The Presence of Vanadium Changes the Effects of Xyloglucan (XGC) from *Copaifera Langsdorffii* on Mitochondrial Bionergetics

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INTRODUCTION: Polysaccharides isolated from different fonts have shown important biological activities, which may be modified by their complexation with metals. Xyloglucan extracted from *Copaifera langsdorffii* (XGC) and its complex with oxovanadium (XGC:VO) were toxic to cultured B16F10 melanoma cells and this effect was related to the impairment of cells respiration. **OBJECTIVES:** With the aim to clarify the effects of XCG and XGC:VO on mitochondrial respiration, in this study we evaluated the effects of these polymers on parameters related to oxygen consumption in isolated mitochondria. **MATERIAL AND METHODS:** Xyloglucan (XGC) was isolated from seed cotyledons from *Copaifera langsdorffii* and its complex with oxovanadium (XGC:VO) were previously prepared. Mitochondria were isolated from rat liver by differential centrifugation. The oxygen consumption was evaluated by high-resolution respirometry (Oxygraph-2K OROBOROS®) and respiratory parameters and enzymatic activities were determined in intact and disrupted mitochondria, respectively. **RESULTS AND DISCUSSION:** When glutamate plus malate were used as oxidizable substrate XGC (0.5 - 25 µg/mL), did not affect the mitochondrial respiration; however, the XGC:VO inhibited at 13% (0.5 - 25 µg/mL) the state 3 but state 4 was not altered. As consequence, the Respiratory Control Coefficient (RCC) was decreased by 13% while ADP/O ratio was unchanged. The activity of NADH oxidase was not affected by both polymers. However, the activity of succinate oxidase was increased (~90%) only by XGC (0.5-1.0 µg/mL). **CONCLUSION:** The presence of vanadium is essential for the inhibition of the respiration in intact mitochondria oxidizing Complex I substrates. On the other hand, the stimulus of succinate oxidase in disrupted mitochondria only for native XGC is suppressed by the complexed form, suggesting that the metal presence changes the polysaccharides effects dependent on the oxidizable substrate and the integrity of mitochondrial membrane.

Keywords: mitochondrial bioenergetics, oxovanadium, Xyloglucan

Supported by CNPq and CAPES