"EFFECTS OF EXERCISE AND NUTRITIONAL INTERVENTION IN ELDERS ADMITTED TO A LONG-TERM CARE (LTC) UNIT"

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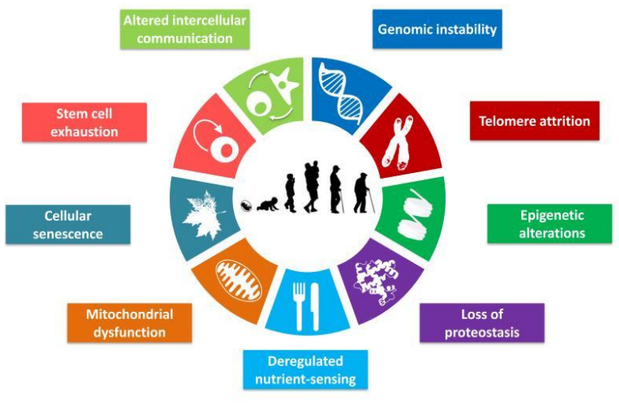
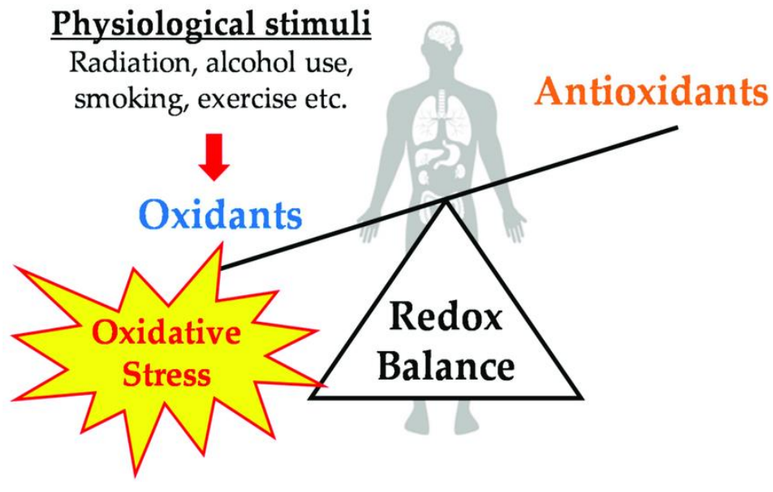
INTRODUCTION



Only approximately 25% of the diversity in longevity is explained by genetic factors. The other 75% is largely the result of the cumulative impact of our interactions with our physical and social environments, which shape behaviors and exposures across the life course. The physical and social environments in which we live have powerful influences on Healthy Ageing.

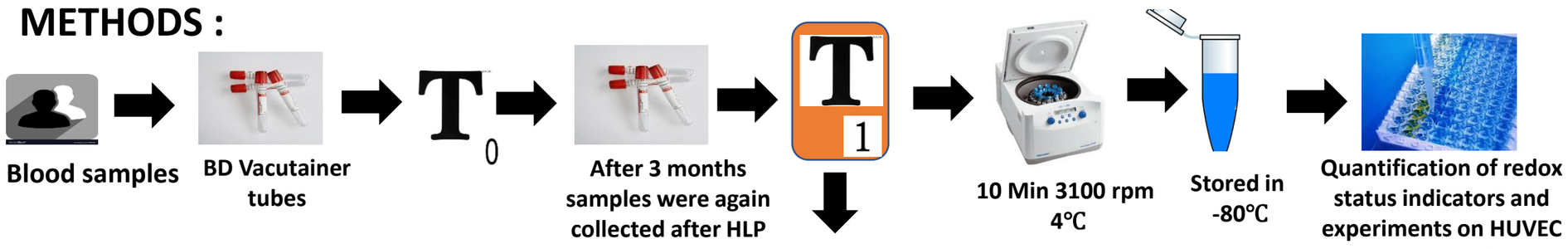
Oxidative stress (OS) is one of the key drivers of these processes as a cause and/or effect of mitochondrial dysfunction. When this equilibrium between oxidant and antioxidant is disrupted the redox balance is altered and oxidative stress is produced.

As far as now, however, the determination of the bio markers of healthy aging related to changes in the redox state has not been clearly identified yet.

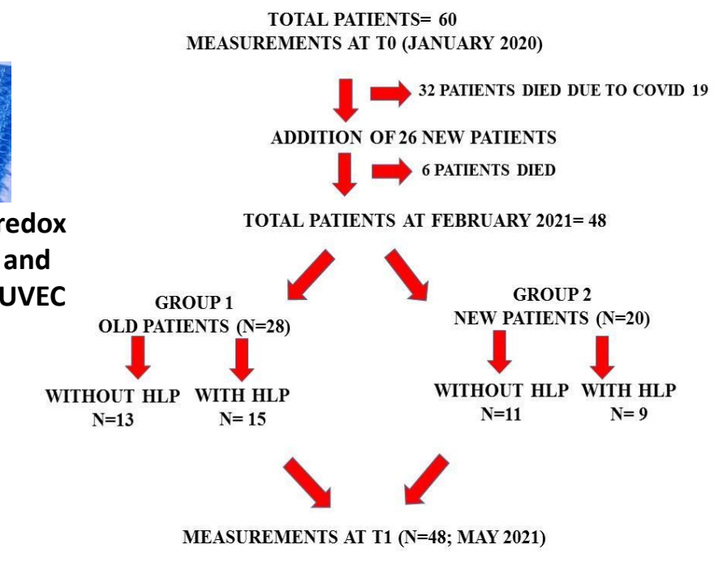


AIM : **The aim of this study was therefore to analyze the plasma redox state of elders admitted to a long-term care unit (LTC) and the effects of plasma on human vascular endothelial cells (HUVEC), in terms of cell viability, mitochondrial ROS (mitoROS) and ROS (reactive oxygen species) release and mitochondrial membrane potential . Those variables were analyzed before (T0) and after a period of health life style program (HLP), which included exercise and a balanced diet (T1).**

METHODS :

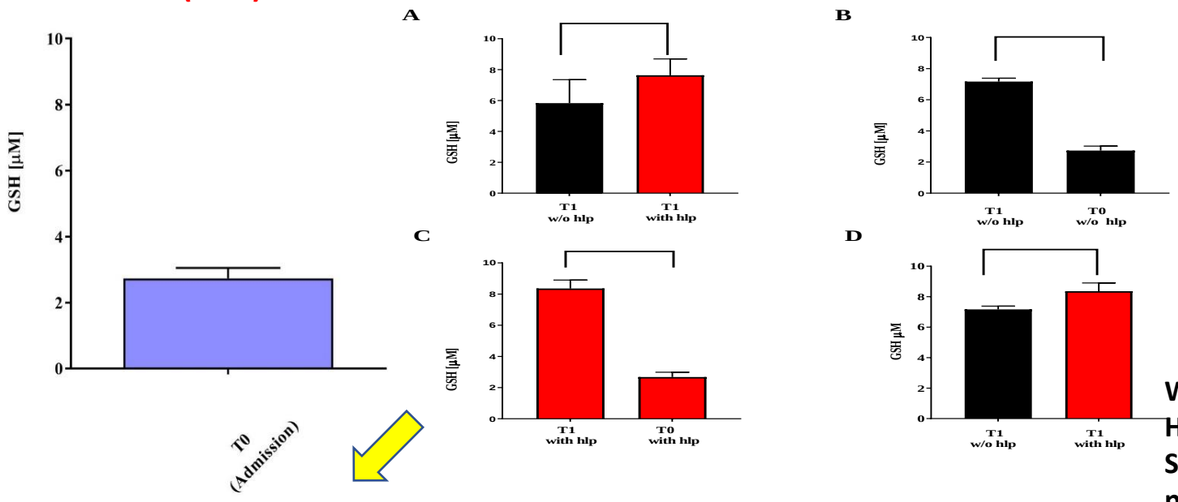


HEALTH LIFE STYLE PROGRAM (HLP) : The nutritional intervention(Normo caloric diet organized into 4 meal: 30g protein + calcium) and the physical activity lasted 12 weeks (3 months)



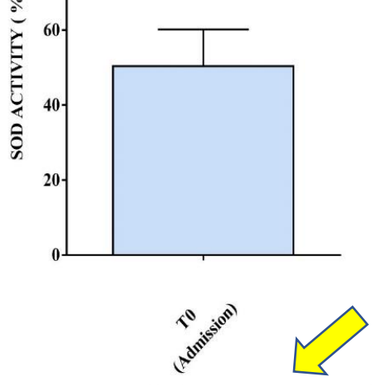
RESULTS :

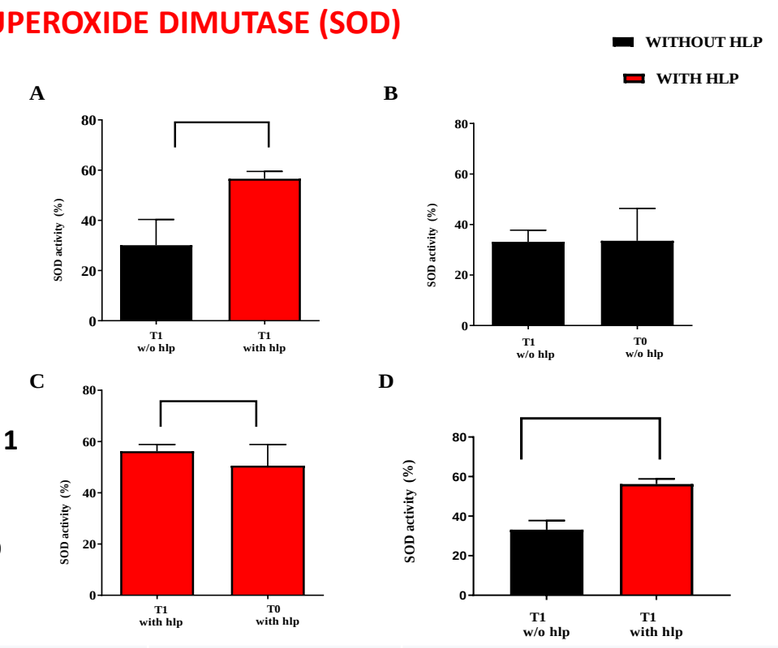
GLUTATHIONE (GSH)



When comparing all the patients without HLP and with HLP there was a big variation in GSH levels in plasma. Hence, GSH levels were higher in patients performing HLP. If considering Group 1 only, GSH levels were higher at T1 than T0 both in the patients with HLP and w/o HLP. However, at T1, Group 1 patients performing HLP had GSH levels higher than those who didn't perform HLP.

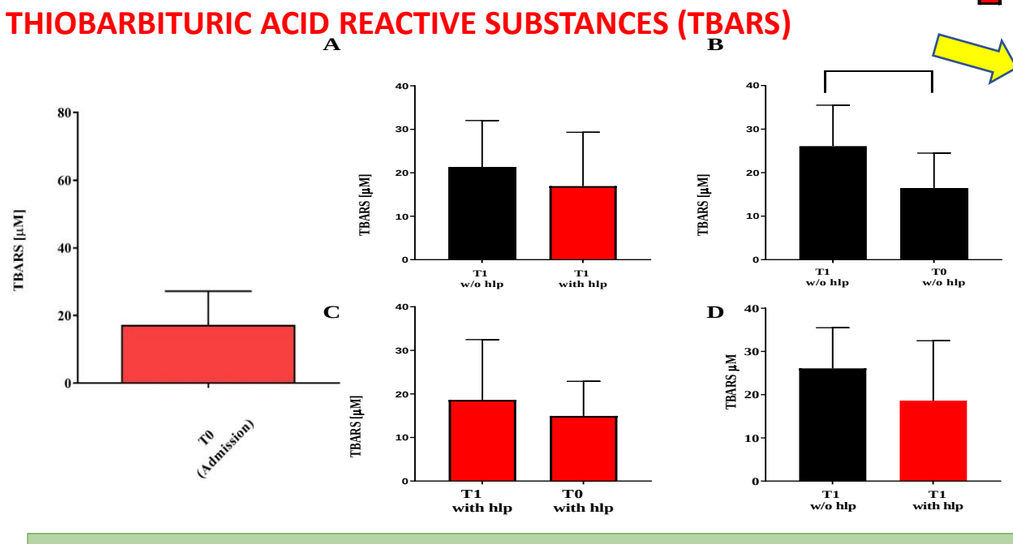
SUPEROXIDE DIMUTASE (SOD)





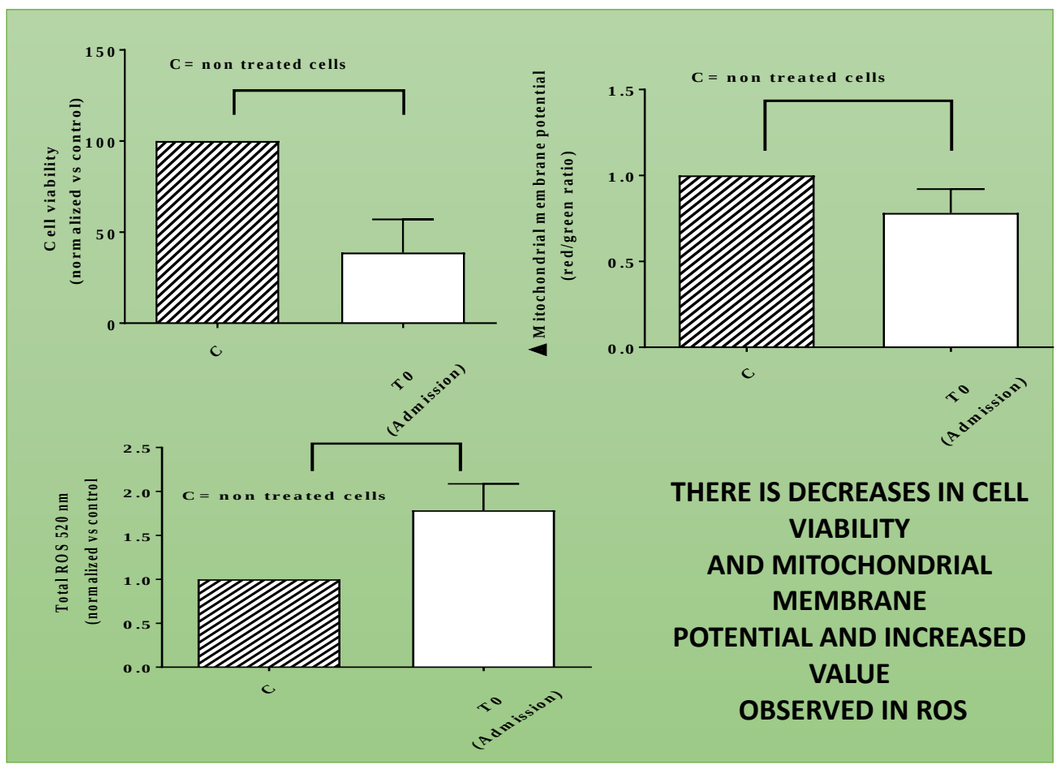
When comparing all the patients without HLP and with HLP there was an increase in SOD activity in plasma at T1 in patients performing HLP . Also, if considering Group 1 only, SOD activity at T1 was higher in patients who performed HLP. Moreover, at T1 in Group 1 patients performing HLP, SOD levels were higher than those found in Group 1 patients who did not perform HLP.

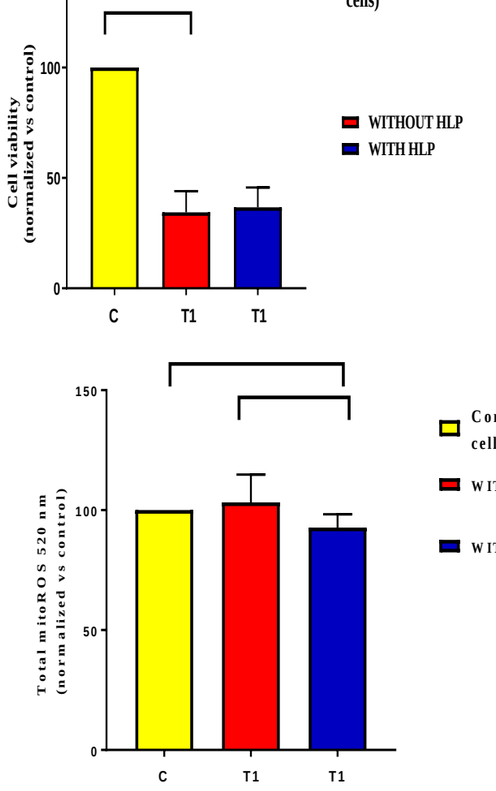
THIOBARBITURIC ACID REACTIVE SUBSTANCES (TBARS)



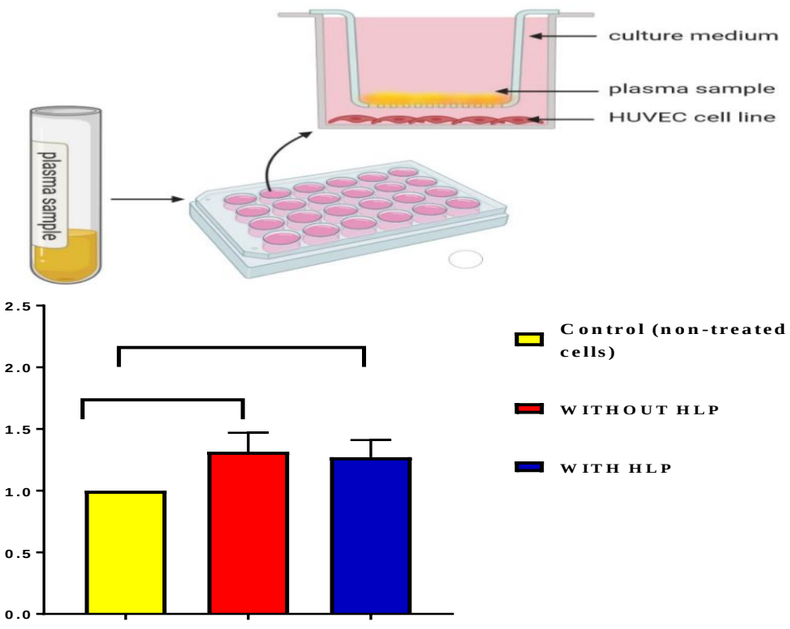
As regarding TBARS, when comparing all the patients without HLP and with HLP we could see a not significant decrease in plasma of subjects who performed HLP. If considering Group 1, TBARS levels were higher at T1 in patients not performing HLP. Instead, in the same group of patients performing HLP, TBARS levels were lower although without any statistical difference, than those found in Group 1 patients who did not perform HLP

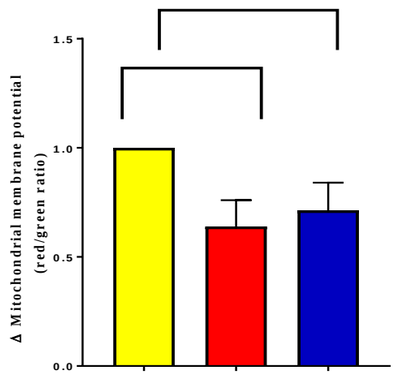
EXPERIMENT	WITHOUT HLP	WITH HLP
GSH	↓	↑
VITAMIN-D	↓	↑
SOD	↓	↑
THYMOSIN BETA-4	↓	↑
TBARS	↑	↓
ISOPROSTANES	↑	↑
8-OH-dG	↑	↑





TO EVALUATE THE EFFECTS OF PLASMA SAMPLES TAKEN FROM THE ELDERLY ON HUVEC, CO-CULTURE EXPERIMENTS WERE PERFORMED, BY USING SPECIFIC TRANSWELL INSERTS





EXPERIMENT	WITHOUT HLP	WITH HLP
CELL VIABILITY	↓	↑
JC-1	↓	↑
ROS	↑	↓
mitoROS	↑	↓

In HUVEC treated with plasma of elders cell viability and mitochondrial membrane potential were lower than that found in non treated HUVEC, whereas ROS release was increased. When comparing the effects of plasma of HLP and non HLP elders, we did not find any significant difference. Instead, the release of mitoROS was higher vs non treated HUVEC when experiments were performed with plasma of non HLP patients. In this case , there was a significant reduction of mitoROS in HUVEC treated with plasma on the HLP patients vs both control condition and non HLP

CONCLUSION

The results we obtained in this study show TBARS levels in elders at T0 to be higher than values found in the young population, in the presence of quite normal GSH levels and SOD activity. After HLP program (T1), GSH levels increased mostly in HLP group. The SOD activity increased only in the HLP group and was reduced in the non HLP group.
On HUVEC, plasma of the elders at To reduced cell viability and mitochondrial function, while increasing ROS release. At T1, the mitochondrial dysfunction was increased in response to plasma of the elders, whereas ROS release was reduced.
It is important to highlight the protection against mitoROS release exerted by HLP plasma

Association Between Plasma Redox State/Mitochondria Function and a Flu-Like Syndrome/COVID-19 in the Elderly Admitted to a Long-Term Care Unit.Grossini E, Concina D, Rinaldi C, Russotto S, Garhwal D, Zeppegno P, Gramaglia C, Kul S, Panella M.Front Physiol. 2021 Dec 15;12:707587. doi: 10.3389/fphys.2021.707587. eCollection 2021.