

Melanopsin's Newly Identified Functions Related to Behavioral Light Adaptation

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Abstract: *The ability of behavior and physiology to adjust to variations in ambient light brightness is essential to survival. These adaptations include the circadian clock's alignment of physiology and behavior to the day-night cycle and the modulation of neuroendocrine activity by light. These non-image-forming (NIF) responses are dependent on ocular light receipt but can work independently of rod and cone photoreceptors, indicating the involvement of novel photoreceptors in the eye. A fascinating entrance point to understanding how mammals adjust to the light environment has been made possible by the discovery of melanopsin in intrinsically photosensitive retinal ganglion cells (ipRGCs) and genetic evidence for its significant role in major NIF responses. Here, we examine the most recent developments in our knowledge of the ipRGCs and melanopsin's newly emerging roles. These discoveries now open up new perspectives on how ambient light affects alertness, sleep, dependent physiologies, potential pharmacological intervention, and lifestyle changes to enhance quality of life.*

Keywords: Melanopsin (OPN4), retinal ganglion cells (RGC), intrinsically photosensitive retinal ganglion cell (ipRGC), retina, non-image forming (NIF) photoresponse, the circadian clock, and opsin

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