SPATIAL CELLULAR COORDINATION IN THE MOUSE RETINA

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INTRODUCTION

Vision starts when light is projected by the optical system of the eye onto the neural retina, which lies at the back of the eye. Surprisingly, the mammalian retina is organized in an inverted cellular order to the one that would be expected intuitively, with the photosensitive photoreceptor cells located last in the light path [1]. Considering this apparent discrepancy, studies recently uncovered that Müller cells, a specialized glia cell type in the retina, act as "cellular optic fibers" that guide light towards the back of the retina, where it can hit photoreceptors [2-3]. While these studies suggest this route mostly benefit cones, a type of photoreceptor responsible for high acuity vision, the structural basis remains unknown to date.

MATERIALS AND METHODS

Using confocal microscopy acquisitions of mouse retina flat mounts, we reconstructed the 3D cellular localization of individual cone and Müller cells in the mouse retina. Analysis of these reconstructions demonstrates that each cone locates proximal to a single Müller cell in the photoreceptor layer, which could be advantageous for their optical alignment and light-sensing.

CONCLUSION

We propose that the cellular organization described here optimizes light delivery to the photosensitive units of the neural retina, thereby contributing to improve light detection and visual processing in mammals.

References

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