

Reply to “Peripapillary hyper-reflective ovoid mass-like structures in astronauts”

There have been a number of eloquently conceived and presented contributions by Dr Wostyn to the concept of an ocular lymphatic system over the years. It was a pleasure to read the present letter detailing how this concept can be extrapolated to astronauts. I agree with the points made by Dr Wostyn and colleagues. The hypothesis can readily be tested because the International Space Station has a spectral domain optical coherence tomography (OCT) device on board similar to the one we used in our study. One point to consider for such an experiment is the influence of hydration on transient, physiological changes in retinal layers, in addition to the proposed change in the pressure gradient at level of the lamina cribrosa. This can readily be done by a fluid challenge [1; 2] . A second point to consider is the investigation of the response to treatment with the carbonic anhydrase inhibitor acetazolamide. It will be informative to learn about the temporal dynamics of retinal layer changes and possible development/resolution of PHOMS. The study design should include longitudinal measurements at baseline on earth, in space, and again after returning back to earth. This will permit us to delineate physiological changes due to the effects of microgravity. Since longitudinal changes may be small it might be helpful to make use of validated OCT quality control criteria to reduce measurement noise [3].

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References

- [1] Balk, L. J.; Sonder, J. M.; Strijbis, E. M. M.; Twisk, J. W. R.; Killestein, J.; Uitdehaag, B. M. J.; Polman, C. H. and Petzold, A. (2012). *The physiological variation of the retinal nerve fiber layer thickness and macular volume in humans as assessed by spectral domain-optical coherence tomography.*, Invest Ophthalmol Vis Sci 53 : 1251-1257.
- [2] Balk, L. J.; Oberwahrenbrock, T.; Uitdehaag, B. M. and Petzold, A. (2014). *Physiological variation of retinal layer thickness is not caused by hydration: A randomised trial.*, Journal of the Neurological Sciences 344 : 88-93.
- [3] Tewarie, P.; Balk, L.; Costello, F.; Green, A.; Martin, R.; Schippling, S. and Petzold, A. (2012). *The OSCAR-IB Consensus Criteria for Retinal OCT Quality Assessment.*, PLoS ONE 7 : e34823.