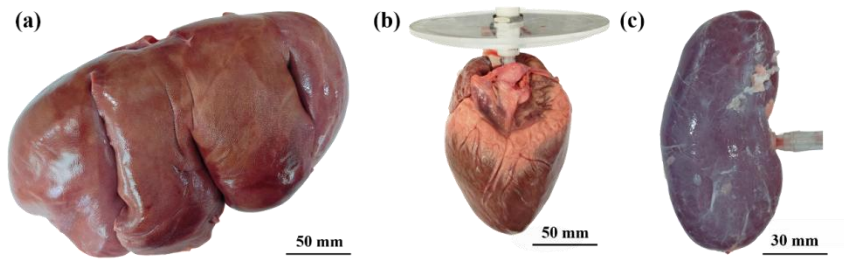


Figure S1. Fresh organs harvested from Bama pigs. (a) Liver; (b) Heart; (c) Kidney.

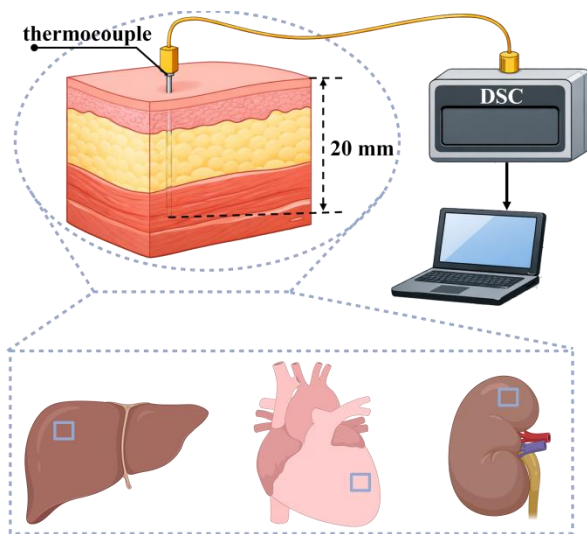


Figure S2. Schematic of the thermocouple temperature measurement setup in biological tissue. A thermocouple probe was inserted into the tissue to measure the local temperature at 20 mm depth. The solid boxed region indicates the thermocouple measurement site. The acquired temperature signal was recorded by the data acquisition system and analyzed on a computer. (Created in [BioRender.com](https://www.biorender.com)).

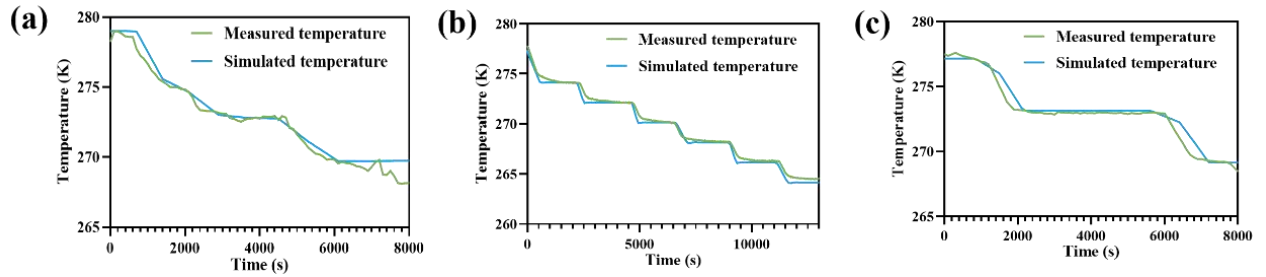


Figure S3. Perfusate temperature time curves comparing measurements and simulations. Created in BioRender.com. (a) Liver; (b) Heart; (c) Kidney ($n = 3$). The thermocouple measurement point is at the perfusion inlet of organ.

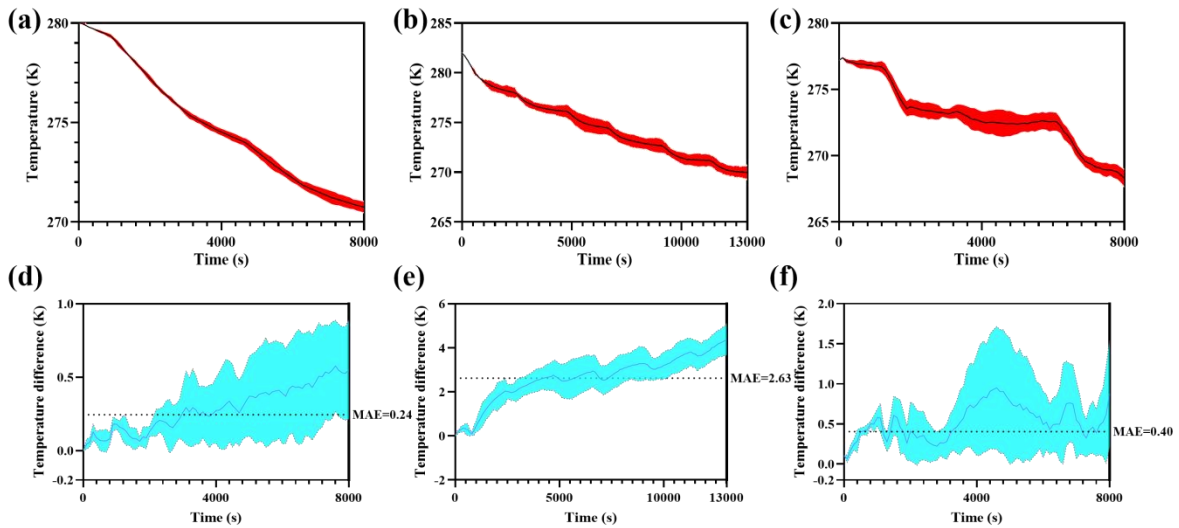


Figure S4. Measured temperature and temperature difference trajectories of the liver, heart, and kidney during perfusion. (a-c) Measured temperature trajectories for the liver, heart, and kidney, respectively ($n = 3$). Solid lines indicate the mean measured temperatures, and red shaded areas indicate the SD of the measure temperature; (d-f) Temperature difference ($T_{\text{difference}} = |T_{\text{measure}} - T_{\text{simulation}}|$) for the liver, heart, and kidney, respectively ($n = 3$), and blue shaded areas indicate the SD of the temperature difference. The maximum temperature differences were 0.90 °C, 5.24 °C, and 1.81 °C, respectively. SD: standard deviations.

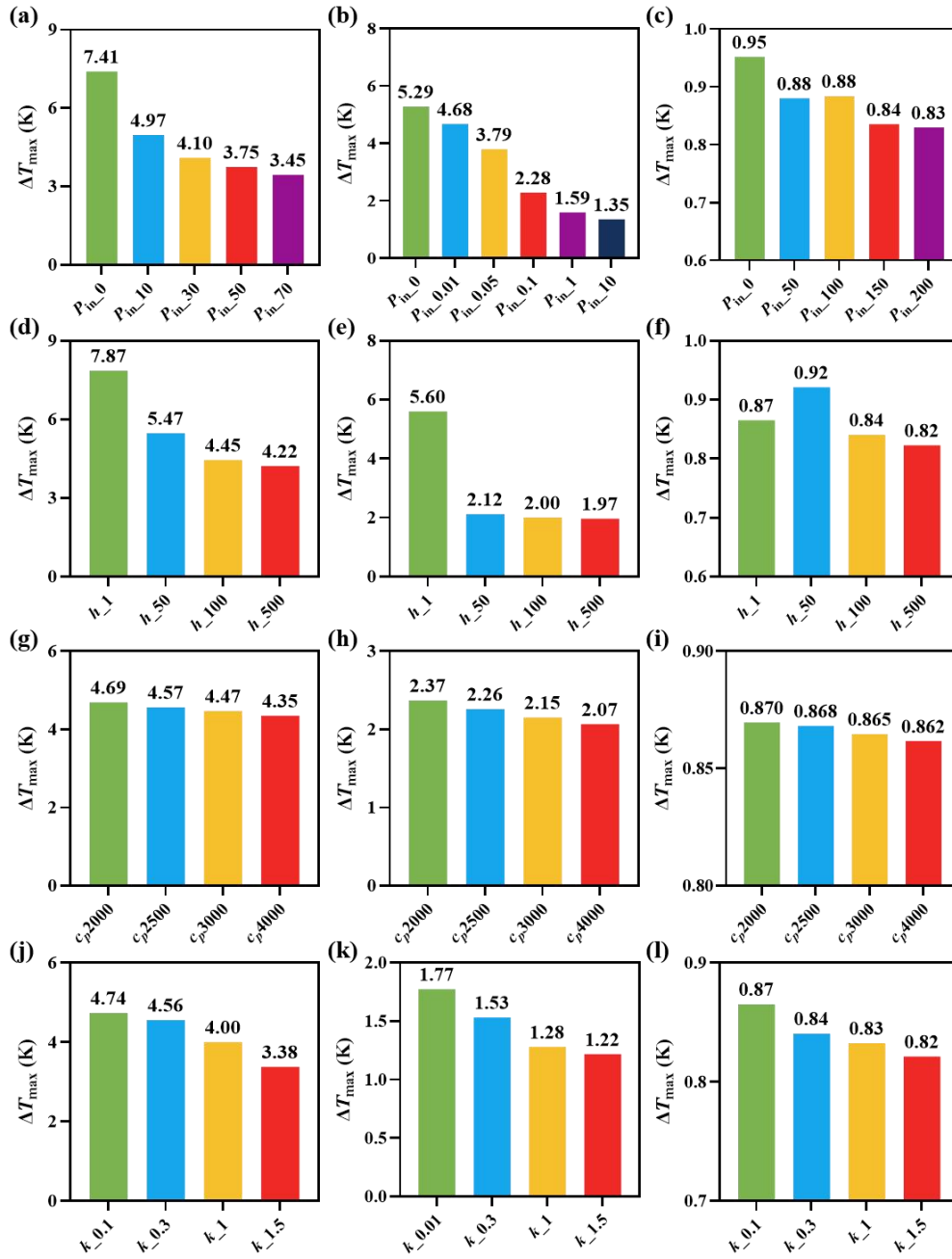


Figure S5. The maximum temperature differences for the liver, heart, and kidney at the final perfusion time point. (a, d, g, j) Liver; (b, e, h, k) heart; (c, f, i, l) kidney. The maximum temperature difference: $\Delta T_{\max} = T_{\max} - T_{\min}$.