

Mitochondrial respiratory control and early defects of oxidative phosphorylation in the failing human heart

Hélène Lemieux^{a,1}, Severin Semsroth^b, Herwig Antretter^b, Daniel Höfer^b, Erich Gnaiger^{a,*}

^a D. Swarovski Research Laboratory, Department of Visceral, Transplant and Thoracic Surgery, Medical University of Innsbruck, A-6020 Innsbruck, Austria

^b Department of Cardiac Surgery, Medical University of Innsbruck, A-6020 Innsbruck, Austria



Human heart: OXPHOS analysis by high-resolution respirometry

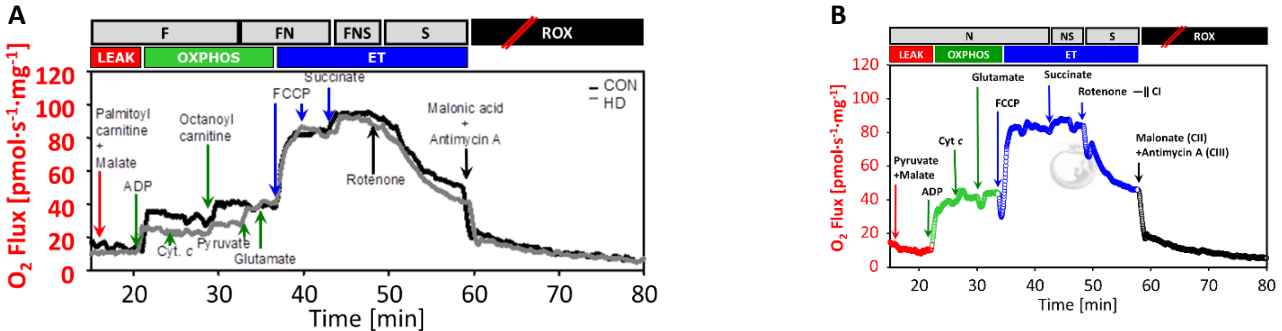


Figure 1. SUIT protocols for evaluation of mitochondrial respiration capacities and OXPHOS control in permeabilized myocardial fibers. (A) Fatty acid SUIT protocol for testing the flavoprotein and Complex I pathway. **(B)** Carbohydrates SUIT protocol to test the additivity at the Q-junction. Both graphs are representative traces obtained by high-resolution respirometry.

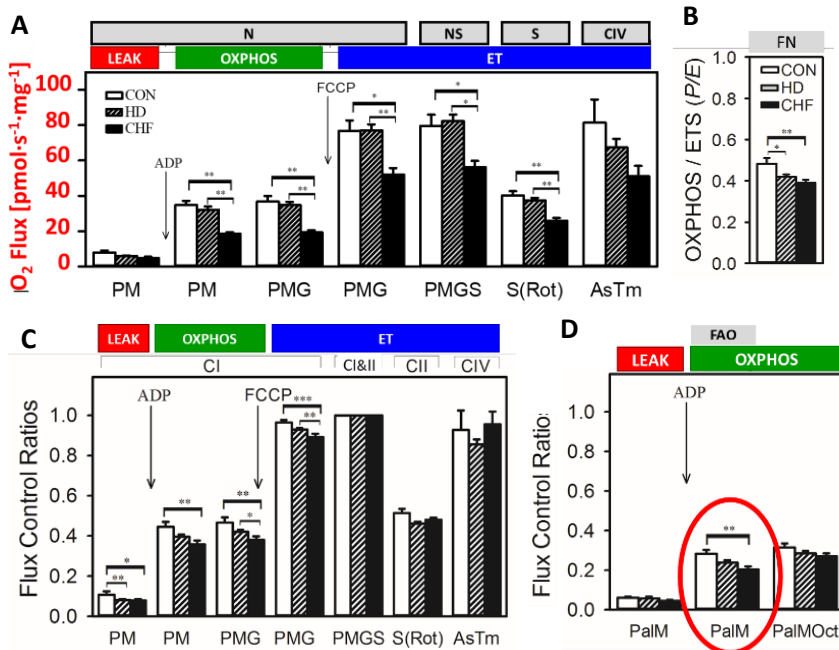


Figure 2. OXPHOS capacity, phosphorylation system, and OXPHOS and ET capacities for N- or FN- pathway. (A) Carbohydrates SUIT protocol to test the additivity at the Q-junction. **(B)** Coupling Control Ratios with substrates for the FN-pathway. **(C)** Flux Control ratios in protocols with carbohydrates. **(D)** or fatty acids. *N*=30-40 depending on the experimental group. Data are means ± SE.

Heart disease and chronic heart failure leads towards a general loss of OXPHOS capacity (mt-density), defects on the phosphorylation system, decrease in the FAO capacity and a reduction in the NADH-OXPHOS and ET capacities

Reference: Lemieux H, Semsroth S, Antretter H, Höfer D, Gnaiger E (2011) Mitochondrial respiratory control and early defects of oxidative phosphorylation in the failing human heart. *Int J Biochem Cell Biol* 43:1729-38.

Figures and texts slightly modified based on the recommendations of the COST Action MitoEAGLE CA15203. [Doi:10.26124/mitofit:190001.v4](https://doi.org/10.26124/mitofit:190001.v4)

O2k-brief communicated by E Gnaiger and J Iglesias-Gonzalez
Oroboros Instruments



Supported by project NextGen-O2k which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 859770

