

# STANDARDIZATION OF THE ASSESSMENT PROTOCOL OF MITOCHONDRIAL RESPIRATION IN HUMAN PLATELETS

**Rațiu D. Corina<sup>1</sup>, Petruș T. Alexandra<sup>1,3</sup>, Lighezan Rodica<sup>2,3</sup>, Oana M. Duicu<sup>1,3</sup>, Muntean M. Danina<sup>1,3</sup>**

<sup>1</sup>Victor Babeș University of Medicine and Pharmacy, Department of Pathophysiology, Timișoara, Romania

<sup>2</sup>Victor Babeș University of Medicine and Pharmacy, Department of Parasitology, Timișoara, Romania

<sup>3</sup>Victor Babeș University of Medicine and Pharmacy Center for Translational Research and Systems Medicine, Timișoara, Romania

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used to assess the occurrence of mitochondrial dysfunction in the peripheral blood in the setting of non-communicable diseases.

## OBJECTIVES AND BACKGROUND

The purpose of this study was to standardize the methodology for platelet isolation and measurement of oxygen consumption using high-resolution respirometry.

## MATERIALS AND METHODS

The platelet isolation protocol consisted of two consecutive centrifugations of 12 mL blood probes collected from healthy adult females (n = 10) yielding a platelet-rich plasma sample. Respiration was measured at 37°C using the Oxygraph-2k, according to a substrate-uncoupler-inhibitor-titration protocol. Platelets permeabilized with digitonin were allowed to respire in the presence of complex I (glutamate and malate) and II (succinate) substrates.

## RESULTS

We obtained a respiratory control ratio of  $2.77 \pm 3.65$  that indicates a good oxidative phosphorylation coupling efficiency.

## CONCLUSIONS

*In vitro* measurement of platelet respiration is a reliable method that can be used to evaluate the human bioenergetic profile. The standardized technique will be

## REFERENCES

1. Ferguson MA, Sutton RM, Karlsson M, Sjovald F, Becker LB, Berg RA, Margulies SS, Kilbaugh TJ. Increased platelet mitochondrial respiration after cardiac arrest and resuscitation as a potential peripheral biosignature of cerebral bioenergetic dysfunction. *J Bioenerg Biomembr.* 2016;48:269-279.
2. Tyrell DJ, Bharadwaj MS, Van Horn CG, Marsh AP, Nicklas BJ, Molina AJ. Blood-cell bioenergetics are associated with physical function and inflammation in overweight/obese older adults. *Exp Gerontol.* 2015;70:84-91.
3. Siewiera K, Kassassir H, Talar M, Wieteska L, Watala C. Higher mitochondrial potential and elevated mitochondrial respiration are associated with excessive activation of blood platelets in diabetic rats. *Life Sci.* 2016;148:293-304.