

Supporting Information

Real-time neurochemical measurement of dynamic metabolic events during cardiac arrest and resuscitation in a porcine model

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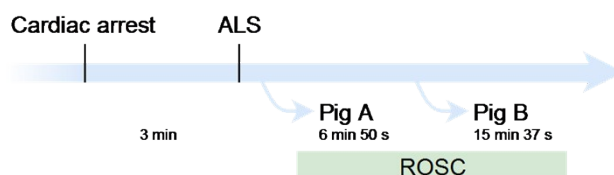


Figure S1 – Advanced life support protocol timeline for each of the two pigs described in the main text in figure 3A and B. The European Resus council guidelines were used as a guide for Advanced Life Support Algorithm (<https://www.resus.org.uk/resuscitation-guidelines/adult-advanced-life-support/>).

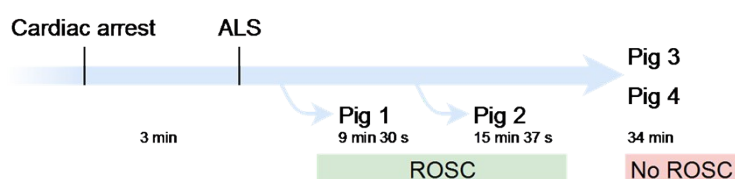


Figure S2. Advanced life support protocol timeline for each of the four pigs described in the main text in figure 4. The European Resus council guidelines were used as a guide for Advanced Life Support Algorithm (<https://www.resus.org.uk/resuscitation-guidelines/adult-advanced-life-support/>).

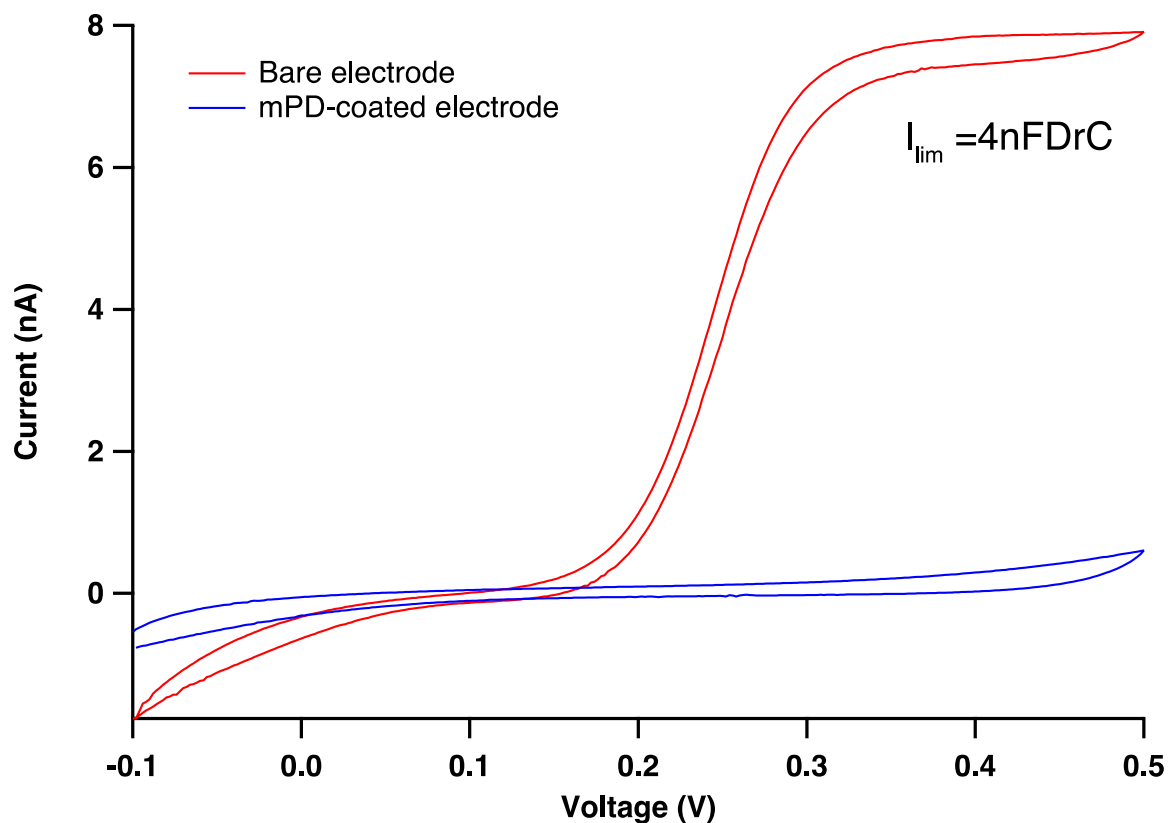


Figure S3. Cyclic voltammogram (CV) of a bare electrode and after coating with poly(*m*-phenylenediamine) (mPD) in 1.5 mM ferrocene monocarboxylate. The working electrode potential was scanned from -100 mV to 500 mV and then reversed for a 50 μm diameter platinum disc electrode. The CV was carried out at 10 mV/s. The red and blue lines show the CVs obtained before and after coating with mPD, respectively. The equation for calculating the steady-state limiting current (I_{lim}) for a microdisc electrode is given ($I_{lim} = 4nFDrC$) where n is the number of electrons transferred, A is the electrode area, F is the Faraday constant, D is the diffusion coefficient, r is the radius of the microdisc, and C is the concentration. For a 50 μm microdisc the theoretical limiting current is 8.29 nA.

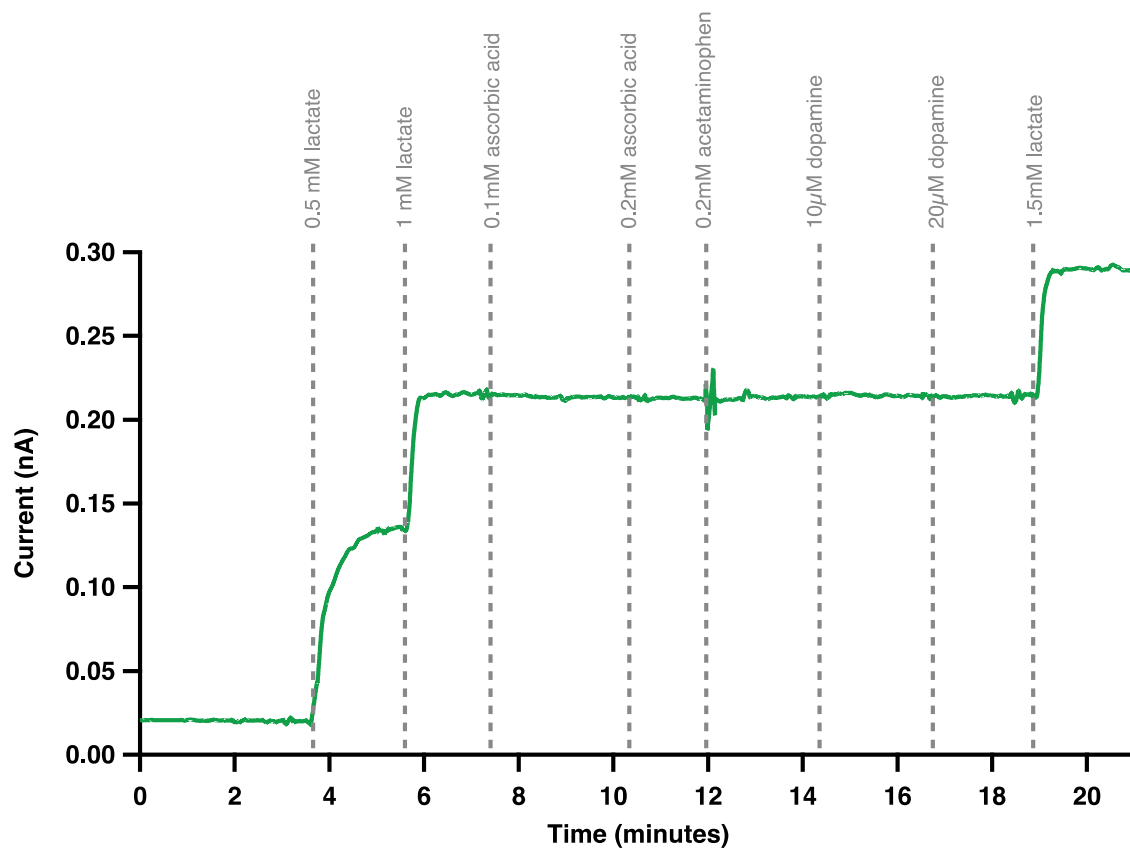


Figure S4. Response of lactate biosensor to interferants. A fully functionalised lactate biosensor was placed in a stirred beaker and the current was measured for induced changes in lactate and known interferants (ascorbic acid, acetaminophen and dopamine). The current of the biosensor was constant despite the addition of interferants. The biosensor showed a selective response only to changes in the lactate concentration.

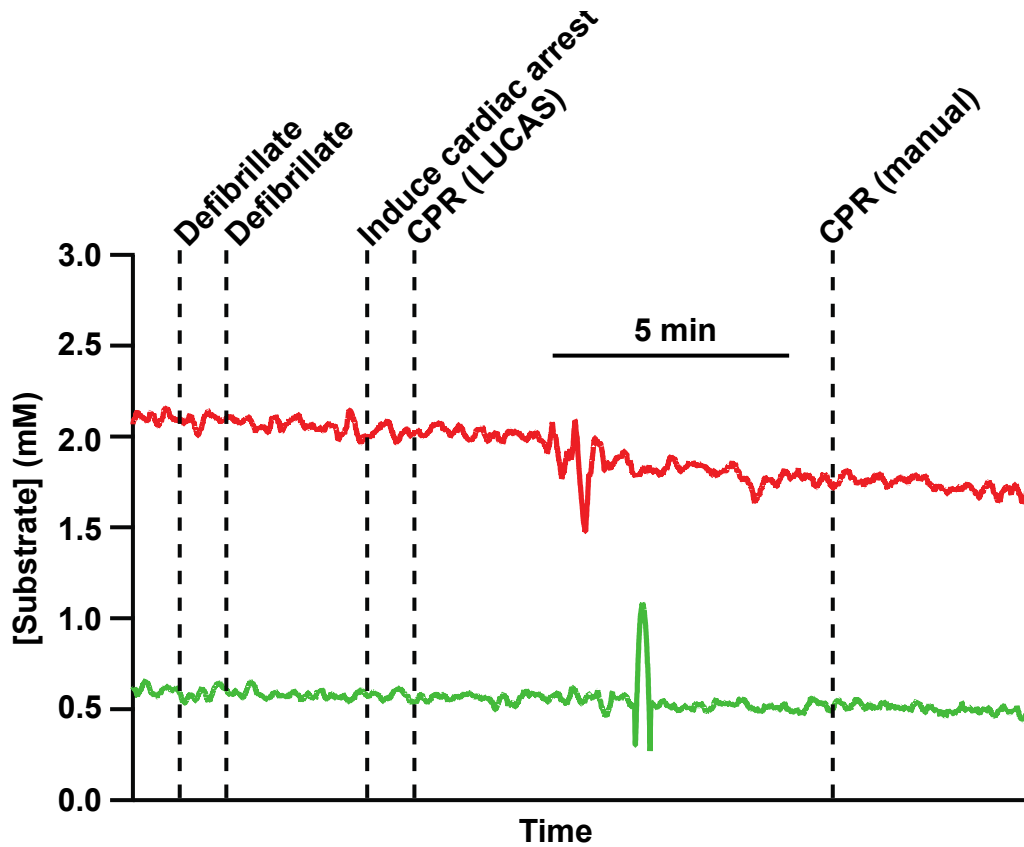


Figure S5. Dialysate glucose (red) and lactate (green) levels in the leg during cardiac arrest, defibrillation, and during CPR both by LUCAS and manual CPR. Events indicated by dotted lines. In this case defibrillation was used to induce cardiac arrest. Online data was sampled at 10 Hz and smoothed with a Savitzky-Golay 201-point filter. Leg trace is much less variable than measurements made in the brain during similar procedures, as peripheral tissue is much less metabolically active while the pig is anaesthetised.