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## Oxygen Dose: A new perspective

Kent MacLaughlin, Jacob J. Lamers, Rudolf Braun, Marlowe W. Eldridge

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Center for Inflammatory Study, Oxyhealth LLC

### Abstract

#### Introduction

This study followed up on our findings, published in 2019, of stem progenitor cell mobilization following intermittent low level hyperoxia (42%) in an animal model. This most recent study in human participants used a never before tested small dose of intermittent hyperbaric air that has been used for many years as a placebo control in hyperbaric oxygen (HBOT) research. Because of the reports of a placebo response using this small dose in HBOT research performed by the Department of Defense and conflicting reports disputing the placebo response, coupled with the lack of evidence in the literature that this dose had ever been tested, we questioned if this a placebo or a dose response.

In this research human participants breathed room air in a portable hyperbaric chamber (mountain sickness chamber) (Vitaeris 320 Oxyhealth LLC) at 1.3 atmospheres absolute (ATA), daily for 10 days. This hyperbaric hyperoxia level is similar to 28% oxygen concentration in normobaria.

We hypothesized that the low dose of intermittent hyperoxia would mobilize stem cells in humans similar to our animal study.

#### Methods

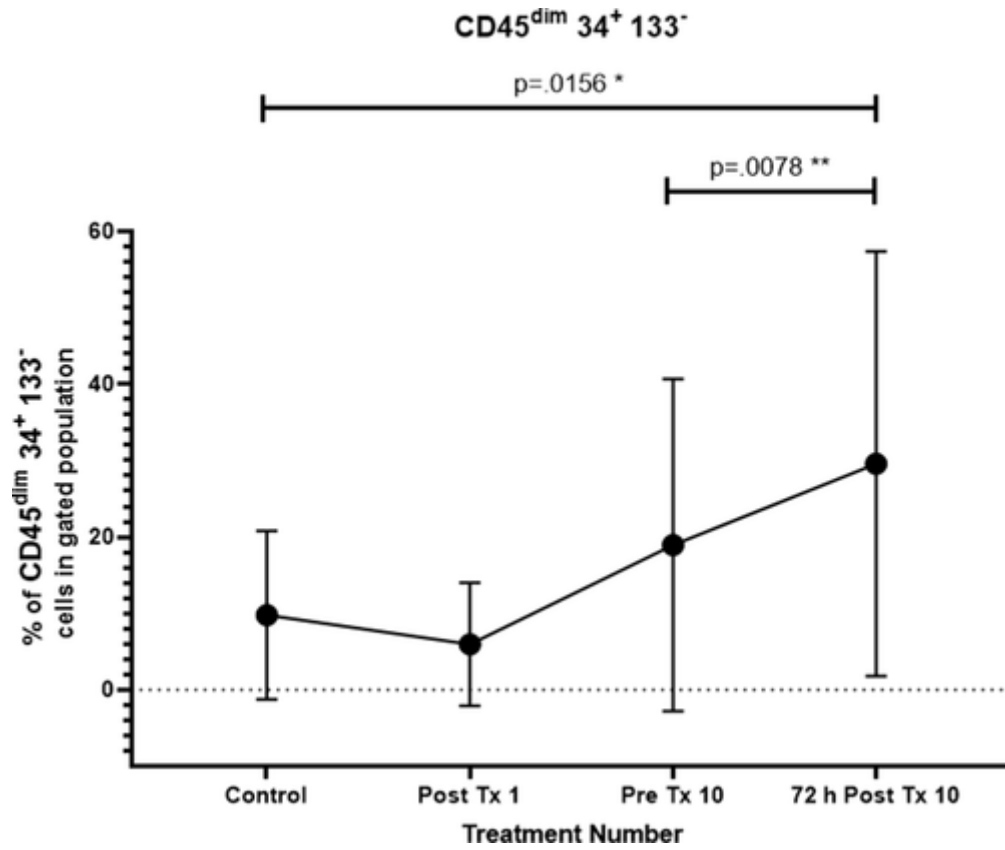
Eight adult subjects were exposed to 1.3 atmospheres absolute (ATA) in a mountain sickness bag daily for 60-minutes, 10-times (M-F) over a 12-day period. Venous blood draws were taken at four time points. (1) Immediately preceding the first treatment (control), (2) Immediately following the first treatment, (3) Prior to the 10<sup>th</sup> treatment, and (4) 72-hours after final treatment. We analyzed blood samples using flow cytometry for changes in the expression of surface markers CD45, CD34 and CD133 and performed a statistical analysis using a Friedman test followed by a paired Wilcoxon signed-rank test.

## Results

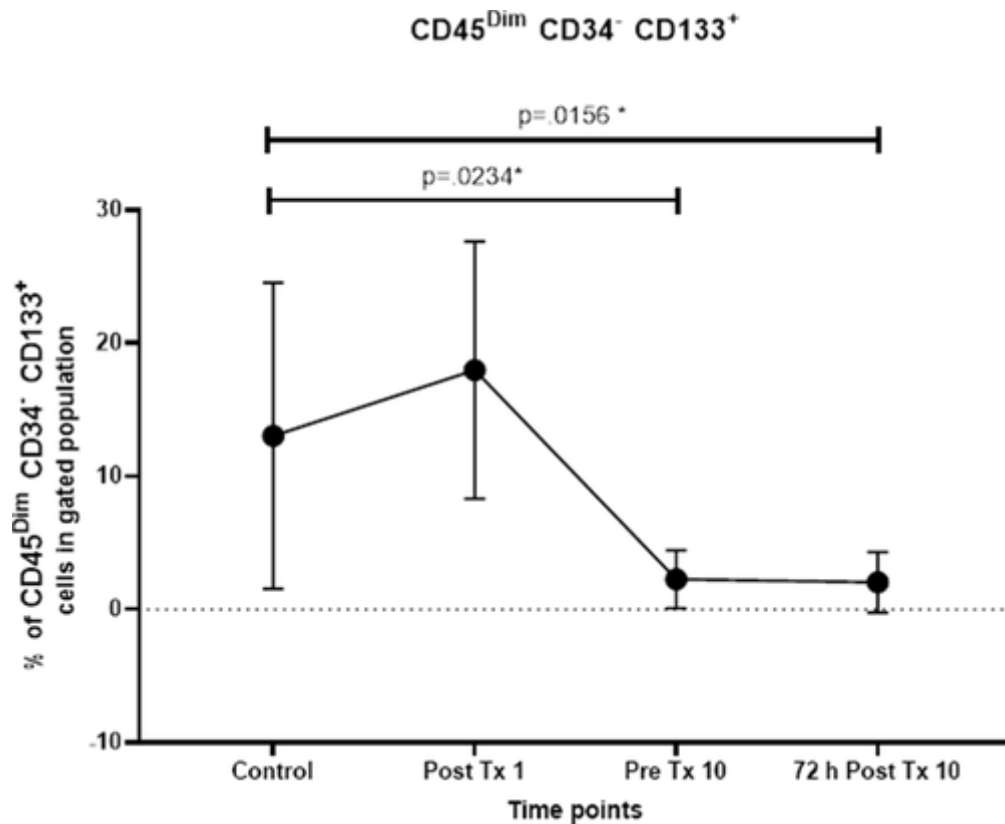
We found a nearly 2 fold increase in the expression of CD45<sup>dim</sup>CD34<sup>+</sup>CD133<sup>-</sup> prior to the 10<sup>th</sup> treatment (9.8% to 18.9% = 194% increase) and a 3 fold increase 72 hours after the 10<sup>th</sup> treatment (9.8% to 29.6% = 303% increase). We also found CD45<sup>dim</sup>CD34<sup>-</sup>CD133<sup>+</sup> decreased by 85% between the control time point and prior to the 10<sup>th</sup> treatment (15% to 2.3% = 85% decrease) and further decreased to a decrease of 84%, 72 hours after the final treatment (15% to 2.0% = 87% decrease).

## Conclusions

We conclude that breathing room air at 1.3 ATA daily for 60 minutes over a 2 week period has significant effects on the mobilization of stem progenitor cells and therefore is physiologically active. These findings suggest that 1.3 ATA hyperbaric air breathed daily is a dose treatment and not a placebo nor a sham. These data suggest a re-evaluation of its use as a placebo control in scientific research is warranted.



CD45<sup>dim</sup>CD34<sup>+</sup>CD133<sup>-</sup>



## CD45dimCD34-CD133+

This is the full abstract presented at the Experimental Biology meeting and is only available in HTML format. There are no additional versions or additional content available for this abstract.



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