



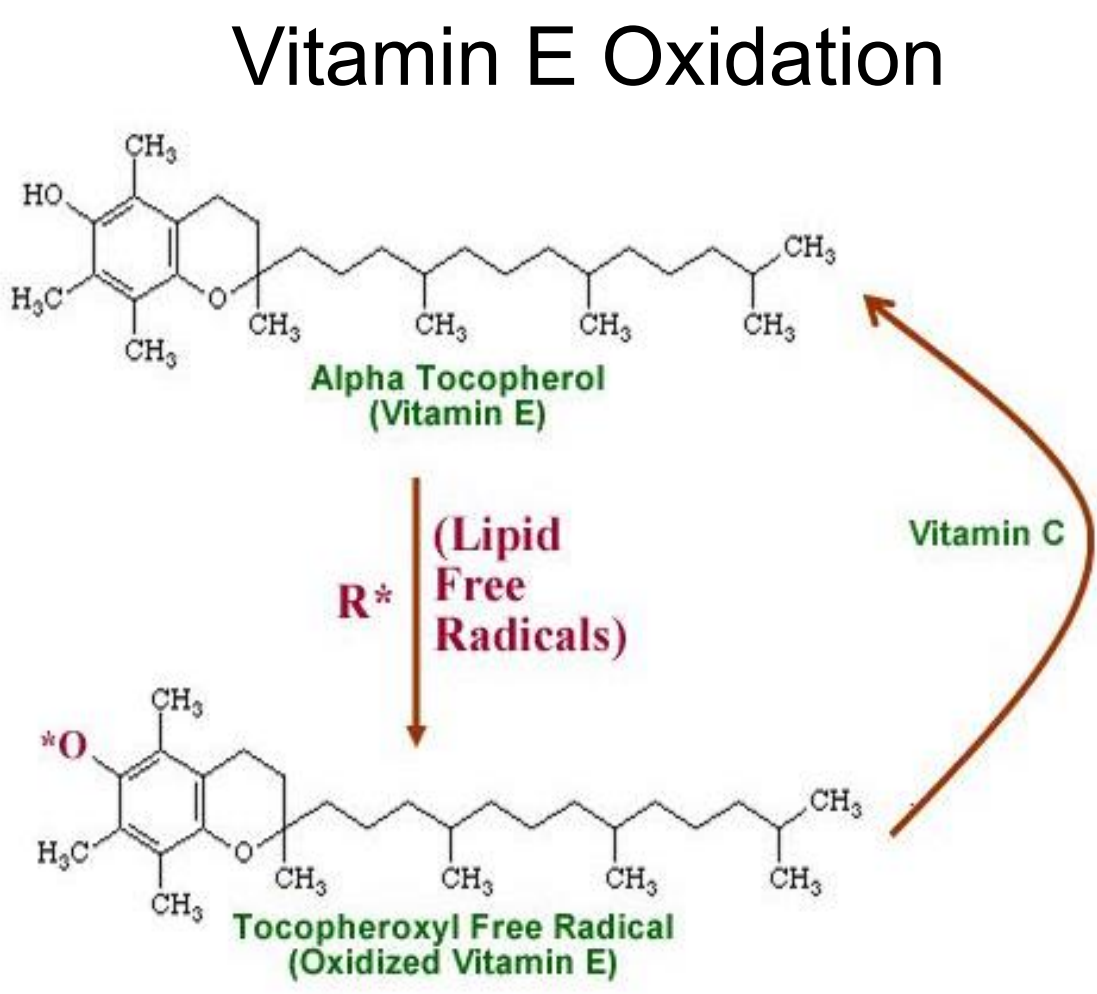
Vitamin E: A Possible Preventative Measure for CTE

Cameron Dargis, Dylan Roth

College of Arts and Sciences, Marian University Indianapolis
3200 Cold Spring Rd, Indianapolis, IN 46222



ABSTRACT



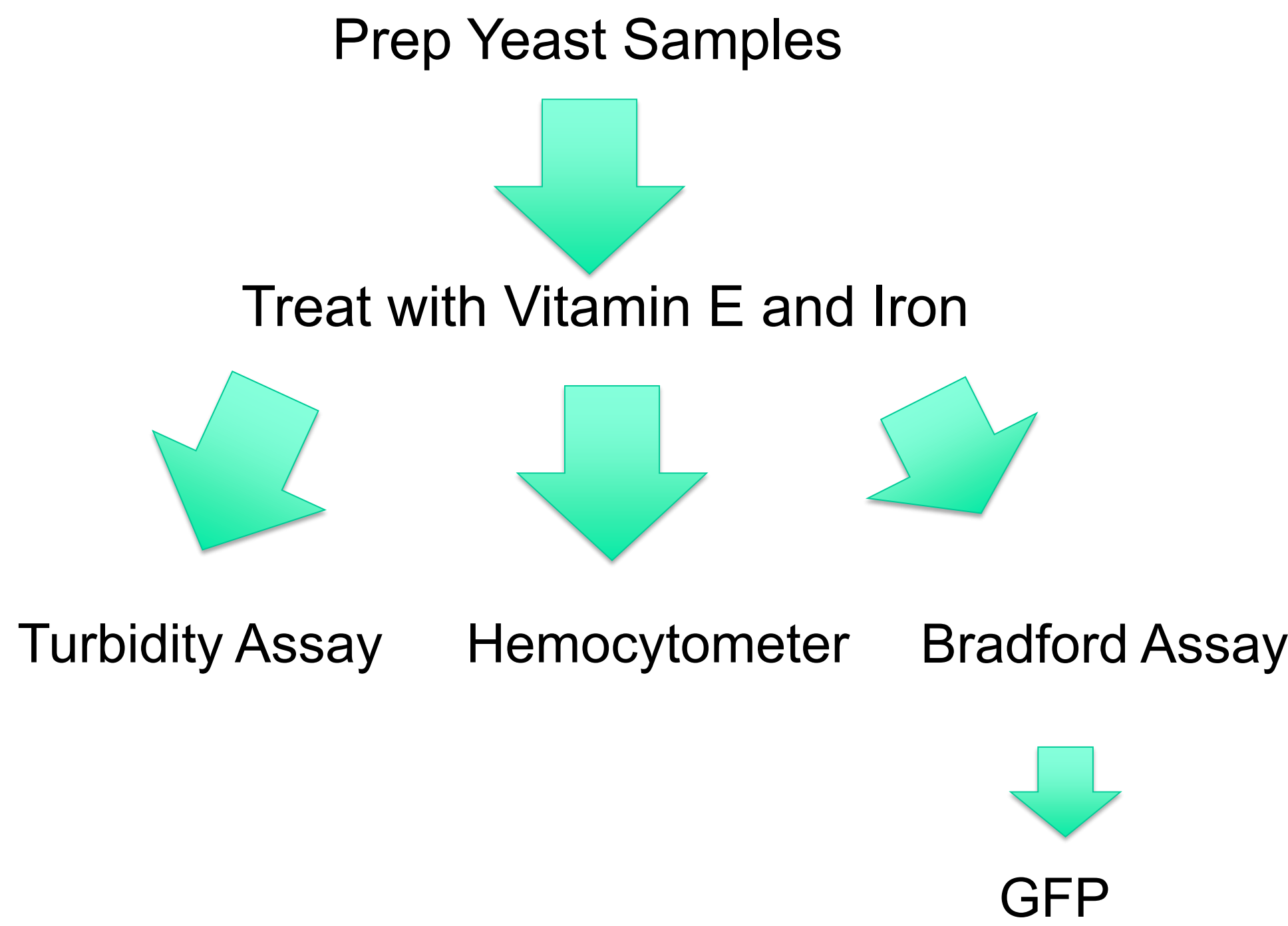
INTRODUCTION

- This experiment is aimed to aide all future athletes.
- The brain injury known as CTE can only be diagnosed after death and upon autopsy.
- Upon research, what causes this is non-heme Iron deposits in the brain cause radical oxygen species that damage the nerve cells.
- Causes many different mental and physical problems
- Research on Vitamin E showed that it can accept radical oxygen species and increase neurological health.
- We will be testing these affects on yeast samples

HYPOTHESIS

- If yeast is treated with Vitamin E before being exposed to radical oxygen species via non-heme iron, then it will have a higher survivability than the non-treated yeast samples.

MATERIALS AND METHODS



TURBIDITY ASSAY

- Treated yeast samples with vitamin E and iron
- Turbidity assay was used to give us a visual on how well the yeast could survive in the iron dense environments
- Good first method to evaluate the yeasts viability

Tube	Viability
1	283.7
2	437.2
3	422.8
4	216.4
5	195.3

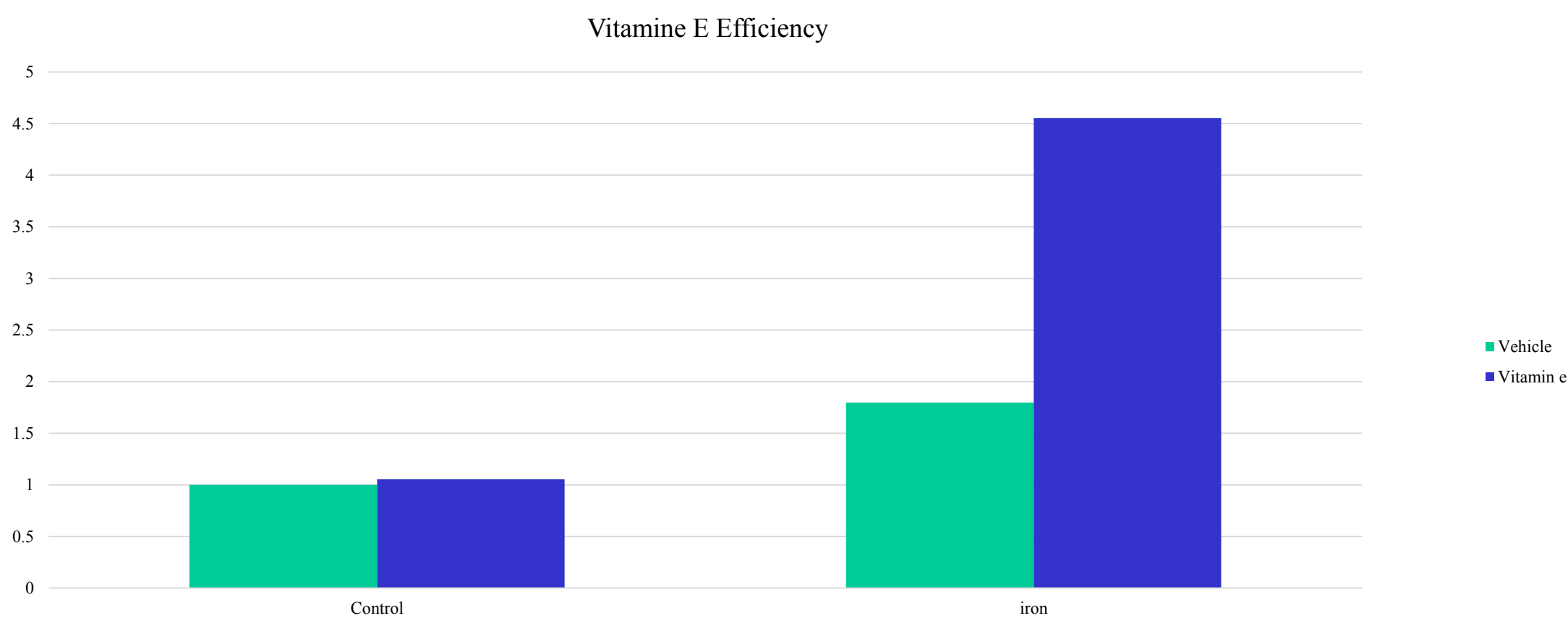
HEMOCYTOMETER

- Same solutions used for this as in the turbidity assay
- When counting dead and alive cells we were surprised it affected the reproductive abilities more than the viability of the cells
- This helped prove that the vitamin E was helping decrease the amounts of dead cells, but did not give us enough evidence

Tube	Alive	Dead	Trypan Blue (ml)	PBS (ml)
1	332	3	40	10
2	47	1	40	10
3	85	1	40	10
4	100	2	40	10
5	68	0	40	10

GFP

- Shows yeasts natural and treated ability to fight off radical oxygens
- Slight increase when no radical oxygens present due to lack of them
- Dramatic increase in ability when non-heme iron was introduced



CONCLUSIONS

- First two methods were not successful, but the GFP gave us the results we needed
- Results show that Vitamin E inhibits the radical oxygens reacting with non-heme iron
- This experiment can a pivotal one in the future mental states of all contact sport athletes.
- The applications of this experiment can lead to many new and pivotal information on CTE.
- The next step for this experiment would to try different time intervals and introduce it to human trials
- Bringing more awareness to this subject may be vital to preventing thousands of mental issues for all athletes.

LITERATURE CITED

- [1] Aiguo Wu, Zhe Ying, & Gomez-Pinilla, F. (2009). Vitamin E protects against oxidative damage and learning disability after mild traumatic brain injury in rats. *Neurorehabilitation and neural repair*, 24(3), 290-8.
- [2] Nisenbaum, E. J., Novikov, D. S., & Lui, Y. W. (2014). The presence and role of iron in mild traumatic brain injury: an imaging perspective. *Journal of neurotrauma*, 31(4), 301-7.
- [3] Vitamin E natural compounds Alpha-Tocopherol a.k.a. Vitamin E. - ppt download. (n.d.). Retrieved from <https://slideplayer.com/slide/5808545/>
- [4] Zhang, S., Qin, X., Lu, H., Wan, M., and Zhu, Y. (2016) The influence of vitamin E supplementation on yeast fermentation. *J. Inst. Brew.*, 122: 289-292. doi: 10.1002/jib.2017

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