VDM PROJECT

- UNITE FOR CLEAR VISION -

Research Proposal 1 of 3

The Origin of Vitreous Floaters & Vision Degrading Myodesopsia (VDM)

VMR Research Foundation

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Project Overview

"Floaters" are a visual phenomenon that results from shadows cast upon the retina (the lining inside the back of the eye acts like a film in a camera) by opacities within the vitreous body (the gel that fills the center of the eye). The origin of these opacities is not clearly understood, but this is important if we are to develop better ways to treat and ultimately prevent vitreous floaters.

The VMR Research Foundation has embarked upon a research collaboration with the Huntington Medical Research Institute (HMRI) in Pasadena, California to learn more about the molecular nature and origin of the vitreous opacities that cause floaters. The research centers on vitreous samples removed at surgery for patients with VDM. These samples will undergo two sets of analyses:

1. Dynamic Light Scattering[1]

This laser-based technology is able to quantify the number of particles in the vitreous samples and the average size of these particles. Samples from patients with VDM will be compared to samples from patients with non-floater disease, primarily macular pucker. It is hypothesized that the VDM group will have more and larger particles than the non-VDM patients, providing molecular insights to the disease of VDM. As previously described,[2] these molecular findings will be correlated with quantitative ultrasonography and measures of contrast sensitivity function, determined in the patients prior to surgery.

2. Detecting Embryonic Remnants

During the first trimester of embryogenesis, the vitreous body is filled with blood vessels that feed the growing eye. During the second trimester these blood vessels regress and disappear. We have studied changes in the proteomic profile during this remarkable phenomenon, with interesting findings.[3] It is hypothesized that people afflicted with vitreous floaters due to myopic vitreopathy,[4] which is the most common cause of floaters in young people, will have evidence of incomplete regression of the fetal hyaloid vasculature. That would explain the linear, sometimes branching configuration of the images seen by floater sufferers, as well as the tubular structures that have the appearance of "glass noodles." To test this hypothesis, we plan to perform assays for fetal vascular antigens in vitreous samples removed at surgery to cure VDM.

Appendix

1. Ansari RR, Dunker S, Suh K, Kitaya N, Sebag J: Quantitative molecular characterization of bovine vitreous & lens with non-invasive dynamic light scattering. Exp Eye Res 73:859-66, 2001

2. Mamou J, Wa CA, Yee KM, Silverman RH, Ketterling JA, Sadun AA, Sebag J: Ultrasound-based quantification of vitreous floaters correlates with contrast sensitivity and quality of life. Invest Ophthalmol Vis Sci 56:1611–1617, 2015 https://doi:10.1167/iovs.14-15414

3. Yee KMP, Feener E, Madigan M, Jackson NJ, Gao BB, Ross Cisneros F, Provis J, Aiello LP, Sadun AA, Sebag J: Proteomic analysis of the embryonic and young human vitreous. Invest Ophthalmol Vis Sci 56(12):7036-42, 2015 https://doi: 10.1167/iovs.15-16809.

4. Nguyen JH, Nguyen-Cuu, Mamou J, Routledge B, Yee KMP, Sebag J: Vitreous structure and visual function in myopic vitreopathy causing Vision Degrading Myodesopsia. Am J Ophthalmol 2020 (in press)

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