

Effects of EnduBerry™ Nu on Mitochondrial Function



S-1117

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INTRODUCTION

Free radicals are highly reactive and unstable molecules, which are naturally formed in the body as a byproduct of normal metabolism, or after exposure to environmental stressors. There are numerous sources of reactive oxygen species (ROS) in the cell, one major site being the mitochondria. The so-called powerhouse of the cell generates the energy that our bodies essentially need to function. However, as a byproduct from this energy generation, mitochondria produce also mitochondrial ROS (mtROS). Usually, the mtROS production is quickly balanced by antioxidant systems. In some instances, however, such as increased physical demand or cellular dysfunction, this balance is not maintained and increased mtROS production causes damage to the cell (1).

Numerous plant-derived phytochemicals have been shown to function as antioxidants, thereby neutralizing the free radicals and reducing the risk of cell damage. In this study, the effect of EnduBerry™ Nu, a Haskap Berry extract, on mitochondrial function was investigated in human cardiomyocytes. For this, a mitochondria-based method was used to determine the inhibitory effect on mtROS production.

STUDY DESIGN

Test samples

A stock solution of EnduBerry™ Nu (a natural extract derived from the Haskap berry) was prepared by dissolving the test compound in water and subsequent sterile filtration.

Cell cultivation and treatment

A human cardiac cell line (H9C2) was used for this study. Prior to the assay, H9C2 were grown in 24-well plates and incubated with or without (Untreated) Haskap Berry extract for 24 h prior to performing the assay. Cells were then treated for 30 min with 10 µm of the mitochondrial stressor Antimycin A. After the cells were labelled for 20 min with 5 µm of the fluorescent mitochondrial ROS probe MitoSOX™ (Invitrogen) and fluorescence measured by flow cytometry.

Detection of mtROS by MitoSOX™

Using the fluorescent mitochondrial ROS probe MitoSOX™, the production of superoxide by mitochondria can be visualized in fluorescence microscopy. The MitoSOX™ probes permeate live cells where they selectively target mitochondria. There, they are quickly oxidized by mitochondrial superoxide but not by other reactive oxygen species (ROS) of the cell. The oxidation yields a highly fluorescent product that can be visualized and analyzed by flow cytometry.

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RESULTS

EnduBerry™ Nu demonstrated a strong protective effect against stress-induced mtROS generation: it led to a dose-dependent protection against Antimycin A-induced mtROS (Figure 1). Treatment with 0.25 % EnduBerry™ Nu reduced mtROS formation by 93 %, which brought the cells almost back to baseline unstressed controls.

In conclusion, EnduBerry™ Nu has beneficial protective effects for the mitochondria by preventing mtROS formation. Therefore, supplementation with EnduBerry™ Nu may lead to improved cell fitness by improving mitochondrial fitness. By protecting the cells energy powerhouses, one can overall boost cell energy production.

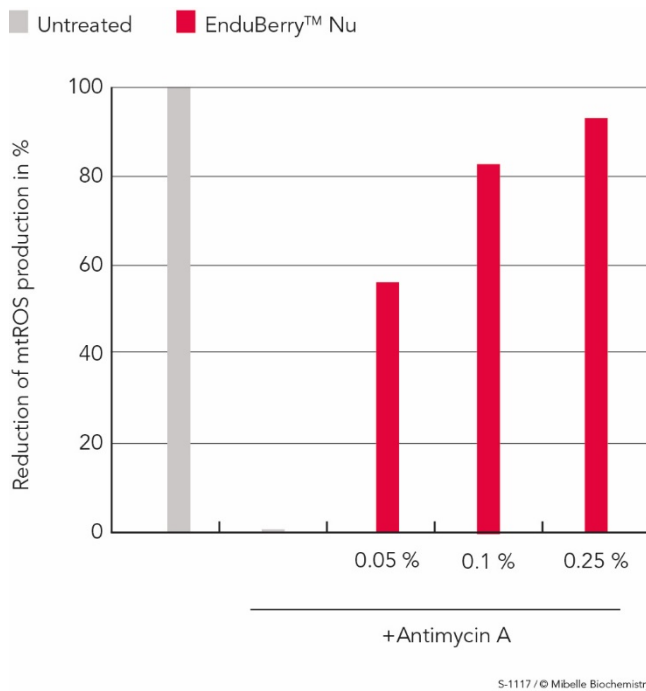


Figure1: Dose-Dependent Protection against Stress-Induced mtROS Generation

REFERENCES

1. Li X, Fang P, Mai J, Choi ET, Wang H, Yang X-f. Targeting mitochondrial reactive oxygen species as novel therapy for inflammatory diseases and cancers. *Journal of Hematology & Oncology*. 2013;6(1):19.

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