

# Reduced glutathione addition effects on sperm motility and viability in frozen donkey semen

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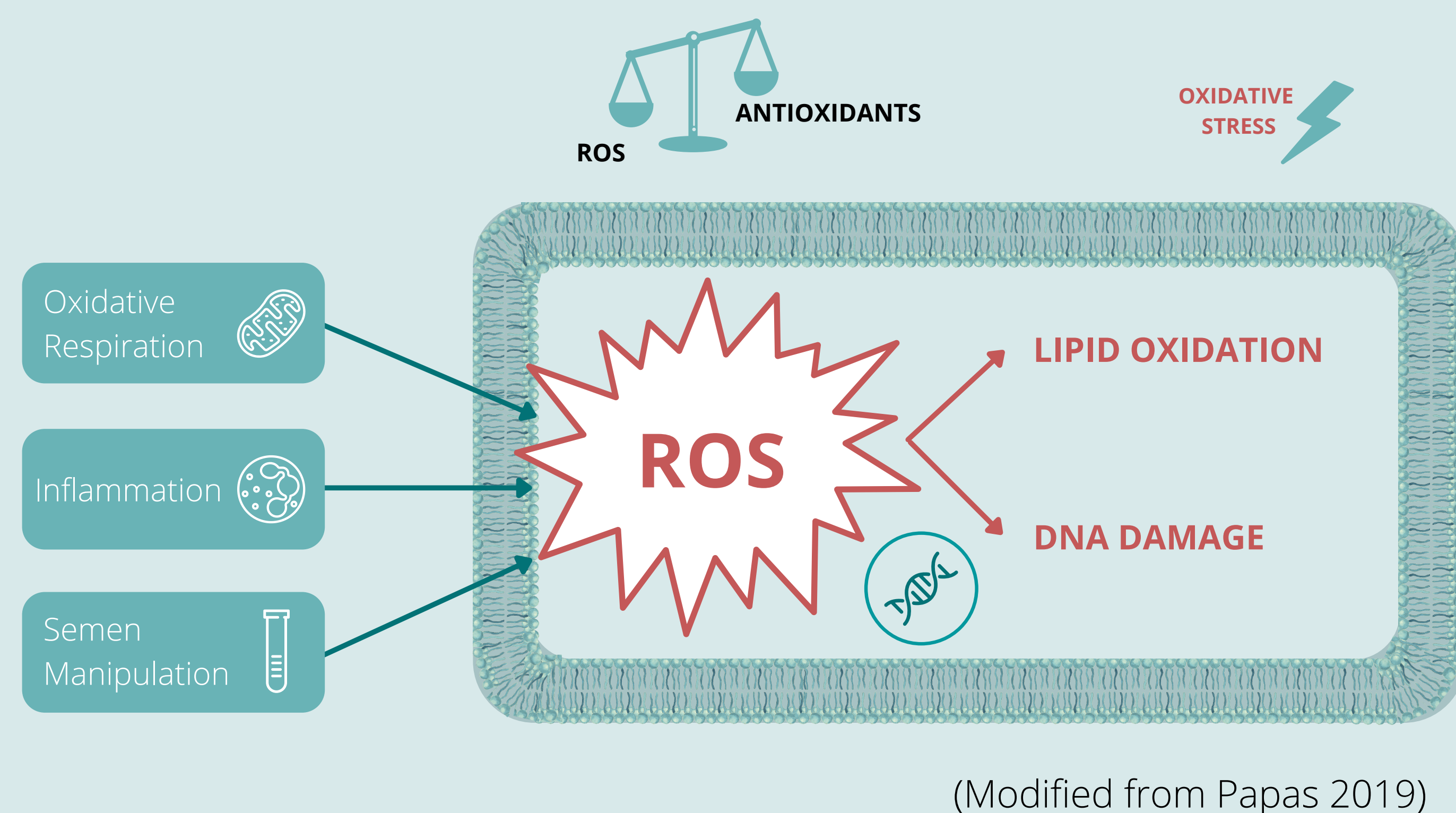
## Introduction

Pregnancy rates when using frozen-thawed semen of donkey (*Equus asinus*) are much lower compared to horses (*Equus caballus*).

Sperm handling for preservation causes many non-physiological changes and an increase of Reactive Oxygen Species (**ROS**) which are highly reactive molecules that modify other biomolecule structures affecting motility and viability.

**ROS scavengers** such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPX) and glutathione reductase (GSR) are complex enzymatic antioxidant systems present in seminal plasma that prevent oxidative damages (Papap 2019).

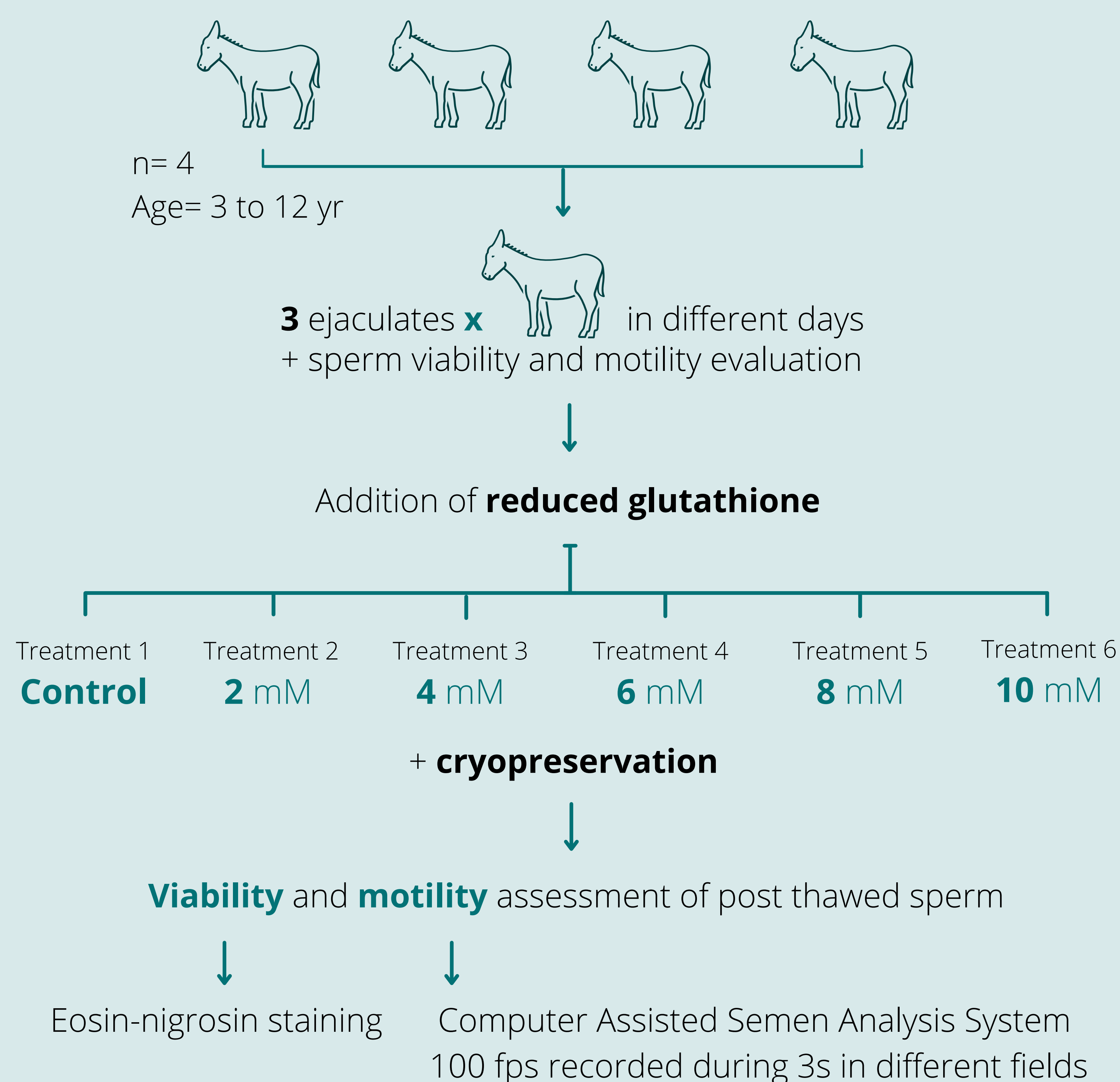
**Glutathione** is a thiol tripeptide ( $\gamma$ -glutamyl cysteinyl glycine). It is a GPX cofactor and a natural reservoir of redox force abundant in seminal plasma, which is used to defend cells against oxidative stress (Oliveira *et al.* 2013).



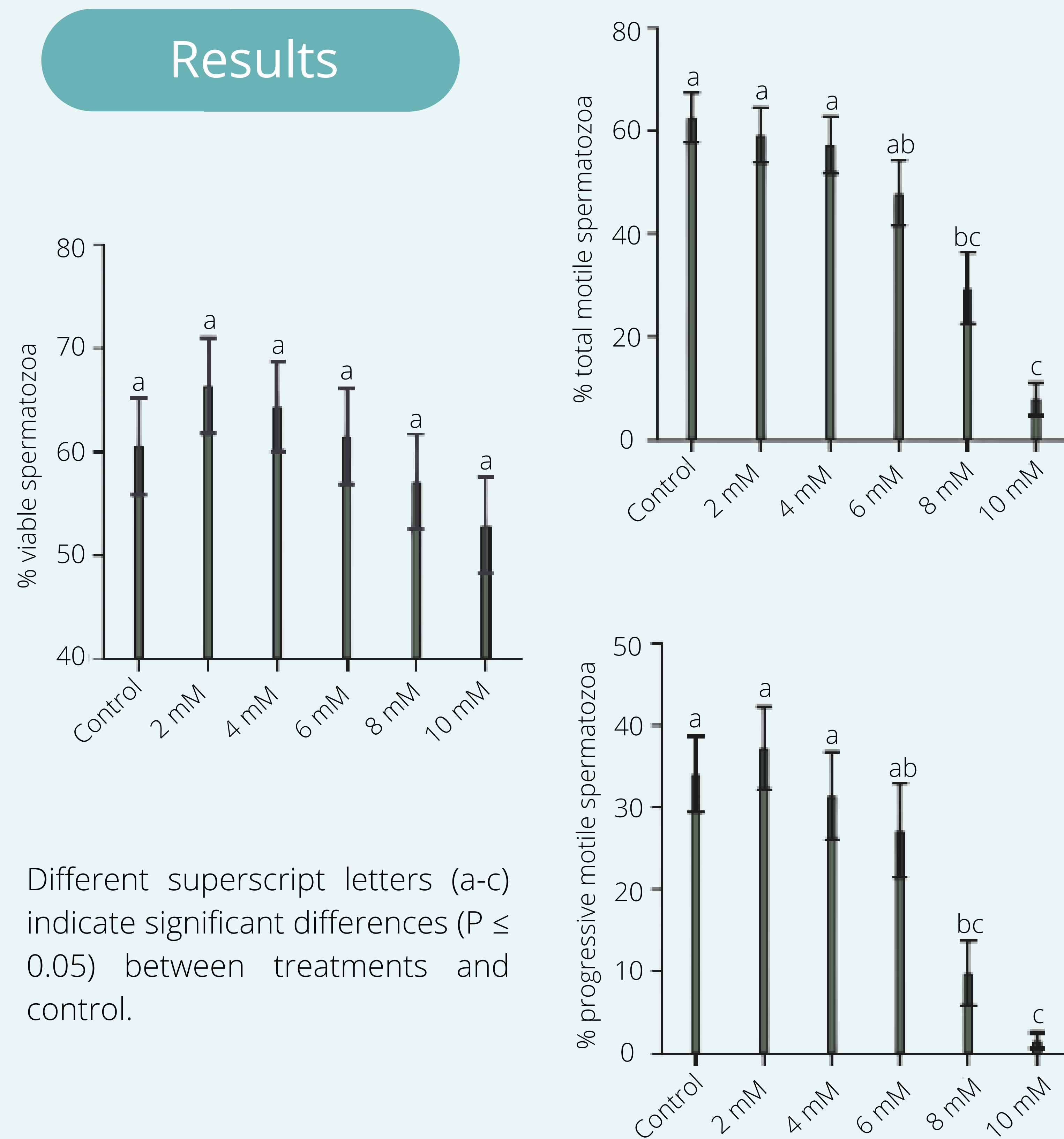
## Objectives

The objective of the present study is to evaluate the in vitro effect on sperm viability and motility of reduced glutathione addition in five different concentrations to donkey spermatozoa compared to the control group, subjected to cryopreservation.

## Material and Methods



## Results



## Conclusion

**≤ 6 mM** reduced glutathione addition have not harmful effects on donkey spermatozoa viability and motility and could be used to improve artificial insemination fertility rates of frozen semen by helping to control ROS levels produced by uterus post-breeding inflammatory response.

## Discussion

In donkey spermatozoa, harmful effects on viability and motility are seen in higher concentration of glutathione compared to horses. The addition of reduced glutathione in **≤ 6 mM** concentrations preserves spermatozoa viability and motility in donkeys. However, an addition of **> 2.5 mM** of glutathione reduced spermatozoa motility and viability in horses (Oliveira *et al.* 2013). This can be explained by the higher production of ROS found in donkeys and a higher activity of seminal plasma ROS scavengers compared to stallions. During the cryopreservation process seminal plasma is removed but its components play a key role in the regulation of physiologic breeding-induced endometritis. This inflammation is very pronounced in jennies and causes an increase of ROS production, which could be regulated by the seminal plasma antioxidants.