Introduction

Retinal organoids are a powerful tool to investigate retinal development, and photoreceptor loss ex vivo. Development of cone photoreceptors occurs in the absence of instructing factors that bias cell fate to another lineage.

Objective/Hypothesis

We aim to: Determine the effect of COCO on photoreceptor cell fate in retinal organoids, and hypothesize that COCO’s blockage of alternate cell fates will lead to a population of cones within our model.

Methods

Fig 2. Culturing of retinal Organoids with cell fate Inducing factors

COCO +/- T/RA

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Fig 1. Proposed photoreceptor cell lineage. Progenitors and factors involved, including COCO, a cone-inducing factor.

Fig 1: Introduction

Fig 2: Methods

Fig 3: Comparison of cone and rod marker gene products across treatments.

Gene product of cone markers Crx and S-opsin (left) increases significantly when COCO is administered in the absence of taurine and retinoic acid. Rod marker Rhodopsin is unaffected, and retinal progenitor gene Chx10 decreases in COCO-only conditions.

Fig 3: Methods

Fig 4: Comparison of primary cone and rod marker gene products in expanded timeline. Long-term COCO leads to overall decrease in cone gene marker product, but has no significant effect on rhodopsin gene product.

Fig 4: Conclusion

Future Directions

We plan to apply our model of treatment to human retinal organoids in service of developing clinical applications of transplant for the alleviation of low vision.

References