

## SEMINARIO DE IMÁGENES Y VISIÓN INSTITUTO DE ÓPTICA (CSIC)

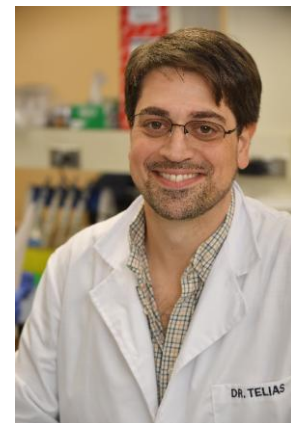
### The role of inner retinal remodeling in vision

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In degenerative blinding diseases, such as retinitis pigmentosa and age-related macular degeneration, the death of the photoreceptors in the outer retina triggers pathophysiological changes in the surviving inner retina, collectively known as remodeling. These changes include abnormal gene expression, spontaneous neuronal hyperactivity, membrane hyperpermeability and ectopic de-novo neurogenesis. Remodeling results in the corruption of receptive fields, breaking down retinal circuits that are essential for high-acuity vision. We have found that chronic hyperactivation of retinoic acid receptor (RAR) in retinal ganglion cells (RGCs) is responsible for many aspects of remodeling in the degenerating mouse retina. Moreover, our data suggests that RAR, a nuclear transcription enhancer, signals through purinergic-activated (P2X7) and cyclic nucleotide-gated (HCN) channels in the cell membrane, exerting cell-specific effects in Off-RGCs. Blockade of RAR or P2X7 reverses remodeling, resulting in reduced hyperactivity, enhanced signal-to-noise ratio and improvement of retinal responses to light initiated by surviving cones. Systemic treatment of late degeneration rd10 mice with the FDA-approved drug disulfiram rescues image-forming vision, opening the possibility of 'anti-remodeling treatments' as a novel approach to improve and restore vision in blinding disorders.

*Dr. Michael (Michel) Telias holds a BSc in Biomedical Sciences and MSc in Medical Neurobiology from the Hebrew University of Jerusalem and a PhD in Cell & Developmental Biology from Tel Aviv University. His PhD work focused on a novel stem-cell based model to investigate neurophysiological abnormalities in Fragile X Syndrome. As a postdoc with Richard Kramer at the University of California Berkeley, he investigated the mechanisms behind spontaneous hyperactivity during retinal remodeling, and its implications for vision. Currently, he is an Assistant Professor at the Flaum Eye Institute & Del Monte Institute for Neuroscience, University of Rochester Medical Center, where his lab is working on understanding neuronal plasticity in retina and brain during progressive blindness, and developing pharmacological targets for clinical applications.*



**Viernes 10 de Febrero de 2023 12:00h**

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**STREAMING:** IO-CSIC youtube channel <https://www.youtube.com/@IO-CSIC/streams>